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Maintenance manual

for use with the hot air balloon

Type:.....

Model:.....

Serial No.:.....

Registration:.....

Date of Issue:.....

Registered copy No.:.....

Pages identified by „Appr." are approved by the EASA.

Date: 31.08.2009

Original date of approval: 10.10.2001

This balloon is to be preserved in an airworthy condition in compliance with instructions and information contained herein.

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0.1 RECORD OF REVISIONS

Any revision of the present manual, except actual weighing data, must be recorded in the following table and in case of approved Sections endorsed by the responsible airworthiness authority.
The new or amended text in the revised page will be indicated by a black vertical line in the left hand margin, and the Revision No. and the date will be shown on the bottom of the page.

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1	0 2 3 4 6	I, II 8 7, 10 4 21	19.12.2001
2	0 3 4 6	I, II 3 1, 4 4	01.07.2002
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4	0 2 3 6	I, II 8 7, 14 18	20.01.2004
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NOTE:
The pages identified by "Appr." are approved by EASA.

0.3 TABLE OF CONTENTS

SECTION 1

1. General

1. GENERAL

1.1 Introduction

The Maintenance Manual (the manual only hereafter) has been prepared to provide information and instructions for safe operation of a BALÓNY KUBÍČEK spol. s r.o. (formerly Kubíček s.r.o.) or 114 (714) ZO Svazarmu, Aerotechnik, Aerotechnik p.o.s. and Aerotechnik s.r.o. hot-air balloon. This manual contains basic technical and descriptive data of hot-air balloons, scope of work during a flight day, instructions for common care and maintenance of the balloon including annual inspections with determined by both 100 flight hours and 12 calendar months limitations.

1.2 Applicability

The information contained within this Maintenance Manual applies to all BB, BB-S, AEROTECHNIK AB, AB2, AB2a or AB8 type from BALÓNY KUBÍČEK spol. s r.o.

The below information related to the burner applies to the Ignis burners with face seal in the main blast valve. For maintenance of Ignis burner with conical sealing and for older burners use the respectice supplement of this manual.

1.3 Warnings, Cautions and Notes

The following definitions apply to Warnings, Cautions and Notes used in the manual:

WARNING:
Warns that in all probability the non-observation of corresponding instructions and prescribed limits leads to an injury or danger of a fatal accident.

CAUTION:
Warns that the non-observation of corresponding instructions and prescribed limits could lead to an object damage.

NOTE:
Draws the attention to any special item not directly related to safety but which is important or unusual.

1.4 Revisions

This manual is kept up to date by manufacturer revisions consisting of a bulletin - optionally with loose-leaf pages and inclusive of the new list of effective pages, requiring the registered manual holder to amend existing information or add new information.
The continued worthiness of your manual should be observed as follows:
1. Accomplish the change according to bulletin instructions or replace original pages with new/amended ones.
2. Insert up-to-date „List of Effective Pages".
3. Record the change of issue number in the table of „Record of Revisions", section 0.1, page (i).

NOTE:
All changes and appendices of the Maintenance Manual elaborated before the date of the issue stated on the title page are incorporated in this manual by the manufacturer.

1.5 Definitions and Abbreviations of Terms

Natural shaped envelope
The envelope shape is designed so that vertical load tapes will carry the whole basket weight and loading. The textile carries only horizontal acting forces of overpressure.

Special shaped envelope
The envelope shape that does not correspond to any of mentioned standard types. The envelope is produced individually (on request) in form of various eye-catching creatures and imitations.

Operator
The person responsible for the technical condition, proper implementation of all prescribed periodic inspections and repairs (in accordance with procedures approved) carried out by persons with appropriate qualification mandated by the local aviation authority; and for carrying out all tasks assigned by bulletins issued by either the manufacturer or Airworthiness Directives released by the local aviation authority (in compliance with the manufacturer's/operator's country) concerning all balloons he/she operates.

Approved organisation
The producer or organisation commissioned by the relevant national aviation authority to carry out prescribed periodical inspections.

Periodical inspections
The mandatory preventative inspection in a range assigned by the manufacturer and operator's national aviation authority.

Parts/Components
Any instrument, mechanism, equipment, accessory or assembly appointed or used during balloon operating or handling contained herein.

Approved type
The part supplied by the manufacturer or authorised by the local aviation authority.

/ -(slash)
The sign used as expression of various text explanations, e.g. : and, or, and/or.

1.6 Index Plates

Index plates for each balloon type, their photos and placement are inserted in the Flight Manual.

1.7 Feedback from Operators

In case any technical trouble occurs every operator is obligated to report it to KB. This mainly concerns:

- Fire caused by a failure
- Burner defect which resulted to damage to the envelope
- Leaks or accumulation of the fuel in the basket crew space or balloon envelope
- Burner failure
- Failure of either the burner or the balloon control system

For reporting troubles and other technical questions operators are kindly asked to use the email:
technical@kubicekballoons.cz.

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SECTION 2

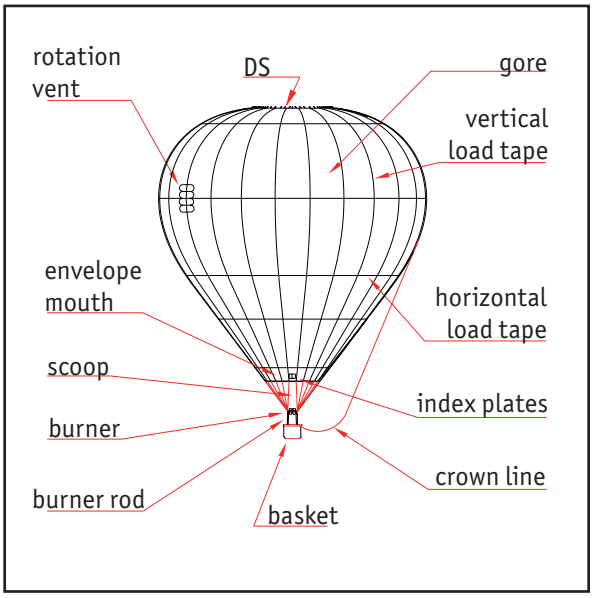
2. Technical Description

2. TECHNICAL DESCRIPTION

2.1 Envelope

An envelope is the major balloon part. The aircraft component is identified by a serial number and a registration. Each envelope should be only accompanied by parts/components meeting requirements specified and approved by the Flight Manual for the pertinent balloon type. All envelopes, except special shaped ones, are of natural shape in the upper part and conical shape application in the lower part. The envelope form is designed so that good flight characteristics, high factors of safety and textile life will be provided.
Basic dimensions and data on envelopes are mentioned in the Flight Manual.

The envelope consists of the main components:
1. Envelope body
2. Deflation System (DS)
3. Envelope equipment



▲ Balloon nomenclature

2.1.1 Envelope body

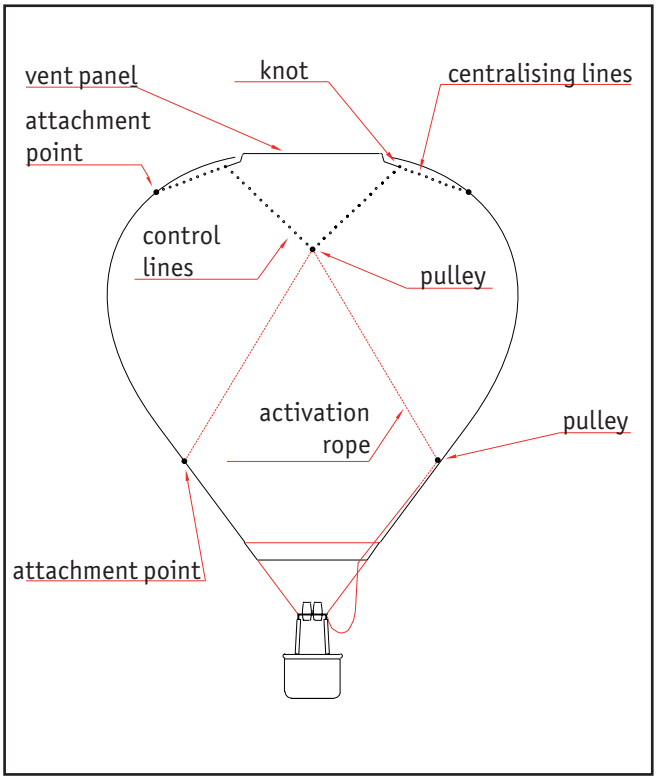
The envelope body is sewed from high tenacity polyester or polyamide base textile, which is coated to make it airtight. The natural envelope shape is designed so that every basket weight and loading will be carried by vertical load tapes (the fabric provides only a horizontal load-carrying element) after envelope hot inflation. A gore is the section of fabric, which lies between two adjacent vertical load tapes. Each gore is constructed from individual panels, i.e. textile parts. The first panel above the mouth of the balloon - the lower part of the envelope body, is made from heat-resistant fabric. Natural shaped envelopes of vertical „N" type and horizontal „O", „Z" type are used as type approved balloons. The ‚N' type has narrow and moderately gibbous gores to give a near-smooth surface with vertical load tapes sewed in their centres. The ‚O' type is characteristic of wider bulbous gores with noticeable curvature and vertical load tapes situated along their edges. A network of vertical and horizontal webbing, called load tapes, encapsulates the envelope body. The vertical load tapes are attached to a crown ring at the top of the balloon. They extend down to the mouth of the envelope where attachment is made to the stainless steel flying wires by a loop. The wires are fixed to the burner frame by means of locking carabiners. Horizontal load tapes appear mostly on every horizontal seam of panel edges to strengthen them and are provided to increase resistance to great rips or tears by large surface dividing. The special shaped envelope body is created from panels in order to reach the required form. Vertical load tapes carry the basket weight and loading. The tapes are sewed towards the envelope body surface or attached to the envelope by shaped load ribs, according to the envelope shape and tape placement on it.

2.1.2 Deflation System (DS)

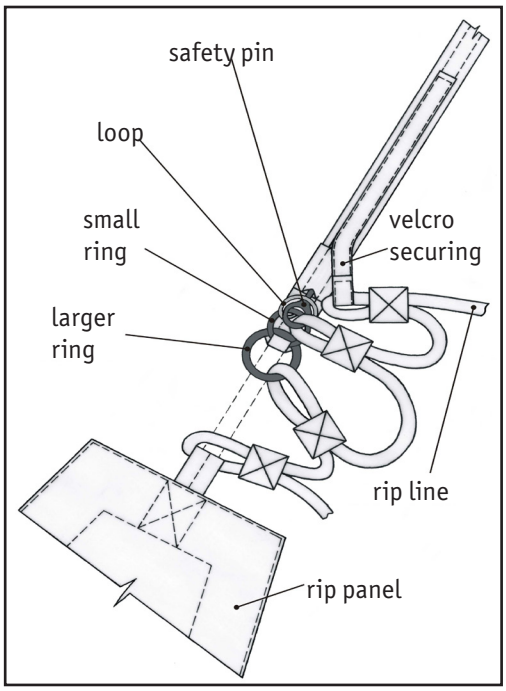
In flight venting of hot air and final envelope deflation is normally achieved using a parachute vent or rip panel, prospectively in combination. The Smart Vent is a rapid deflation system , where one of its functions serves for central venting during landing and final venting.

Parachute

The parachute takes form of a parachute-style disc panel inside the top of the balloon, sealing a circular opening in the top of the envelope. The lateral position of the parachute is controlled by centralising lines, which join its edge to the inside surface of the balloon. Companion velcro tabs are sewed both at the edge of vent hole and parachute panels for the purpose of sealing them together during inflating. After envelope inflation, the parachute is held in position by the internal overpressure and closes tightly the envelope. The parachute is operated by pulling on a red activation rope in the basket transferring the vertical downwards force to a pulley, which is at the confluence point of a number of control lines attached to the edge of the parachute panel. The parachute resets itself to the former closing position after activation rope releasing.



▲ Parachute control



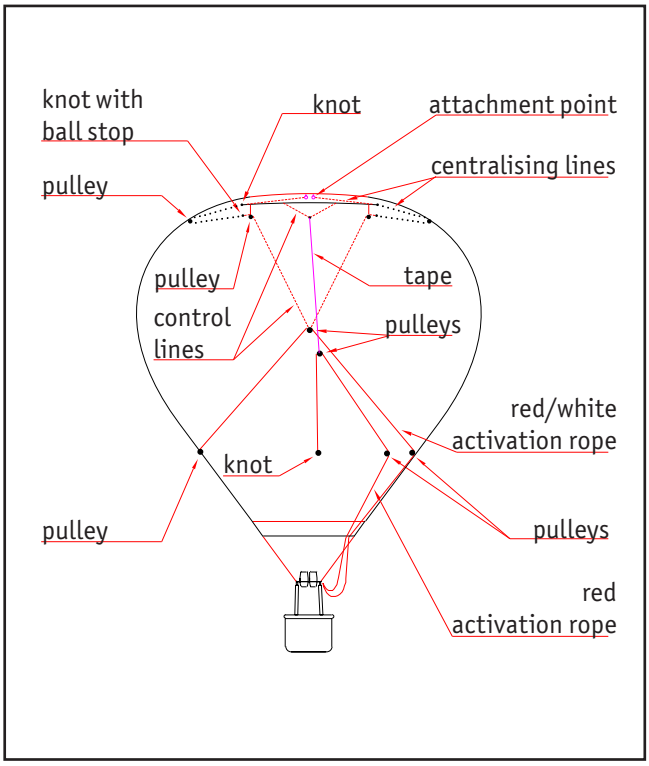
▲ Securing of the rip panel

Rip panel

The velcro rip panel is a partially removing panel of vent opening to permit faster deflation, held in place around part of its edge by velcro. One or more riplocks with velcro securing, in accordance with the envelope type, are fitted around the panel edge to prevent the panel from inadvertently opening the velcro tapes. The rip panel shape matches up with the vent opening. Pulling the rip line first causes a number of riplocks to break, which warns the pilot of the nature of this panel, then causes the panel velcro joint to separate. The rip panel will not reseal itself once the rip line has been pulled, thus revealing a large opening for the escape of hot air.

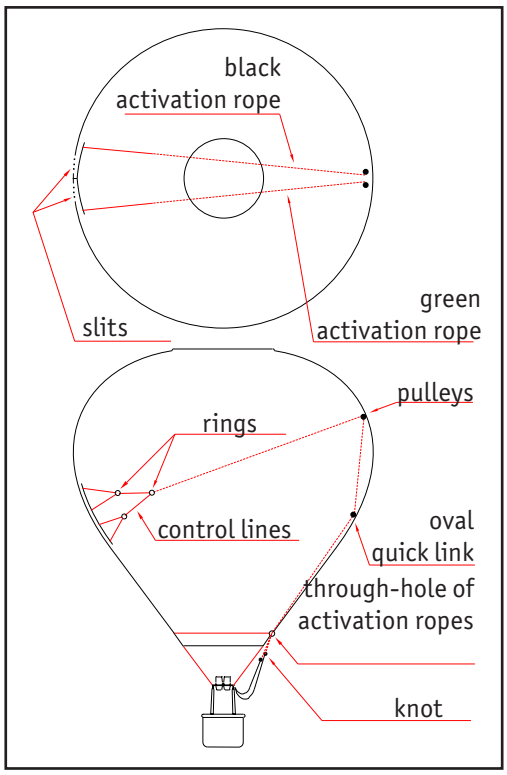
Smart Vent

The Smart Vent is a vent hole closing of two different modes of hot air escaping. The Smart Vent deflation system is similar in appearance and use to a parachute vent followed up by further control lines and an activation rope so that the centre of the panel can be pulled down into the balloon and reset again. The rigging of the parachute vent consists of centralising lines to keep the panel in place horizontally and going to and through pulleys on the inside surface of the balloon, then back to the vent panel. A stop ball is fitted there on the centralising lines, behalf which the lines have free way through pulleys and become parachute control lines. When the red/white activation rope is pulled, the stop ball comes up against the pulley on the underside of the vent, and stops all horizontal forces and so the vent panel can be opened routinely. This in effect changes the rigging into a standard parachute style and in flight venting is the same as a normal parachute.



▲ Smart Vent control

Pulling on the red activation rope, connected by means of a tape to the centre of the vent panel underside, gathers the vent panel down into a column in the centre of the opening for a rapid deflation. The centralising lines are rigged so that the length between the vent edges and attachment envelope point is variable - the edges of the vent move towards the crown ring and centralising lines lengthen to allow this to happen. Then pulling the red/white activation rope spreads the vent panel to the resetting position.

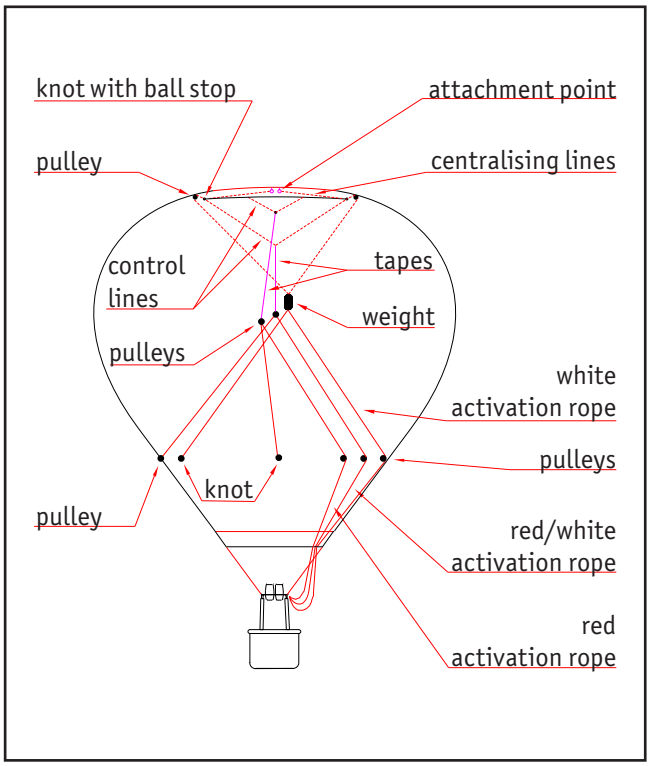


▲ Control of rotation vent

Rotation vent

The rotation vent is located around the envelope equator and consists of a strengthened break in the fabric and a tightly sewed overlap panel with ribs. When the arrangement activated, slits open sending out air tangentially and the effect causes the necessary force for required envelope rotation. Operation is by rotation vent activation ropes (once the force is released from the rope, the internal air pressure causes the vents to reseal).

Light Vent
The Light Vent is a vent hole closing similar to a Smart Vent. Light Vent differs from Smart Vent in that it has three activation ropes and that the parachute centralising lines go through pulleys on the inside surface of the envelope and then to a weight suspended under the parachute vent. This weight reduces the force needed on the white rope to close the vent panel. Pulling on the red/white vent rope curls the edge of the vent panel down whilst the centre of the panel remains in place. When this rope is released the vent panel reseals. Pulling the red rip rope gathers the vent panel into a column in the centre of the opening. The ripping action can be reversed by pulling on the white reset rope.



CAUTION:
For operating the Smart Vent, the white activation rope instead of red/white one can be used regarding the BB balloons up to the including serial No. 177.
For operating the rotation vent, the white and black activation rope can be used regarding the BB balloons up to the including serial No. 177.
For operating the rotation vent, the yellow and green activation ropes can be used regarding the balloons of the AB2, AB2a, AB8, and AEROTECHNIK AB types.

2.1.3 Envelope equipment

Crown line
The crown line is a rope or tape attached to the crown ring. The crown line secures the envelope position during inflation and landing.

Scoop
The scoop is made of a fabric with very high resistance to heat in the form of a polygon or circle, suspended in hook-up loops at the bottom of the envelope mouth. The scoop protects the burner flame against wind effects and keeps the sufficient pressure in the envelope under windy conditions during inflation.

Envelope bag
The envelope transport bag is sewed in the form of a pouch and serves for the envelope storage and transporting.

2.2 Basket

The basket serves with the aim of crew/load, fuel cylinders and equipment transporting, to protect people during a flight and especially while landing. Flexible rods fit into basket and burner frame sockets to support the overhead burner frame system.
Basic descriptive data of each basket size are tabulated in the Flight Manual.

The basket consists of the main components:
1. Basket body
2. Basket load cables
3. Burner rods
4. Basket equipment

2.2.1 Basket body

Conventional baskets are of a traditional wickerwork construction, built on a marine grade plywood floor. The floor is reinforced underneath by the addition of wooden or tubular lower frame and hardwood runners, to prevent damage on basket cables. The wickerwork is woven between tubular U-frames concerning smaller-sized baskets. These frames provide strength and stability to wickerwork and protection for steel load cables. The structural load is taken by stainless or steel cables forming a continuous sling around the basket. Flexible rods fit into sleeved sockets at the basket rim and burner frame to support the overhead frame system. On the basket walls there are holes providing passages for strapping in fuel cylinders, and footsteps are provided for easy entry into the basket. The top basket rim is strengthened by the upper stainless steel tubes and glass-reinforced plastic poles. The whole top basket rim is covered with dense foam and then trimmed with suede or leather. The bottom edge is covered with rawhide, which protects the basket from damage during landing and transit. Along the basket top rim underneath, there are internal strong rope handles for use by passengers during landing. Within the lower weave of the basket are included also rope carrying handles externally, which facilitate basket manipulation.

The K13S basket have a multilayer aramid - carbon composite sandwich floor instead of plywood. Both upper and lower tube frames are made of aluminium alloy.

2.2.2 Basket load cables

The load cables are highly strong steel cables with a wire core. Their eyelet endings are squeezed by means of a ferrule and thimble or spliced.

2.2.3 Burner rods

Support rods are either provided as separate flexible rods made of alkaline polyamide or as tilt-mounted frames, both inserted into steel basket sockets. The rods, basket load cables and burner hoses are covered with padded suede covers, to prevent damage or people injury during landing.

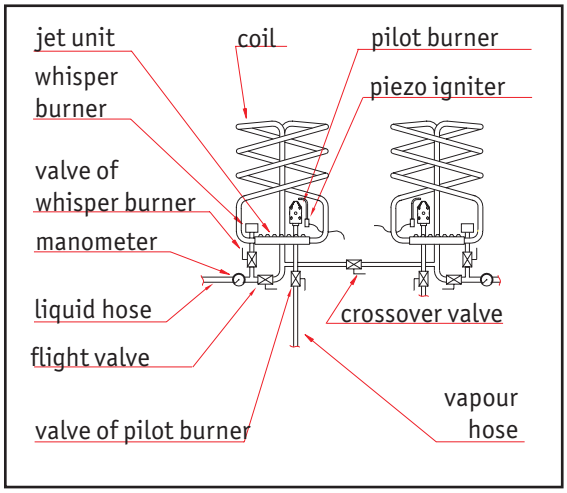
2.2.4 Prescribed basket equipment:

1. The dropline, rolled up in a textile casing at an accessible place above the basket floor, is fixed by a carabiner to the basket wall.
2. The (powder) fire extinguisher of min. 1 kg capacity - according to the basket size.
3. Heat-resistant cloth
4. First aid kit.

▲ Basket equipment

2.3 Burner

The high-pressure atmospheric diffusion burner provides heating and directing air into a hot air balloon envelope, which is from the safety point of view backed up by the separately controlled whisper burner. These both in company with the pilot burner comprise the burner unit. The burner is assembled from one or multiple burner units and the burner frame.



▲ Nomenclature of burner control

The burner consists of the major parts:

1. Main flight burner
2. Pilot burner
3. Whisper burner/Liquid fire
4. Burner frame

2.3.1 Main flight burner

The main flight burner operates with the liquid phase of fuel gas supplied by a main high-pressure armoured liquid hose through a ball valve commonly referred to as the flight (blast) valve (FV) towards a vaporising coil, where the liquid propane is vaporised prior to combustion. In case of transfer crossover valve (CV) opening, the liquid fuel is fed from fuel cylinders into the second flight burner coil as well. Then already in the gas form it flows across jets to the combustion room to be diffusely mixed with the ambient air and burned. The main flight burner ignition is achieved via the pilot burner. The protection against flame and condensate effects is kept by means of cans forming also the burner body.

2.3.2. Pilot burner (PB)

The pilot burner is a low-pressure burner that uses gas vapour. The vapour is either taken from a fuel cylinder by a vapour hose, passing through a closeable valve/ball cock to the pilot light jet or it is taken from the liquid supply in the burner block, through the pressure reducer (pressure unit) to the pilot light jet. On burners which have vapour hoses the pressure, and therefore the height of the pilot light flame, may be adjusted by using the regulator on the fuel cylinder. The pilot light burner is lit by means of a piezo igniter, match or other means of ignition.

2.3.3 Whisper burner (WB)

The whisper burner feeds liquid fuel through a shutoff valve/cock directly to a multi-hole jet bypassing the coil, via the same supply liquid hose utilised for the main burner. It produces a stream of liquid propane injected into the combustion room. The combustion efficiency and burner power output are lower, but on the other hand, thus producing less noise approximately by one-half than the main burner. The sound spectrum is in the range of low frequencies better accepted by people or animals than high ones. In case of the main flight burner malfunction, the whisper burner serves as a backup burner at the same time.

2.3.4 Burner frame

The burner frame is a solid stainless tube construction carrying horizontal forces of load flying wires. The burner units are swivel-mounted in the inner burner frame or joints, which in its turn is swivel-mounted in the outer frame. This provides a 2-axis gimballed system allowing circular turns of the burner. At each corner the burner frame has sleeved sockets to accept the support rods or upper tilt-mounted basket frames.

2.3.5 Burner descriptive data

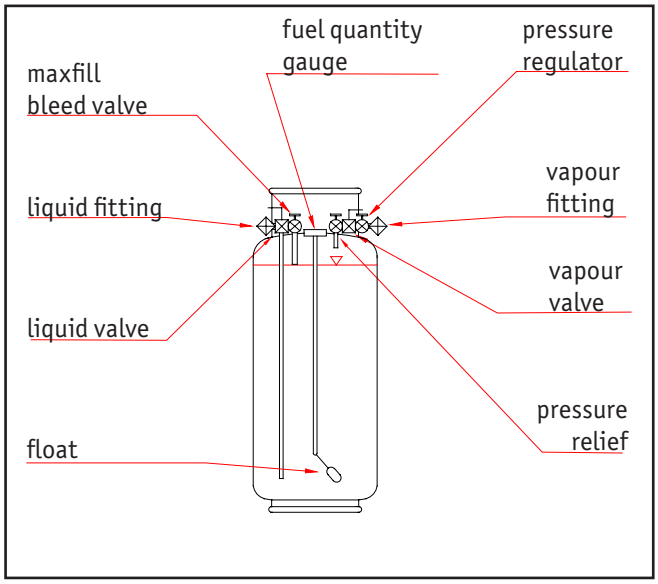
Type	Power output under 6 bar [MW]	Distance between the burner frame attachment points for the envelope [mm]	Connecting couplings of the liquid fuel phase	Connecting couplings of the vapour fuel phase	Fuel
KOMET DUO (K10-K22)	2 x 3,4 (2 x 3,6*)	720 x 600	REGO 7141F, TEMA 3800, ČSN	DYNAQUIP D3, TEMA 1300 LORCH, ČSN with pressure regulator	Liquefied propane or commerial mixture of propane and butane
KOMET DUO (K25P)		1250 x 835			
IGNIS 2 units (K10-K22)	2 x 3,7	720 x 600			
IGNIS 2 units (K25P)	2 x 3,7	1250 x 835			
KOMET TRIO (K25P-K32T)	3 x 3,6	1155 x 1035			
KOMET TRIO (K40Y)		1550 x 990			
IGNIS 3 units (K25P-K32T)	3 x 3,7	1155 x 1035			
IGNIS 3 units (K40Y)		1550 x 990			

* Burners from serial number 105

NOTE:
Concerning the fuel hoses, Rego 7141F and Dynaquip D3 couplings are fitted as standard.

2.4 Fuel Cylinders

The liquefied gas - propane fuel, supplied for the burner operation is stored and transported within pressurised fuel cylinders for in-flight use, which all have a liquid supply via a major liquid valve/cock (standard type), and some also a vapour supply by a vapour valve/ cock (master type). A pressure relief /safety blow-off valve and a maxfill bleed valve serve for the purpose of checking by volume. All cylinders have a float fuel quantity gauge. The master cylinders are equipped with a pressure regulator. All control elements are positioned in a way to be protected by a cylinder collar.



▲ Nomenclature of (master) fuel cylinder

NOTE:
The pressure regulator is a component of the connecting vapour coupling as far as relating to the S23 cylinders.

2.4.1 Cylinder descriptive data

Descriptive data for fuel cylinders is included in the Flight Manual.

2.5 Balloon equipment

2.5.1 Prescribed balloon equipment:

1. Altimeter
2. Variometer
3. Fuel quantity gauge on one major cylinder at least
4. Melting link
5. Fire-extinguisher
6. Fireproof fabrics (heat-resistant cloth)

All balloon equipment should be of the approved type.
Operating, Maintenance, repairs and preventative inspections are to be carried out in accordance with the relevant sections in this manual.

SECTION 3

3. Inspections and Operating Periods

3. INSPECTIONS AND OPERATING PERIODS

3.1 General

The qualification on the balloon continued airworthiness is to keep to prescribed periodical inspections. Inspections of the balloon parts (e.g. baskets, burners) produced by another manufacturer have to be conducted in accordance with the relevant producer's instructions.

Type of Inspection	Operating Period	Concerning
Annual inspection	100 flight hours or 12 calendat mounths (1), (2)	envelope, basket, burner, fuel cylinders, equipment

3.2 Periodical Inspections

(1) At operating period determination by both flight hours and calendar months limitation, the service period is applied that starts first. The 100-hour time limit can be exceeded up to max 5 hours, under condition that the breach is used for the flight completing started before the 100-hour limit reaching. The operating period, exceeding the 100-hour interval, must be included as hours flown relating to the next 100-hour inspection.

(2) At operating period determination with calendar month limitations, the revision has to be made on the balloon or its parts till the last day for the month, in which the last inspection was carried out after the defined limit expiration.

3.3 Qualification

Inspections must be carried out by an organisation, which is approved by the relevant national airworthiness authority. Inspectors dealing with inspections/repairs must be trained.

3.4 Annual Inspection

3.4.1 Documentation preliminaries

1. Check completeness of the service-technical documentation. Verify validity of each certification, as well as the documentation on maintenance and insurance. Inspect the Flight Manual and Maintenance Manual for conformity with the particular balloon, their comprehensiveness and complete records of revisions.

2. Check serial numbers of all the balloon components listed in the logbook against those to be inspected in accordance with index plates and pertinent certificates.

3. Inspect the logbook management - the number of flying hours, flights and modifications performed since the last inspection should be correct and up to date. Check the logbook for repairs, inspections or/and maintenance entries; implementation of issued bulletins and Airworthiness Directives (AD).

3.4.2 Envelope check

1. Supervise the fabric, on the spread or cold inflated envelope, for damage and performed modifications and repairs being in compliance with the information contained herein. Concentrate on the DS and equator fabric during checking.

CAUTION:
Attached banners or patches deforming the envelope shape are inadmissible.

2. Check envelope fabric strength by a grab test, or alternatively the section of the fabric may be removed from the envelope and submitted to a textile-testing laboratory by a tearing test in the horizontal direction (i.e. perpendicularly to the vertical load tapes). The requirement of the min. strength is mentioned in Section 4.5.1 contained in the manual. Description of the test carrying out is inserted in Section 7.2. The test should be conducted for each fabric colour on the panels at about 2-meter distance above the rim of the DS vent aperture, min. at three positions and one time over a seam at least. Perform the test concerning all fabric types used at the load-bearing envelope part if there are more envelope fabric patterns. In adition to the tests listed above BB20 GP envelopes are to be tested at a minimum of three positions in the 4 th and 5 th panels (6-7.5 m above the envelope mouth), BB20XR envelopes at a minimum of three posisions in the first row of panels above the 5 th horizontal load tape. Check the fabric for porosity by your mouth trying to blow through it. If the porosity of the fabric is high, a flight test should be considered by the inspector, to assess the fuel consumption and balloon controllability (see Section 7.5), or the section of the fabric should be sent to the envelope manufacturer for reviewing. The fabric of the rotation vent needs to be grab tested as well.

WARNING:
In case of not observing the requirement, the in flight tearing or ripping of the envelope can occur.

3. Check all load vertical load tapes for security of stitching along the whole length. Pay particular attention to the load tape edges for their potential wear or fraying, and especially around the envelope crown where load tape loops of turnbacks could be abraded or damaged by the crown line. The horizontal load tapes should be free of damage along the whole length.
4. Check the figure-8 crown ring for damage, especially for cracks, splits or extensive corrosion. The crown line should be free of damage.
5. The melting link attached to the temperature warning streamer in position, must be of prescribed type and undamaged. In case of the tempilabel fitting, inspect its condition and when the solder link has been melted during exceeding the max admissible temperature (124 ^{0}C), always record the fact and maximum temperature reached in the log book.
6. Inspect the DS textile for no damage. Pay particular attention to the textile edgings. Check the condition of velcro tabs and their proper function. If there is a rip panel, aim your observation to its velcro tapes, riplocks and

securing. Ensure the DS is functional. Test the system function, sealing and necessary activation force.

7. Supervise completeness and condition of the whole centralising lines of the DS. Inspect them for wear, fraying, stiffness or further damage indicating overheating. Check the centralising lines for security of attachment at both ends (correct loop stitching of the lines and safety knots), and improper stretching, shrinking or tangling. Concerning the SV system, inspect ball stop attachment on the centralising lines and sufficient slack of the lines at pulleys.

WARNING:
Frayed, ruptured or missing the centralising lines, or riplocks and rip panel velcro malfunction could cause uncontrolled air leakage out of the envelope while airborne.

8. Check the DS control lines for completeness and no damage, their position and attachment towards pulleys of activation ropes. Damaged parts have to be replaced with the new ones. The knots serve for repairs or minor damage of the control lines can be tolerated if it is ensured that the pulleys/loops are free and running smoothly. Concerning the Lite Vent system inspect the condition and attachment of the weight.
9. Supervise the DS activation ropes for completeness and no damage along the whole length. Pay special attention to the length measuring, the activation ropes should not be worn or frayed from pulley running or heating - check that by the palpation. Inspect the ropes for correctness of colours (according to the DS type) and kinks. Concentrate on the rope connection to the burner frame.
10. Inspect the whole pulleys of the Deflation System to ensure that they are free and running and not worn (no loosened screw joints or seized bearings). Check non-metallic components of pulleys for wear by activation ropes. Pay particular attention to potential damage by flames/ropes and the proper security and attachment to the envelope. Supervise that the loops providing the pulleys fixing are in a good condition and also for security of their stitching to the envelope.
11. Check textile of the rotation vent and ambient localities. Inspect control lines and activation ropes of the rotation vent along the whole length for completeness and no fraying, wear or burn damage. Supervise pulleys and their attachment to the envelope. Test the rotation vent function, especially its sealing.
12. Supervise the load tapes near by the envelope mouth for no burn damage or fraying. Concentrate on the load tape loops that connect the flying wires to the envelope, whether they are not worn or heat damaged. Ensure that the load tapes with stitching are not stiffened by overheating in the first three-meter distance from the envelope mouth, their threads have no burn damage at the connections and the load tapes themselves have no edge damage due to repair of the lower panels, which are often replaced. Inspect the horizontal load tape around the envelope mouth for no damage. Mildly burned places can be tolerated.
13. Inspect the flying wires and envelope carabiners. These should be checked for distortion or damage and that thimbles and ferrules are intact (a slack thimble ordinarily signals a loose wire at a ferrule). Check wires for corrosion and mechanical damage stages (cracking or breaking partially). In case of the number of broken wires not higher than 8 per 1-meter length of a flying wire, this matter can be tolerated under the condition that any strand is not totally separated and there is no doubt about the flying wire strength. Supervise flying wires for any signs of the heat damage reducing their elasticity. Carabiners should be free of fraying and distortion and the screw gate should operate freely. Concerning the balloons up to the 1600 - m^3 volume, dural carabiners of Walter-M type can be used. Inspect the carabiners for no scratches deeper than 1 mm. In the event that any damage, as described above, is detected, then the carabiners must be replaced promptly.

3.4.3 Basket check

1. Steel basket load cables should be inspected for damage along the whole free length. Concentrate on the locations of the basket cable leaving the dural/stainless frame in the bottom and on the basket rim. Check cable wires for corrosion and mechanical damage (cracking or breaking partially) from the cable banding during the basket assembly and disassembly. In case of the number of broken wires not higher than 8 per 1-meter length of a basket cable, the matter can be tolerated under the condition that any strand is not totally separated and there is no doubt of the cable strength. Furthermore, review the condition and operation of load-bearing carabiners.

2. For situations of basket cable squeezing, check that there is no damage to thimbles or ferrules (a slack thimble ordinarily signals a loose basket cable at a ferrule). Applying to baskets with cable splicing, remove leather covers and inspect the splices.

3. Check strapping for cylinder attachment and locations of their openings providing passages on the basket walls. The passages should be safe enough for strapping in fuel cylinders, especially during landing.

4. Inspect the condition and firmness of the plywood floor, runners / rawhide covers protecting steel basket cables underneath the basket. Pay particularly attention to any cracks present on the underside of the floor, at the connection of the floor with the basket body and to any worn, cracked or slotted locations of protective runners. Ensure that no steel basket cable is uncovered.

5. Supervise the basket body, especially for no unsafe sharp edges with imperfectly covering or dangerous holes in the wickerwork which would cause danger to occupants and through which any object carried by the basket could drop out. Inspect the basket that the internal rope handles arc strong and safe enough to be used by passengers during landing. Inspect upper and lower basket frames. Check the stiffness of upper frame by trying to deform it and general condition of both frames visually without removing any part of the basket.

6. Check the condition of the drop line, its accessibility, compactness and attachment to the basket.

7. Check the type of the pertinent fire extinguisher (filling capacity should be min. of 1 kg, according to the basket size). Inspect the fire extinguisher by weighing, or in accordance with the instructions for pressure gauge for full filling. Ensure that the last revision of the fire extinguisher has been valid so far. The date of the revision should not be older than prescribed by the producer.

8. The EASA Form One should be completed and distributed as required.

3.4.4 Ignis burner check

The below information applies to Ignis burners. For maintenance inspections of older burners use the respective supplement of this manual.

1. Check the burner for completeness thoroughly.

2. Inspect (without overpressure) the manometers/pressure gauges, their general condition, protective glass lens fixing, and condition and legibility of the dial with pointer, which must indicate/ read zero under the standstill condition/with no fuel pressure applied.

3. Supervise fuel hoses are of the correct age from data mentioned on hose squeezed endings (see Section 4.5.1). Use only the original hoses approved by the burner manufacturer in case of replacing. Inspect the physical condition of hoses thoroughly. Pay special attention to the liquid ones. Observe outer covers of hoses along their entire length to check for no mechanical damage or worn places. Concentrate on bent locations and hose end fittings, if they are not cracked/slack at the squeezed endings. If there are any doubts about the hose perfect condition, replace it with a new one (use only the original hoses produced by the burner manufacturer). During deciding this, please keep special attention and severity. Minor surface damage to fuel vapour hoses (the hoses supplied the pilot burner) is not critical and can be permitted.

4. Check connecting couplings of both the liquid and vapour phases. Inspect the strength and tightness of the hose to couplings connection. Inspect the condition of contact surfaces and also entering tapered cones for no mechanical damage. Regarding the Rego couplings / connectors equipped with a self-closing valve, review its function. Check colour marking of the couplings (if used).

5. Check welds and surface of the vapouriser and burner frame, especially at position of bends on the upper tube edge of the coil and at position of a tube contact with steel connecting band. If you find any damage of the coil tube edge, ask the producer or authorised service for carrying out strength test of the vaporizer (a pressure test). The test procedure see section 7.4.
Check welds and surface of the frame, cenral gimbal suspension block and the rod inserting sockets on both the burner and basket frame.

6. Check all threaded joints and the condition of retaining safety rings. Reject any safety ring showing a loosening / slack or strain, and replace it with a new one. Check pins and safety rings of the frame flexible ending.
Check condition and wear of the corner rubber blocks (if the frame is fitted with them). Damage of a rubber block does not affect working order of the frame, but we recommend to replace it with a new one, you will reduce wear and damage risk of all corner flexible pivot system.

7. Check the FV function and conrollability. Inspect correct working of the vent by several opening and closing the FV lever. While the valve is completely closed, free movement of the control lever must be 2-5mm(measured on the lever end in vertical direction). Connect the burner to the fuel cylinder and ignite several times.
Check capacity and shape of the flame. Check tightness of the supplying tube inlet to the couplings and tightness around the tubes. Check that there is no burning under the jet array because of fuel leakage under jets or around connecting of the supplying tube. Leaky and slack jets should be tightened and sealed by a professional service.
Check that the FV completely closes the fuel inlet and there is no abnormally long afterburning or incomplete shuting off the flame. (The FV can be shut improperly because of worn sealing on the vent seat or the age of the spring).
Check the WB function in the same way.

8. Supervise the function of the piezo igniter and also the distance setting of ignition electrode contact. Conduct the test for ingnition and stability of PB heating (ignite and shut off PB at least three times). Inspect that the flame is not easy to shut off.

9. EASA Form One should be completed and distributed as requiered.

3.4.5 Fuel cylinder check

3.4.5.1 General

If there is any doubt whether damage or a defect found on a cylinder during an inspection is acceptable then KB or the manufacturer of the cylinder must be contacted and advice sought.

If a cylinder is unsuitable for further service as part of a hot air balloon then this means that it is also unsuitable for the safe storage of liquefied gases separate from the balloon.

If a cylinder is passed as acceptable as part of a hot air balloon this does not exempt the owner or operator from any other national or international regulations or legal obligations regarding propane cylinders in storage or transit.

3.4.5.2 Annual / 100 hr inspection

The inspection is to be carried out on a cylinder containing the fuel so that a correct function and leakproofness can be verified.

Validity of the Last Inspection
Verify the date of the last 10-year inspection, the date is engraved on the data plate.

Cylinder Body
Remove the outer jacket and protective padding.

Thorouhtly inspect the entire outer surface of the cylinder. Pay attention to possible dents, scratches, bulges and corrosion. The dents may not be deeper than 25% of their diameter and without any sharp edges. The eventual minor scratches may not be deeper than 0.2 mm (0.008“) No sharp notches are allowed. No bulges are allowed. An eventual minor corrosion can be removed by polishing the surface using fine sandpaper.

Remove the rubber handhold from the upper rim annular tube. Inspect both upper and lower rims and annular tubes. Minor deformation is acceptable as long as the cylinder can stand stably, easy access and operation of upper fittings is not limited or no intrusion od rims to the upper or lower bottom is present.

WARNING:
The lower surface also must not get to contact with the surface!

Carefully inspect all welds along their entire length. No damage is acceptable.

Valves and Fittings
Carefully inspect all valves and fittings. No damage or modification is allowed.

Pressure reducer: Make sure the regulator is correctly tightened, eventually tighten its union nut if necessary.

Take Off Bosses
Inspect all couplings for damage and presence of dirt. No part of any fitting may protrude above the upper protecting ring.

Liquid phase take-off: Open the handle by 45° and verify tightness. If a Rego coupling is fitted, inspect its rubber seals for damage, wear or impurities. If necessary, replace them. (Face seal 3300.00, Rear seal 3305.00)

Tightness of joints
Apply a leak detector on all threaded joints, connectors, seals, valves and welds around bosses. A possible leak is indicated by bubbles.

Fuel Contents Gauge
Inspect the glass and needle for damage and verify readability of the dial. Check a correct function of the inner mechanism by rolling and leaning the cylinder - the needle should move.

Functional Check
Connect a vapour hose, turn the vapour valve on, light the pilot flame and, whilst the vapour is flowing check that there is no leak from the vapour hose quick release using a leak detector. Turn the vapour valve on the cylinder off and make sure that the flame goes out and the flow of vapour stops.

Liquid Take Off: Remove the dust cover if one is fitted. Open the cylinder valve fully. Check that there is no flow of liquid from the valve. Close the valve. Vent the liquid connector by depressing the central spigot with a plastic rod. Attach a burner hose to the cylinder valve. Check that all the burner valves are closed and then open the tank valve and using the leak detector check that there are no leaks from the hose to tank connection, from the valve operating mechanism or the valve stem where it enters the cylinder. Operate the burner for at least 15 seconds and check that the burner pressure remains constant. Turn the cylinder valve off and operate the burner until no more gas flows – this should take just a few seconds. Disconnect the burner hose.

Maxfill Valve: Check for leaks around the base of the valve and the valve outlet. Open and close the valve to check that it operates correctly.

Vapour Take Off (if fitted): Without a vapour hose connected open the vapour valve and check that no gas comes out. With the valve open check that there are no leaks from the joint between the regulator and the boss or around the base of the boss.

3.4.5.3 10-year Inspection

Precautions
The 10-year inspection is consists of the annual / 100 hr inspection followed by more detailed inspection procedured. After the annual / 100 hr inspection is completed, the cylinder must be carefully emptied from the fuel according to the procedure specified in section 6.7.2 below.

Annual / 100 hr Inspection
Follow the procedure of the annual/100 hr inspection as decribed above

Vapour Take-off check Valve
Verify the correct function of the check valve at the Rego or Tema coupling. On the Rego coupling replace both rubber seals (Face seal 3300.00, Rear seal 3305.00). The Tema coupling has no replaceable parts.

Pressurize the cylinder with the air to 7 bar (100 psi) and verify correct sealing and function of the check valve. In case the valve is defective, the entire coupling is to be replaced (Rego coupling *180.00*, Tema coupling *2710.00*). Secure the thread by Loctite 270.

Removal and Maintenance of Fittings
Remove the fuel contents gauge and inspect its correct function and condition of the float and gear mechanism. Verify the mechanism moves frelly in the entire range.

Remove the pressure relief valve and install a new one. The pressure relief valve is either a stand-alone item (*3466*,00 on Standard cylinders) incorporated in the vapour valve (*3188*, on Master cylinders).

If fitted, remove the vapour phase take-off and and install the blindening plug instead.

Liquid phase take-off: Dismantle the ball cock assembly and replace the PTFE set of seal (*3186.01)*, the new seals are to be lubricated with PTFE Carbaflo BBL-50 (*2901.00*). Inspect all parts and replace if any damage or wear is found.

Hydraulic pressure test
Fill the cylinder through the fuel contents gauge hole with water in its maximum possible volume. Then install blindening plug outo the fuel contents hole.

Using a flexible measuring tape measure the circumference of the cylinder body in a half of its height. Connect the nitrogen pressurization to the liquid take-off fitting, open the valve and pressurize the cylinder to 30 bar (435 psi). Check all fittings for leakage and repeat measuring of the circumference. Note and compare both distances. The increment of circumference during pressuriation may not be greater than 0.5% of the circumference measured prior to pressurization. Release the pressure, disconnect nitrogen hose and remove both blindening plugs. Empty the cylinder and blow the inner space dry with hot air.

Inspect the inside of the cylinder using a suitable light for dirt and corrosion.

Re-installation of Fittings
Fuel contants gauge: Use a new gasket (*3085.00*) and re-install the contents gauge, secure the threads with Loctite 243.

Vapour phase valve with pressure relief valve: No maintenance is required, the new valve with pressure relief valve is to be installed. The new valve may not be older than 5 years.

Pressure regulator: Inspect all parts and replace by new ones if damaged. Then reinstall onto the cylinder.

Liquid phase take-off: Inspect the Rego or Tema coupling and replace if damaged (secure the threads with Loctite 270). The coupling may not protrude above the upper protecting rim.

Pressure Test
Pressurize the completed cylinder with the air to 7 bar (100 psi) and verify a propper sealing of all joints and couplings using a leak detecting spray. Then disconnect the air hose and maintain the inner pressure. Re-install the outer protective padding and its jacket.

Data Plate Marking
Engrave the mark and date of the 10-year inspection on the data plate. By performing the 10-year inspection the requirement for an annual/100 hr inspection is met.

3.4.6 Equipment check

1. Review that the last inspection, in compliance with the Technical description (present submitted documentation), of the relevant ancillary instrument/equipment is valid. You should also check the result of the inspection and supervise their extra standard operating periods. Regarding the BALÓNY KUBÍČEK spol. s r.o. instruments, the EASA Form One is applied to certify and release them for operating.
2. Ensure that the condition, function, conspicuous data legibility and exactness concerning each instrument keep the rules contained in the Technical description/service and maintenance manual.
3. Check all the supply and by-passing hoses applied in compliance with Section 3.4.4 - 3.

Validity of the inspections prescribed by the manufacturer concerning instruments:

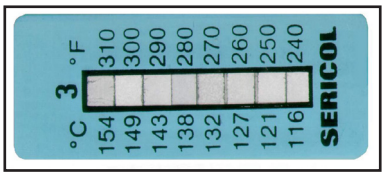
Type of Inspection	Operating Period
LUN 1124.xx - 8 altimeter	Either 600 flight hours or 5 years, according to that starts first.
LUN 1121.xx - 8 altimeter	
LUN 1141.xx altimeter	
LUN 1147.xx - 8 altimeter	
Combined instrument of Piccolo Plus type	2 years
M1 electronic thermometer	

WARNING:
Applying different than approved hoses could lead to the hose loosening out from the coupling by corrosion and an ensuing fire hazard.
If there is any noticeable damage to the hose external surface or couplings applied, this fact could cause a fuel leakage and fire risk.

3.5 Irregular Inspection

3.5.1 Inspection after envelope overheating

The balloons are fitted with a temperature-warning streamer, which will descend or be damaged when the melting link melts after exceeding the maximum allowable temperature in the envelope. If this occurs, the inspection must be canied out.



Tempi-label: If the maximum temperature indicated on the tempilabel is greater than 124 ^{0}C, sew on a new one, do not remove the original label, it must stay in its cover.
Envelope fabric: Then a fabric strength test should be conducted by means of a Grab test at various positions of about 2-meter distance from the envelope top DS edge. The envelope fabric should be grab tested perpendicularly to the vertical load tapes. In case of the fabric tearing, submit the envelope to the manufacturer for further inspection.
Lines: Ensure that the lines are in good condition with no burn damage, stiffness or length reduction. Replace the stiff lines with new ones.
Envelope mouth: Supervise the load tapes at the envelope mouth and the locations that connect the load tapes to the flying wires for any signs of heat damage. If there are any doubts concerning the condition of any parts, a new component must be applied.
Log book: Record the maximum temperature reached, result of the tests and ensuing repairs in the logbook.

NOTE:
Excessive heat on fabric tends to cause cracking due to stiffness.

3.5.2 Inspection after contact with electric power lines

If the envelope or basket touches electric power lines, the inspection should be carried out in scope of the annual inspection with concentration on the checks described below.
Envelope textile: Review all envelope textiles, especially for signs of any damage to the load tapes by the electric discharge. The damaged parts must be repaired.
Crown ring: When supervising the crown ring, draw attention to any noticeable damage. In case of this matter, a new crown ring should be installed.
Flying wires: Perform the inspection of the flying wires along their whole length including thimbles and ferrules. In the event that any damage from the electric current is detected, then the flying wire must be replaced.
Basket cables: These should be checked for electric damage along the whole length and that the thimble and ferrule are in good condition as well. After removing the basket protective runners/rawhide, pull out the cables. Replacement of damaged basket cables should be carried out. In the event that any problem of the whole length checking of the cable occurs, a new basket cable must be installed.
Fuel cylinders: Remove the padded jackets/covers and inspect the cylinders bodies for external damage from the electric discharge. After detecting any damaging effect the pressure test of the cylinder should be performed. If the cylinder has been deemed unsuitable for further service in accordance with the test results, put the cylinder out of operation. The failed cylinder must be marked and secured against accidental filling.
Logbook: The accident concerning the contact with power lines and the following tests/repairs should be entered in the balloon's log book.

3.5.3 Inspection after hard landing

After a hard landing following items must be inspected in scope of the annual inspection:

- basket floor and floor runners
- nylor rods
- basket upper rim
- fuel cylinder straps
- burner frame
- fuel contents gauges on each fuel cylinder

Logbook: The hard landing and following inspection / repair should be entered in the balloon's log book.

Balloon Type	Serial No.	Registration	Date of Inspection

Annual Inspection - Preliminaries				
3.4.1	Check	Minimum scope	Conducted	Inspected
1.	Documentation Completeness	Log book. Certificate of Airworthiness (C of A). Certificate of Registration. Certificate of Insurance. Maintenance Statement and Certificate of Release to Service. Aircraft Station Licence. EASA Form One - Authorised Release Certificate. Flight Manual. Maintenance Manual. Basket/burner book of records		
2.	Index Plates and Part/Component No.	Balloon, envelope, basket, burner, fuel cylinders, equipment.		
3.	Service - technical documentation	Log book. Accomplishment of Bulletins and Airworthiness Directives (AD)		

Envelope Type (Size)	Serial No.	Registration	Date of Inspection

Annual Inspection - Envelope				
3.4.2	Check	Minimum scope	Conducted	Inspected
1.	Envelope Fabric	Fabric damage and performing of previous repairs.		
2.	Fabric Strength and Porosity	Tensile strength and porosity/airtight.		
3.	Load Tapes	Intact vertical and horizontal load tapes along the whole length and tape endings at the crown ring.		
4.	Crown Ring	Crown ring, crown line.		
5.	Melting Link and Tempilabel	Attachment location, condition.		
6.	DS	Textile and velcro (panel) condition, function and sealing, state and operation of riplocks with velcro securing of the rip panel and the control force.		
7.	Centralising Lines of DS	Completeness, condition, attachment and length of the lines, state of SV ball stops and the slack in pulleys.		
8.	Control Lines of DS	Damage, slack in pulleys, attachment into the envelope, position and fixing up to pulleys and free pulley passage, condition and attachment of SV + weight.		
9.	Activation Ropes of DS	Damage, slack in pulleys, attachment into the envelope, sufficient lengths and colour correctness.		
10.	Pulleys of DS	Fixed attachment of pulleys, bearing condition, screw tightening, heat or mechanical damages and sewing up loops for pulley towards the envelope body.		
11.	Rotation Vent	Textile state, function, sealing, condition of pulleys, control lines and activation ropes, and fixing to the envelope.		
12.	Envelope Mouth	Connections of load tapes and flying wires, load tapes over-stitching, esp. at endings, and the horizontal load tape sewn around the envelope mouth edge.		
13.	Load Flying Wires	Condition and slack in thimbles, corrosion stage, burn or mechanical damage, wire elasticity and types, state and function of the load-bearing carabiners applied.		

Basket Type (Size)	Serial No.	Date of Inspection

Annual Inspection - Basket				
3.4.3	Check	Minimum scope	Conducted	Inspected
1.	Load Cables	Broken wires, corrosion, condition and function of load-bearing carabiners.		
2.	Cable Squeeze	Condition and slack in thimbles.		
3.	Cylinder Straps	Strength, attachment to the basket and no damage to clasps.		
4.	Basket Floor	Cracks in the basket floor, condition and wear of protective runners.		
5.	Basket Body	Dangerous sharp edges, holes in the basket body and condition of rope handles and both upper and lowe frame. Stiffness of the lower frame. For aluminium alloy: Passage of the wire through the guide.		
6.	Dropline	Completeness, position and fastening.		
7.	Fire Extinguisher	Filling and current revision.		
8.	Documents	EASA Form One (Testimonial).		

Burner Type	Serial No.	Date of Inspection

Annual Inspection - Burner				
3.4.4	Check	Minimum scope	Conducted	Inspected
1.	Burner Units	Thorough check of completeness.		
2.	Manometers	General state and function of manometers, glass lens fixing, condition and legibility of the dial with pointer.		
3.	Fuel Hoses	Age and condition, damage, pressing in at the couplings, colour marking and function of couplings.		
4.	Connecting Couplings	Function of endings and the self-closing valve if applied, condition of contact surfaces and seals.		
5.	Vapouriser and welds	Weld, vapouriser and burner frame check		
6.	Thread and flexible joints	All thread joint, safety ring and cotter pin check. Flexible joint ending of the frame check.		
7.	FV and WB check	FV and WB function and controllability check. FV and WB burning and tightness check.		
8.	PB check	Check function and controllability, safety of PB ingniting.		
9.	Documents	EASA Form One		

Fuel Cylinder Type	Serial No.	Date of Inspection

Annual Inspection - Fuel Cylinder				
3.4.5	Check	Minimum scope	Conducted	Inspected
1.	Pressure test	Check validity of the last inspection.		
2.	External Inspection	Dents, scratches and longitudinal welds of the cylinder body.		
3.	Function and tightness of Fittings	Sealing of threaded joints, function and tightness of fittings during closing, operation of the fuel quantity gauge and the pressure regulator, stage and function of connecting fittings.		

Equipment Type	Serial No.	Date of Inspection

Annual Inspection - Equipment				
3.4.6	Check	Minimum scope	Conducted	Inspected
1.	Instruments with Separate Maintenance System	Validity and result of the last inspection.		
2.	All Instruments	State, function, conspicuous data legibility and exactness, verification of requirements specified in the technical description.		
3.	By - passing Hoses	Type, state and age.		

SECTION 4

4. Airworthiness Limitations

4. AIRWORTHINESS LIMITATIONS

4.1 Approval Statement

The Airworthiness Limitations section is EASA approved and specifies maintenance required under the applicable certification basis.

4.2 Inspection Period

The balloon must undergo the annual/100 hour inspection after 12 calendar months or 100 hours of operation, whichever is the sooner.

The envelope fabric with a reduced strenght must undergo the strenght test (grab-test) after every 50 hours of operation or after 12 calendar months, whichever is the sooner.

The fuel cylinders Kubicek KB72L and KB97L must undergo the 10 year inspection after 10 years from the date of manufacture and then every 10 years.

4.3 Personnel

Inspections must be performed by an organisation approved by a relevant national airworthiness authority. Inspecting personnel must be suitably trained.

4.4 Inspection Procedure

The annual/100 hour inspection description and checklist is provided in section 3 of this manual.

Item	The annual/100 hour inspection description
Envelope	Chapter 3.4.1, 3.4.2
Burner	3.4.4
Fuel cylinders	3.4.5
Basket	3.4.3
Ancillary equipment	3.4.6

4.5 Life Limited Items

When a life limited item has reached the end of its life it must be replaced and the original item discarded. All items replaced because they have reached the end of their life must be recorded in the balloon's logbook. Other items are to be replaced when worn or damaged.

Item	Part no.	Limit
All burner fuel hoses	53102.XX*, 53103.XX*	10 years
Fuel cylinders	-	According to instructions of the respective manufacturer

Pressure Relief Valve - Kubicek Fuel Cylinders (KB72L, KB97L)	3466.00 - Standard 3188.00 - Master	10 years (maximum storage life prior to installation 5 years)
Pressure Relief Valve - Schroeder Fire Balloon Fuel Cylinders (VA 50, VA70)	3055.00	
Pressure Relief Valve - Cameron Balloons Fuel Cylinders (CB 497, CB 599, CB 2088, CB 426, CB 959, CB 2385, CB 2387, CB 2380, CB 2383, CB 2900, CB 2901, CB 2902)	3160.00, 3161.00	
Pressure Relief Valve - Thunder & Colt Fuel Cylinders (V 20, V30, V40)	3160.00, 3161.00	
Pressure Relief Valve - Linstrand Balloons Fuel Cylinders (T30, V 20, V30, V40)	3198.00	

* XX is a two-digit code identifying the hose length and coupling

4.6 Minimum Fabric Strength

The envelope fabric is not given a time life limit. Its actual strength is a limiting factor.

Minimum fabric strength: **200 N/5cm (44 lb/2 in)**

This value correspond to the lowest acceptable strength obtained by a grab test. A full description of the fabric grab test and evaluation of its results is described in para 7.2.

4.7 Minimum Load Tape Strength

Type of Load Tape	Minimum Strength	
PES, width 25 mm, thickness 1.7 mm*	7 500 N	1 690 lb
PES, width 25 mm, thickness 2.7 mm**	12 500 N	2 810 lb
PES, width 20 mm	5 100 N	1 150 lb
PES, width 30 mm	15 000 N	3 370 lb

* Identified by a single longitudinal thread in a contrasting colour.
** Identified by two longitudinal threads in a contrasting colour.

NOTE:

There is no need to test and evaluate the load tape strength. The fabric grab test is decisive.

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SECTION 5

5. Balloon Handling and Maintenance

5. BALLOON HANDLING AND MAINTENANCE

5.1 Handling

Balloons are very simple aircrafts. Therefore, the balloon parts not mentioned in this chapter do not necessitate any detailed comments on operation than it is described in the Flight Manual.

5.2 Preventative Maintenance

5.2.1 Envelope

Besides common cleaning and keeping the below mentioned storage instructions (Section 5.2.4), the envelope does not necessitate additional maintenance.
Use customary cleaning detergents, water diluted. Soiled areas should be cleaned by means of damp cloth. Then, before packing, the envelope should be dried thoroughly.

5.2.2 Basket

The basket necessitates periodical cleaning. The cane and floor should be cleaned with flowing water and brush, or pressure water as far as possible (protect the upper suede rim against overly wetting through). Preserve cane from overly drying, the matter gets down its fragility resistance. Care about the basket not being exposed to moist storage. Under moist conditions acting for a long time, there is a danger of mould and rot inception. Rawhide on the basket bottom and leather/suede on the top rim is recommended be attended to common products for oxhide/leather/suede care (for example Elaskon). If there is a suede cover on the upper rim, simply restore it by brushing with a special suede shoe-brush.

5.2.3 Burner and fuel system

During the operation of the burner, there is inevitably an accumulation of carbon deposits, i.e. soot and condensates, within the coil and can of the burner. These deposits may be regularly removed by using a dry soft cloth - flannel (the best after each flight day). This has been keeping your burner appearance in good condition for a long time. While more accumulating, you can clean the carbon deposits by using a weak detergent with hot water soaked cloth. In some instances, when cleaning of burners does not be accomplished efficiently and periodically as specified above, the next continued burner operating may result in the mess burning-in and sticking. These can be removed only with difficul ties.
Cleaning and the lubrication of valves, the adjustment of the pilot burner electrodes and further maintenance are specified in Section 6.5.

5.2.4 Balloon storage and road transport

The rolled up balloon envelope is best stored in a transport bag and at a dry airy place. Pack the envelope in absolute dry condition and minimise the exposure to the sunshine or heater effect (recommended is storage onto a pallet so that airing from the bottom could be ensued. In case of the wet envelope after the flight completing, ensure its complete drying without fail and as soon as possible. Spread the envelope on a dry shady field and keep airing. The wet envelope should be gently dried by cold and then hot inflation until the whole moisture has evaporated). During packing the basket pay attention so that it is not exposed to the moist of the floor. Under moist conditions acting for a long time, there is a danger of mould and rot inception.
Besides common keeping of the mentioned storage instructions, the burner does not necessitate additional maintenance. It is recommended to remove accumulation of carbon deposits (soot and condensates) after each flight day. Ensure that no fouling to couplings of fuel hoses can occur during transport/storage (a connector cover is recommended). Draw close attention to fuel hose storage that any collision with heavy objects, fall or hard object squeeze should not cause damage to them. The burner should be always stored and transported with empty fuel hoses. Residual fuel in hoses shortens their operatiny life. Moreover, concerning the burner transport, a padded burner bag

is recommended, and is available at your balloon dealer or the manufacturer. Ideally the burner should always be restrained from movement during transportation.
Follow the procedures recommended by your national regulations valid for transport and storage of liquefied oil gas tanks.

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SECTION 6

6. Repairs

6. REPAIRS

6.1 General

Repairs of modern hot airs balloons are relatively simple compared with other types of aircrafts. However it is important that the people carrying out the repairs are acquainted with repairing methods of manufacturer BALÓNY KUBÍČEK spol.s.r.o. and get a certification from THE AVIATION AUTHORITY enable the work to be carried out safely.
Basic repairing procedures are given in this Section. For work of a greater complexity than described, please consult BALÓNY KUBÍČEK spol. s r.o. Balloon components made by another manufacturer – different from BALÓNY KUBÍČEK spol.s.r.o. – must follow the repair procedures given by that producer.

BALÓNY KUBÍČEK spol. s r.o. run courses which cover the maintenance and repair of their balloons.

CAUTION:
If it is not possible to discover the reason for the failure of a component then contact BALÓNY KUBÍČEK spol. s r.o. and have the repair made by them.

CAUTION:
All replacement items must be approved by the manufacturer of the balloon come with the correct documentation (EASA Form One).

NOTE:
Common repairs do not include for instance slack lines, unfastened screws or loose cane – these examples are taken as a part of daily service and maintenance.

6.2 Prohibited repairs

The following repairs are prohibited except by the manufacturer BALÓNY KUBÍČEK spol. s r.o.

Envelope:
Replacement of more than 50% of the fabric panels within one repair, counted by the total number of panels, irrespective of area.

Basket:
Replacement of more than 20% of the total basket surface area.

Repairs of broken aluminium alloy tube frames.

Burner and Fuel System:
The repair of any burner components or fuel hoses with squeezed couplings, differently than by their replacement of the whole parts with new ones.

Fuel Cylinders:
Steel body or damaged thread repairs.

Load bearing wires:
The repair of swaged wire flying cable assemblies or basket wires.

CAUTION:
BALÓNY KUBÍČEK spol. s r.o. accepts no liability for the consequences of carrying out prohibited repairs.

6.3 Envelope Repairs

6.3.1 Repairing the fabric of the envelope

If the coat of the envelope, panels of the DS, rip panel or rotation vent are torn, take appropriate procedures according to the size of the damage.

6.3.1.1 Small tears – damage smaller than 10 cm covering less than 10% of panel area

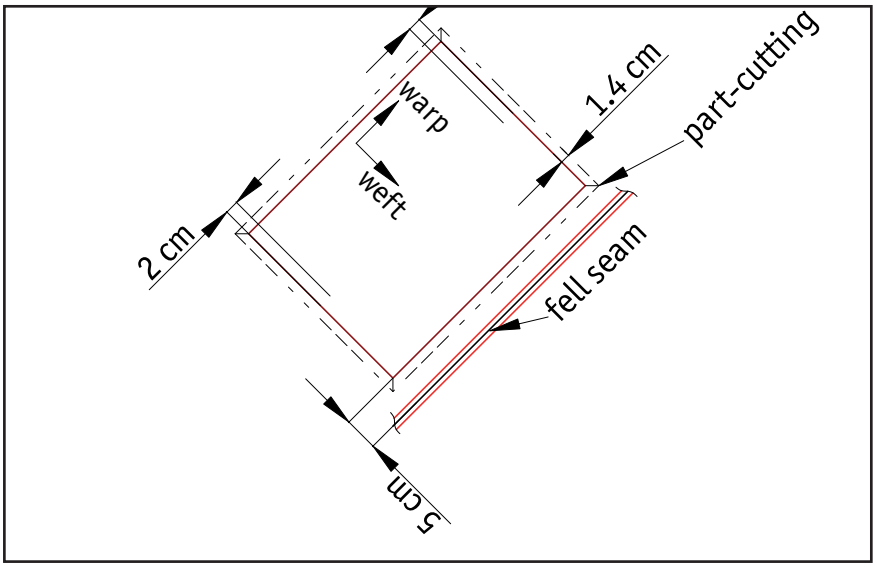
Small tears (maximum 3 cm) can be mended by means of sticky-backed patches that are standard for repairing boat sails. Other tears to the maximum of 10 cm are possible to cover and seamed by a simple „hot cut and overlay" patch from any material of either polyester or polyamide origin.Also the sticky-backed patches can be used provided their edges must be sewn together with the envelope body using two rows of parallel independant stitching. This kind of repair must be finished before the start of the next flight day. The distance between the patches must be more than 10 cm.
When mending small tears the fabric of the envelope in the place of the patch does not have to be cut away.
If the tear is less than 5 cm from the fell seam, the seam must be unraveled and the patch sewed in the fell steam.

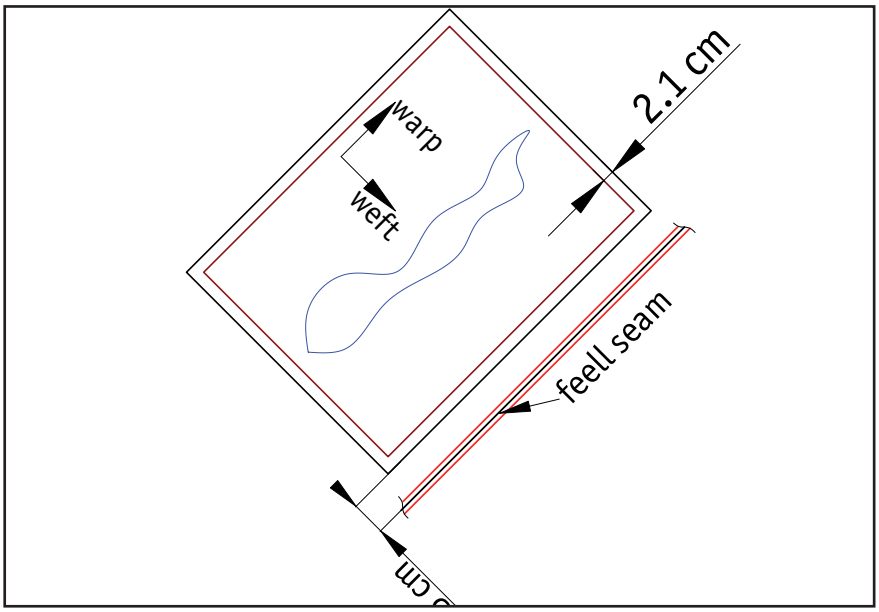
6.3.1.2 Large tears / burnt holes – damage larger than 10 cm

Mending larger tears you must cut away the damaged fabric close to the tear or cut the panel between the adjacent seams and replace it with new one. If the damage covers more than one panel replace the fabric of all damaged panels. Cut the fabric around the damaged area at least 2 cm from the edge of damaged area. When replacing it the orientating of the tread direction (warp / weft threads) of the new inserted fabric must follow the orientating of the original fabric.

Guidelines to the envelope fabric repairs:

- Mark out the damaged place on the envelope in the parallel direction that follows the anti-rip grid along the whole width / length of the panel between the adjacent vertical / horizontal seams or around the damage.
- Mark out the position of the fabric in the envelope on the part to be cut away to ensure the correct orientating of the thread direction concerning the envelope after cutting it away.
- Unpick the fabric and cut away the remaining partly seam in the parallel direction that follows the anti-rip grid or cut the damaged place around. Cut the corners.
- The damaged fabric from the envelope shall be used as a pattern to create a new part for replacement. Cut the replacement part of the panel of new fabric (depends on the envelope serial no., Contact BALÓNY KUBÍČEK to specify which fabric to use.) that is 8.4 cm larger that the marked edges (2.1cm – additional allowance for one fell seam) and mark out orientation of its location within the envelope.If the fabric is seriously damaged, take the measures from the adjacent panel).
- Sew up the panel / patch into position of the envelope using the technique of the double structural fell seam.





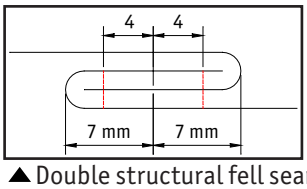
▲ repair of patch

CAUTION:

For repairs use only the original fabric from BALÓNY KUBÍČEK spo. s r.o.

6.3.1.3 Carrying out the fell seam

For carrying out the fell seam it is necessary to take into accounts additional allowance 2.1 cm on each side of the fabric. Carry out the seam according to the picture. The length of the stitch should be from 4 to 7 mm. Recommended length is 5 mm.



▲ Double structural fell seam

6.3.1.4 Nomex mouth repairs

To repair nomex mouth use patching by nomex fabric. When repairing the vertical load tapes must be always protected against flames of the burner by nomex fabric.

6.3.1.5. Restrictions

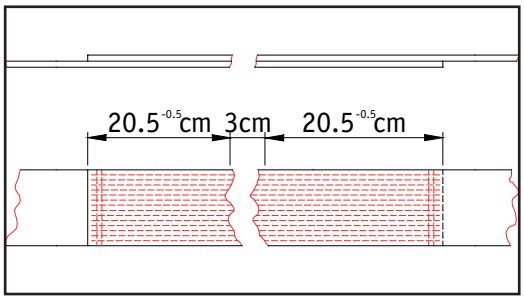
Repairs defined in section 6.3.1.1. must be provided only on the lower part of the envelope coat not higher than the first horizontal load tape. On the rest of the coat only repairs of damages with maximum size of 3 cm are allowed

Repairs defined in section 6.3.1.2 must by provided only by BALÓNY KUBÍČEK spol. s r.o. or an organization with written certification for providing these repairs from BALÓNY KUBÍČEK spol. s r.o.

6.3.2 Load tapes and wires repairs

6.3.2.1 Vertical and horizontal load tapes

Damaged or cut load tapes shall be changed or covered with a new one of the same type in that way there is the minimum overlap of 50 cm in both directions from the damaged area. (Contact BALÓNY KUBÍČEK spol.s r.o. to specify what type to use) Heat-seal the load tape ends. The sewing shall be secured using 15 rows of twice parallel stitching along the tape length according to the picture. Sewing of the load tapes altogether must be finished before their fixing to the fabric of the envelope.



▲ Sewing of the load tapes

6.3.2.2 Connection of the flying wire or crown ring with the load tape

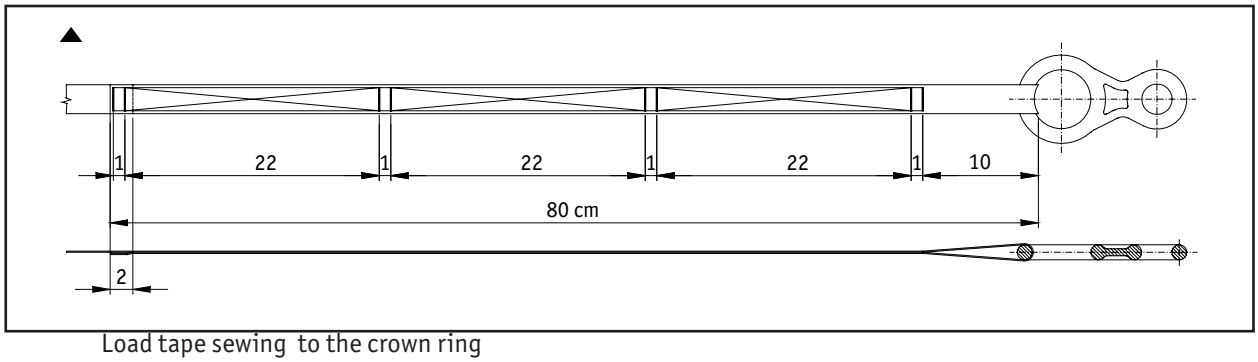
Unpick the damaged load tape in the connection. Cut the damaged part and cover the load tape with a new one according to the procedure in 6.3.2.1. Thread the load tape through the thimble of the flying wire or crown ring, sew the load tapes altogether and back to the envelope. Sew the load tapes according to the picture retaining the original overlap. If you damage ends of the load tapes during unpicking, cut the damaged part and replace with a new load tape according to the procedure in 6.3.2.1.
When sewing up the load tape in the envelope mouth there must be a space at least 40 cm between each stitch (in the case of damaging the load tape by the flame of the burner, you reduce the risk of burning all the seam.)

6.3.2.3 Crown ring

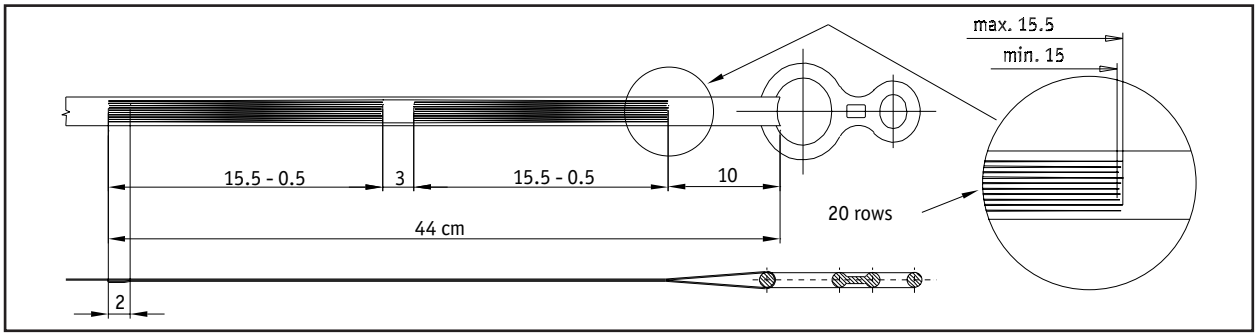
Unpick the damaged crown ring and replace with a new one (80) according to para 6.3.2.2.

6.3.2.4 Replacing the flying wire

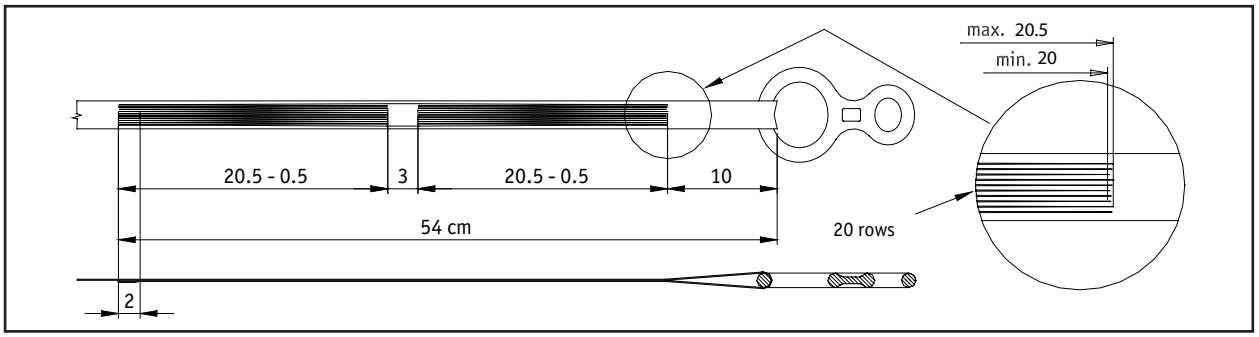
Replace the damaged flying wire with a new one according to para 6.3.2.2. Make sure it is of the same diameter as the original one. (In case of any doubt ask BALÓNY KUBÍČEK spol.s r.o. for advice.)



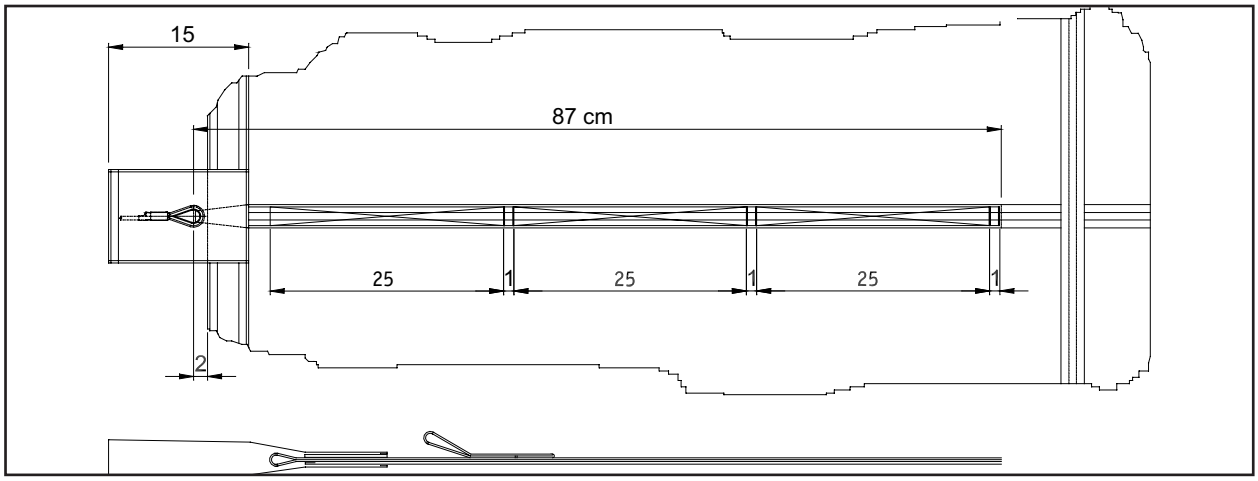
Load tape sewing to the crown ring



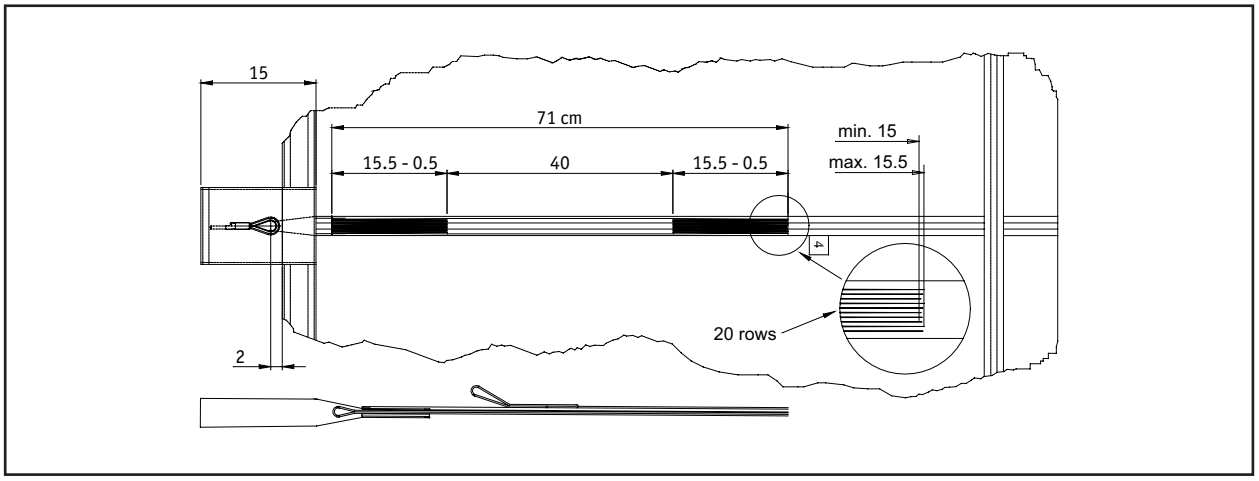
▲ New load tape sewing to the crown ring for envelopes BB12 – BB60 (32 gores)



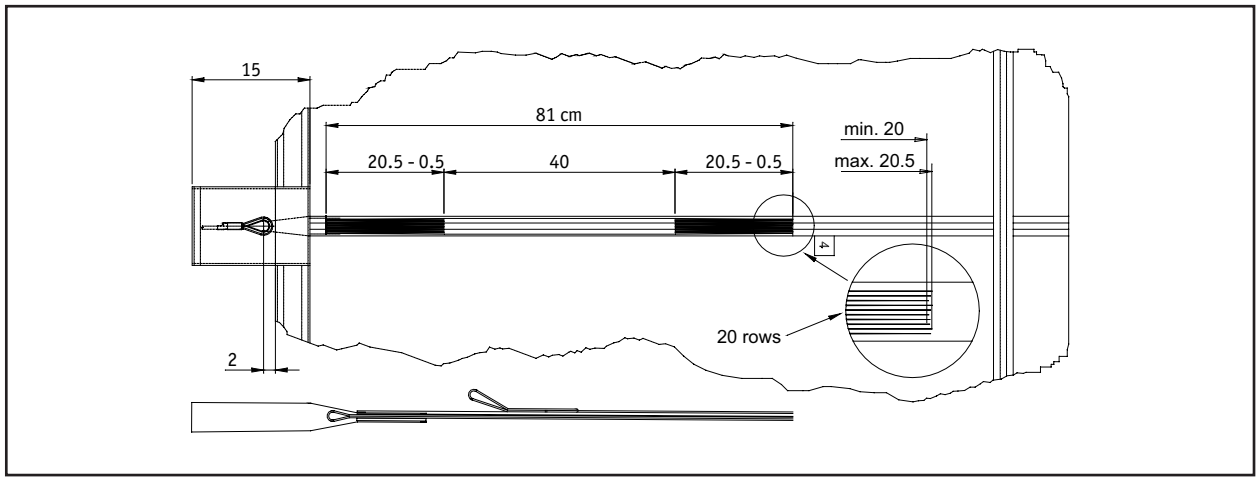
▲ New load tape sewing to the crown ring for BB602 (24 gores), BB702 and BB85Z



▲ Connection of the flying wire and the envelope load tape



▲ New connection of the flying wire and the envelope load tape for BB12 – BB60 (32 gores)



▲ New connection of the flying wire and the envelope load tape for BB60Z (24 gores), BB70Z and BB85Z

6.3.2.5 Restrictions
All connection repairs, component and load tape replacing must by provided by BALÓNY KUBÍČEK spol. s r.o. or by an organization which has a written certification for providing these repairs from BALÓNY KUBÍČEK spol. s r.o.

Replacing load tapes by squeezing must be provided by BALÓNY KUBÍČEK spol. s r.o. or by an organization which has adequate equipment and written certification for providing this repair from BALÓNY KUBÍČEK spol. s r.o. and has adequate technological equipment for their squeezing. Squeezing load tape ends must be provided in compliance with requirements of standard EN 13411-3.

6.3.3 Vent hole sealed with the velcro panel

6.3.3.2 Riplock
The repair of the riplock must be provided by the complete re-change. The seam length and types of the knots must be kept. Changing the velcro you must use the type supplied by the envelope producer and the velcro tab must be sewn all along its edges. Load tapes protective covering must remain.

CAUTION:
The load protective covering minimises damage to the velcro tabs during the envelope packing. Using other than certified velcro can cause a disconnection by moisture or change of temeprature.

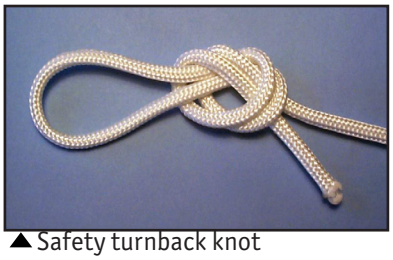
6.3.3.3 Restrictions

The repairs of the riplock must by provided by BALÓNY KUBÍČEK spol. s r.o. or by an organization which has a written certification for providing these repairs from BALÓNY KUBÍČEK spol. s r.o.

6.3.4 Ropes and lines

6.3.4.1 Conrol lines of the rotation vent
Damaged control lines must by replaced with new ones.

6.3.4.2 Activation ropes of DS


▲ Safety turnback knot

Provide the repair by replacing all the damaged rope. The activation rope can be also extended by tying in the damaged end for activating with the same rope type. Make the lengthening by means of safety turnback knots to keep the free movement of the rope.

6.3.4.3 Control lines of DS

Mending is provided by enlongation of the damaged control lines in that way the length between the pulley and the loop on the edge of the vent panel remains the same. Lengthening is to be made by means of safety turnback knots. If more than three control lines are damaged it is necessary to change them for the new ones. (Contact BALÓNY KUBÍČEK spol. s r.o. to specify which type to use.)

6.3.4.4 Centralising lines of DS

Centralising lines for both the parachute vent and the Smart Vent fix the right position of the vent panel and that affects its sealing.

Short line pulls the vent panel inside the envelope, it causes dangerous stress or strain to its edge and afterwards the vent panel possible leakage. The short line is responsible for the characteristic tense flat edge of the vent.
Long line allows pulling the vent panel inside the load tapes, it increases the force and time necessary to open and can cause leakage. The long line is typical for the drooping edge of parachute vent.

Adjusting the length of the parachute lines:
1. Join up the velcro panel of parachute vent and the relevant matted gore on which you provide the adjustment.
2. Untie the centralising line from the envelope body. Then stretch out the load tape between the loop of the vent panel on the envelope and the edge of the deflation / vent hole.
3. Tight up the line using the safety turnback knot in that way the distance between the loop on the envelope body and the velcro panel of the parachute becomes longer by 6 ± 1 than the distance between the loop and velcro panel on the envelope body.

Replace the damaged or broken cords with new ones (83). When replacing cut off damaged cord close to the edge of the parachute vent so there remains the overlap end of 5 cm as minimum and heat seal this end.Place and fasten the new line into the loop on the vent panel edge, after adjusting its length it can fe fixed into the loop on the envelope body.

CAUTION:
Using other knots than turnback safety knots can cause problem owing to the high force to the lines, and their loosening and undoing leads to the faulty sealing of the parachute vent.

NOTE:
Add the 5 cm surplus as minimum, which is the lost while replacing cords with a knot. Conduct the final check of the length after fixing.

Adjusting the length of the Smart Vent line:
There is no need to adjust it. There are special heat-resistant vectran lines for the Smart Vent and no shortening occurs.

Damaged and broken vectran cords must be replaced with new ones (1011). Use a double fisherman's knot to knot in vectran and control lines and a bowline knot to fix the vectran cord to the edge of the vent panel.


▲ Bowline knot


▲ Double fisherman's knot

6.3.5 Smart vent + weight
Mend any damage to the tapes by sewing them together. Do not repair a damaged weight, replace it with a new one.

6.3.6 Pulleys of the envelope
Replace the damaged pulleys with new ones. (Contact BALÓNY KUBÍČEK spol. s r.o. to specify which type to use).

CAUTION:
Be careful and do not replace one type of fixed pulleys with another type of pulley that allows its rotation around the vertical axis and vice versa. You risk tangling up of lines.

6.3.7 Carabiners
Replace the damaged carabiners with new ones. Use only steel Stubai carabiners of the same or higher loading capacity (30 kN carabiner 217.00, 40 kN carabiner 2784).

6.3.8 The test by means of inflating after provided repairs
If controling system components (DS, rotation vent, rip panel) are replaced or repaired, realise the test inflation up of the envelope and check a proper function of the systems.

If the extent of the repair and technical condition of the balloon need to carry out the test flight, follow the instructions in 7.4 Test flight.

6.4 Basket repairs

6.4.1 Upholstery and padded suede / leatherwork repairs

6.4.1.1. To mend soft parts of suede / leatherwork use common upholstery aids.

To mend soft parts of suede / leatherwork use common upholstery aids. Repair the damaged leather by sewing it together or patching with proper material. Replenish damaged or rubbed off parts of soft upholstery padding with softened polyurethane or other proper upholstery padding. Fix the inserted parts with chemoprene.

6.4.1.2 Basket types K7 to K18

After treatment of thick cowhide (leather work of basket bottom and entries) use impregnating preparation - Elaskon after warming it to about 50 – 60 °C in two layers minimaly. Before coating with the Elaskon firstly clean up the leather with brush and wash it with hot water and detergent and then let it dry.
When repairing damaged leather upholstery parts it is necessary to replace it all. Unpick all damaged part and use it as a pattern to create the new one. Cut the leather with purchase shears for sheet metal. For sewing punch in holes with diameter of 5 mm along the edge. Impregnate the leather properly with Elaskon treatment and sew back with cord PES with 5mm diameter and to the bottom fix the leather with upholstery tacks (if you do not have a tacker, fix it with nails of proper size).

6.4.1.3 Basket types K22 and bigger

To maintain the white rawhide (leatherwork at the basket bottom and entries) clean it dry with a brush and possibly apply common shoe treatment for white leather.
Damaged protective cables and bottom basket rims covered with hard white rawhide shall be repaired by replacing all the damaged leather strip or its part. Before other processing it is necessary to soak the leather in water for 10 hours as minimum (recommended length is 24 hours). Cut the new strip in the way that there is the minimum overlap of 70 mm on both sides of the connection with the original leather. Punch in holes with 3mm diameter along the edge for sewing. Sew with PES cord with 3mm diameter and to the basket bottom fix with upholstery tacks. If you replaced the leather parts that cover basket load cables, check that the cables are not damaged.

6.4.2 Basket wickerwork repairs

6.4.2.1 Exserting ends or broken canes

Inweave the exserting ends, or broken canes of the basket and fix them by means of cord, string or plastic strap. If the broken end is not long enough to be inweaved, cut the exserting part off. Scratched or split canes must be cut out and replaced with new ones.

6.4.2.2 Ratan - canes

Repair damaged vertical ratan-canes by partial replacement of them. Cut out the damaged part. Use mitre cutting of the end in the length of 50 mm as minimum. Put on the new cane with the same scarfing of the end. Fix the prominent part (in the length of scarfing) with plastic straps.
Vertical canes which are damaged under the roots must be repaired by a basket producer.

6.4.3 Basket floor, load-bearing wooden frame or other wooden component repairs

6.4.3.1 Small damage of the plywood floor
Repairing small damage of the floor use common techniques of woodwork (bonding,...). Small holes cracked through the floor (if the floor is not entirely broken) shall be repaired by lapping with 1-milimetre thick incorrodible sheet metal and screwing with the floor. If the floor is heavily damaged or even cracked through it must be replaced with a new one (Contact BALÓNY KUBÍČEK spol. s r.o. to specify which type to use).

6.4.3.2 Cover strip
If there is so serious damageor breakthrough of wooden cover strip protecting cables and tubes that they do not carry out their protective function, they must be replaced with new ones. After installation cover the repaired parts with transparent synthetic protective varnish for wood. While applying the varnish firstly note that any protective varnish must be completely removed from the damaged area by using the wire brush and then the sandpaper and only afterwards put on the synthetic re-varnish coat for wood in two layers as a minimum. Before you start to varnish up the coloured part of wickerwork, it is good to use a stain of suitable colour to dye in first.

6.4.3.3 Exserting sharp objects
Arrange sharp objects (parts of screws, floor splinters etc.) to prevent injuries to the crew (cut off, abrade).

6.4.3.4 Cracked skid covers
Glue up cracked skid covers (K25P baskets and bigger) with dispersive adhesive for wood, sand the repaired place and put on synthetic varnish for wood. Replace broken runners with new ones (Contact BALÓNY KUBÍČEK spol. s r.o. to specify which type to use).

6.4.3.5 Damaged sliding shims
Unscrew the damaged sliding shims (K7 to K22 baskets) and replace them with new ones (Contact BALÓNY KUBÍČEK spol. s r.o. to specify which type to use). In position of bulge put a round piece of thick cowhide or hard rubber under the sliding shims. You will prevent pressing in the concaved part of the washer sliding shims while operating the basket along the hard flat ground.

6.4.3.6 Composite Floor Repair
The technique of repair depends on actual damage. Contact BALÓNY KUBÍČEK spol. s r.o. for advice

6.4.3.7 Composite Floor Replacement
When necessary the composite floor is to be replaced in the same way as the plywood one. Their attachment to the basket structure is the same.

6.4.4 Pipe frame / fibreglass support repairs

6.4.4.1 The broken pipe frame
If the top or bottom basket frame is either damaged or distorted then contact Kubicek Balloons for advice

6.2.4.2 Broken fibreglass support
Do not repair the broken fibreglass support,replace it with a new one *(50169 or 52153 according to the basket size)*.

6.4.5 Handle repairs

Cut the damaged rope at least 50 cm from the handle on both sides and pull the rope out. Inweave a new part of the rope. Cut out the core from the ends of the rope and put on the 20 cm of the original rope as minimum. Fix the ropes together with straps.

6.4.6 Load cable repairs

Do not repair a damaged load cable, replace all of it with a new one (Contact BALÓNY KUBÍČEK spol. s r.o. to specify which type to use).

6.4.7 Equipment and accessories repairs

6.4.7.1 Load - bearing carabiners

Any repairs or adjustments of load-bearing carabiners are prohibited, it is always necessary to replace the damaged carabiner with a new one (30 kN carabiner 217.00, 40 kN carabiner 2784).

6.4.7.2 Strapping for cylinder attachment

Replace the damaged strapping (a buckle which is deformed or does not work, torn abraded strapping) with new one. Because of a high load capacity of new strapping it is possible to tolerate rip or wearing through the strapping up to 15 % of its width.

6.4.7.3. Fabric and leather equipment

Repair the fabric and leather equipment in a common way of sewing or patching.

6.4.7.4 Damaged drop line

Replace a damaged drop line with a new one (50091).

6.4.7.5 Broken or cracked frame of the burner

Do not put bond or repair a broken or cracked frame of the burner. It is necessary to replace it with a new one.

6.4.7.6 A damaged or expired first –aid kit box and fire extinguisher

Must be replaced with new ones. The first-aid kit is not necessary to be replaced all, only damaged or expired medical supplies must be substituted.

6.4.8 Restrictions

Wickerwork repairs which extend more than 5 rows of horizontal or 2 rows of vertical canes in one place of wickerwork must be provided by BALÓNY KUBÍČEK spol. s r.o. or by an organisation with a written certiffication for providing these repairs from BALÓNY KUBÍČEK spol. s r.o.

Wickerwork repairs which extend the connection to the bottom or upper basket frame must be provided by BALÓNY KUBÍČEK spol. s r.o. or by an organisation with a written certiffication for providing these repairs from BALÓNY KUBÍČEK spol. s r.o.

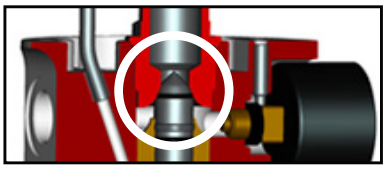
Repairs of a broken steel frame by welding must be provided by BALÓNY KUBÍČEK spol. s r.o. or by an organisation with a written certiffication for providing these repairs from BALÓNY KUBÍČEK spol. s r.o. and adequate technological equipment and a licenced worker according to EN 287-1.

Handle repairs (see 6.2.5) must be provided by BALÓNY KUBÍČEK spol. s r.o. or by an organisation with a written certiffication for providing these repairs from BALÓNY KUBÍČEK spol. s r.o.

Load cable repairs by replacing must be provided by BALÓNY KUBÍČEK spol. s r.o. or by an organisation with a written certiffication for providing these repairs from BALÓNY KUBÍČEK spol. s r.o. and adequate technological equipment for squeezing. Squeezing of the cable ends must be provided in compliance with requirements in standard EN 13411 - 3

6.5 Ignis burner repairs

The below information applies to Ignis burners with face seal in the main blast valve. For maintenance of Ignis burner with conical sealing (as showed on the picture) and for older burners use the respectice supplement of this manual.



▲ Conical seal in the blast valve

6.5.1 General notes

WARNING:
Before starting any maintenance or repair work disconnect the burner from all fuel supplies and vent all the fuel from the burner.

CAUTION:
It is essential that all fuel system and burner repairs are carried out in a clean environment.
The presence of dirt or chemicals may damage movable parts, rubber seals or bonded joints and could blockage the burner jets.

CAUTION:
When maintaining or repairing fuel system and burners all replacement items must be approved by BALÓNY KUBÍČEK spol. s.r.o. and come with the correct documentation (EASA Form One). BALÓNY KUBÍČEK spol. s r.o. accept no liability for items not provided by them.
Common commercially available parts (unified items) can be replaced with equivalents, provided in common trade network.

6.5.2 Sealing and threaded joints techniques

6.5.2.1 O-rings and Rubber Seals

When disassembling sliding parts with 'O'-rings use new 'O'-rings must be used for reassembling. When disassembling other types of joints the O-rings and seals must be inspected and replaced if damaged or deformed. A graphite-based lubricant (Molyduval Attila GR is recommended) is to be used for lubricating O-rings on the sliding joints and silicone grease for O-rings on other joints. We recommend to replace the O-rings after 12 months of intensive service.

6.5.2.2 Threaded Joints

a) General – When assembling burner parts and fuel hoses that are not fixed either with a sealant or sealed with PTFE tape lubricate the threads with silicone grease. Otherwise the threaded joints on the parts of aluminium alloys may jam.

b) Joints secured with a sealant – Threads must be clean and free from grease, dirt and old sealant. Smear the sealant on the male thread and screw it in immediately. To shorten the drying time for sealants a spray activator may be applied to the thread before the sealant is applied. Always comply with the drying times recommended by the sealant manufacturer.

Common sealants:
- Loctite 243 – for securing threads against unintentional loosening (removable joints)
- Loctite 270 – for sealing and securing thread

c) Joints sealed with PTFE tape – Ensure that the threads are clean and free from grease, dirt and old tape. Burrs on the threads may be removed with emery cloth or a wire brush.

When using PTFE tape wrap the male thread in the direction of the thread.

▲ PTFE sealing tape use

Keep tension on the tape whilst wrapping the thread so that the tape is pulled into the thread. Use between 3 and 6 layers depending on the diameter of the thread; the greater the diameter the more layers of thread.

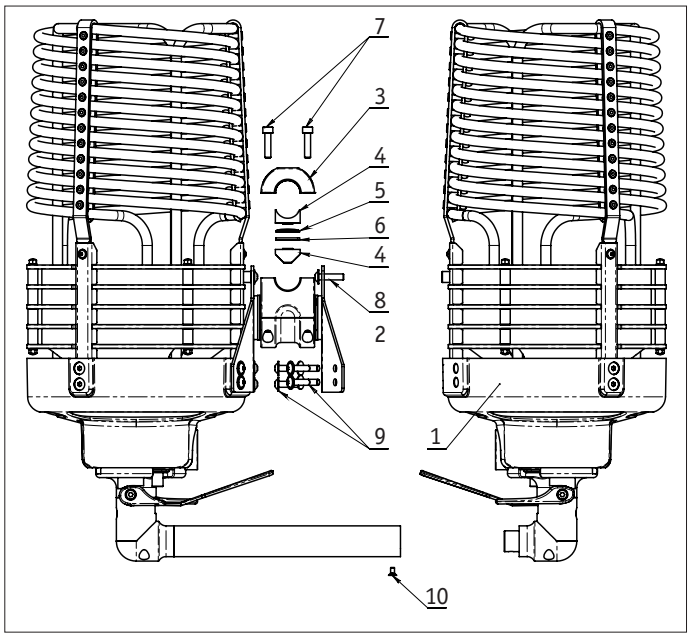
When the thread is correctly wrapped the tape must fill the space between each thread and form a cone as seen on the above picture.

CAUTION:
Keep the first thread free from tape to prevent tape being cut off during reassembly. Loose pieces of tape could get into the fuel system and cause a blockage.

6.5.3 Standard practices

6.5.3.1 Removing the burner from the burner frame

It is recomended to remove the burner from the frame prior to each maintenance or repair on burner unit or fittings.



◀ Removing the burner

1 – Ignis burner unit (53115)
2 – Gimbals (52926)
3 – Gimbal top (52929)
4 – Gimbal friction pad (52934) – 2x
5 – Gimbal friction washer (52935) – 2x
6 – Spring disc (2734)
7 – Bolt M6x20 hex (2735) – 4x
8 – Bolt M6x8 with washer (2839)
9 – Bolt M6x20 with washer (2839)
10 - Bolt M6x20 hex, countersunk head (2860)

Removing the burner:
- unscrew the bolts (7) and remove the gimbal top (3)
- remove the burner
- keep the friction pad and washers and spring discs (4, 5, 6) inside the gimbal or store them apart

Removing the burner units:
- pull aside the handle grip and unscrew the bolt (10)
- unscrew bolts (8) and (9)
- remove the burner unit

Reassembling the burner into the burner frame:
- connect the burner units with the handle
- refit all the screws and tighten slightly
- tighten all the screws
- lubricate the burner frame tube and insert shims in this order: 4 – 5 – 6 – 5 - 4 (friction pad (4) – friction washer (5) – spring disc (6) - friction washer (5) - friction pad (4))
- fit the frame and gimbal top, tighten the bolts (7)

6.5.3.2 Fuel hoses replacement

WARNING:
Never try to repair damaged fuel hoses! Always replace the damaged hose with a new one supplied by BK.

Burner hose connections with 1/4“ NPT threads (fuel hose / REGO coupling) should be assembled with PTFE tape.

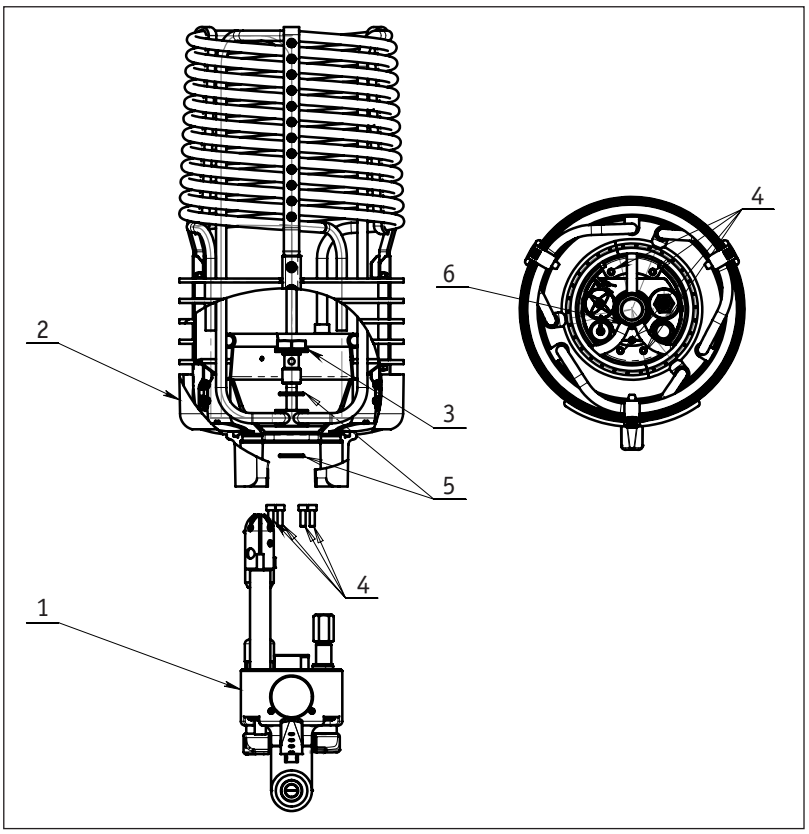
Burner hoses with 3/8“ BSP and M18 x1.5 parallel threads (fuel hose / TEMA 3810 coupling and hose / burner) should be assembled with the appropriate sized Dowty seal (steel washer with bonded rubber insert).

Burner hoses supplied with pre-applied Everseal sealant (stiff blue paste on the connector male thread) use no additional sealing means and are to be installed directly.

These maximum recommended torque values should not be exceeded when replacing the following components:
- 1/4 NPT thread max. 20 Nm
- 3/8 BSP thread max. 20 Nm

NOTE:
It is recommended to lubricate burner hose connections sealed with Dowty seal with graphite powder. No additional lubrication is to be used when PTFE tape or Everseal sealant is used.

6.5.3.3 Removing the manifold block
It is recommended to remove the manifold block from the burner unit for easier maintenance of the blast valve, Whisper Burner valve and Pilot burner valve and for removing the Pilot Burner with the pressure reducer.



◀ Removing manifold block

1 – Manifold block (53116)
2 – Vaporising coil with the can (53298, 53116)
3 – Fuel supply bolt (53264)
4 – Bolt M5x16 hex (2927) – 4x
5 – O-ring 20x2,5 (2927) – 2x
6 – O-ring 96x2 (2912)

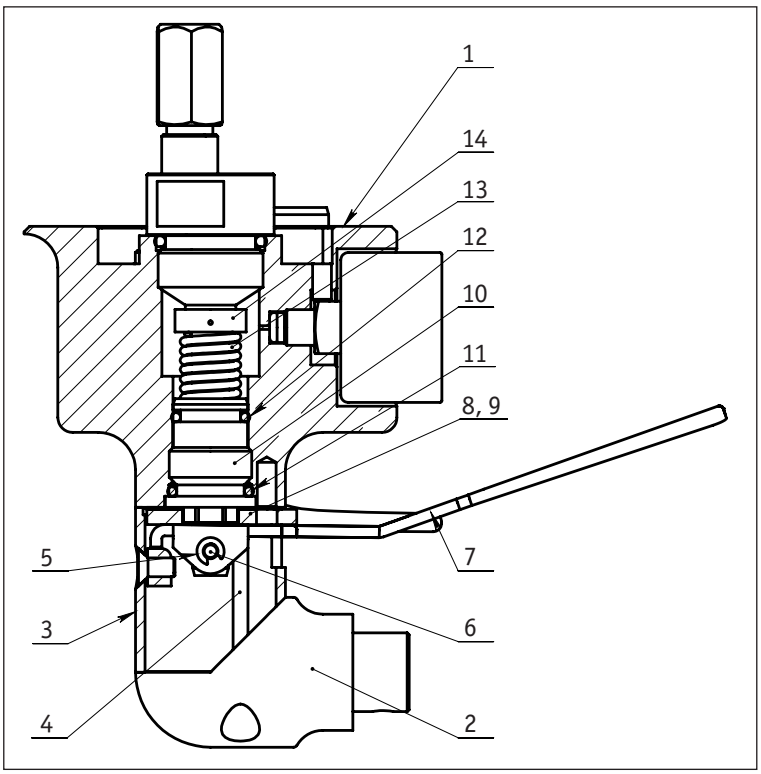
Removing the manifold block:
- unscrew the fuel supply bolt (3)
- unscrew the bolts (4) – 4x
- take the manifold block out of the can**:**

  Note: If the can can not be easily removed, screw the screw the fuel supply bolt back into the manifold block so there remain approximately 5 mm gap between the blot head and the vaporizer ring. Unblock the manifold block by tapping on the screw head.

Mounting the manifold block:
- lubricate the 0-ring (6) and insert it into the can (2)
- attach the manifold block
- insert the 0-rings (5) -2x into the vaporiser connection ring , screw the bolt (3) – do not tighten
- tighten the bolts (3) and (4)

  Note: lubricate the bolt threads with silicone grease
- adjust the position of the slurper tube, its end should be right above one of the jets

6.5.3.4 Disassembling the main blast valve (MBV)



◀ Main blast valve assembly

1 – Manifold block (53116)
2 – Handle body (53142)
3 – Handle tube (53146)
4 – Screw M4x60 (2834)
5 – Circlip (2984)
6 – Main Blast Valve Lever pin (53265)
7 – MBV lever – left/right (53287)
8 – Friction washer (53258)
9 – Distance washer 0.3 / 0.5 (53266)
10 – MBV cone case housing (53257)
11 – O-ring 18 x 2.5 (2931)
12 – O-ring 16 x 2.5 (2930)
13 – MBV spring (53192)
14 – MBV cone

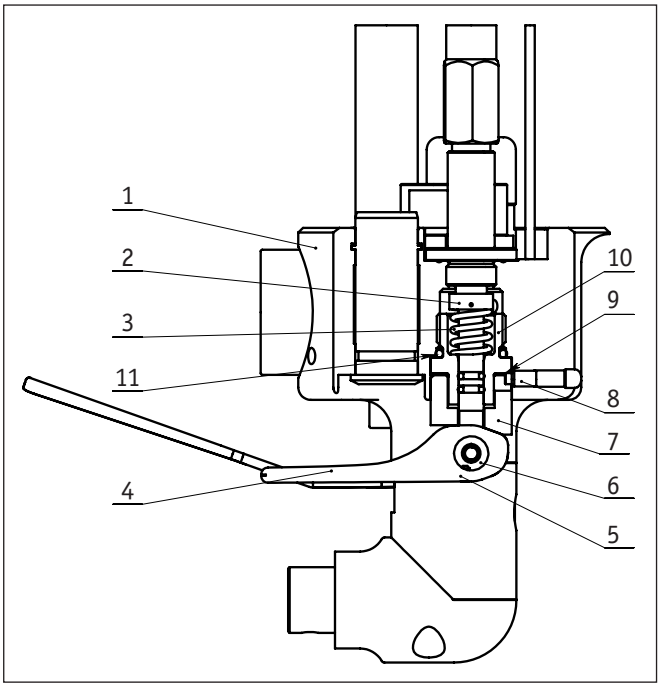
Disassembly:
- unscrew the screw (4) – 2x
- remove the handle body (2) and handle tube (3)
- remove the circlip (5) and push out the lever pin (6)
- remove the lever (7) and washers (8) and (9)
- using the 13 mm tubular box spanner unscrew the cone case (10) and remove it together with the cone (14) and spring(13)

Assembly:

Note: Before the re-assembly clean the dirt and old grease from all the parts

- lubricate the MBV cone with the Molyduval Attila GR grease while avioding the grease to fill the O-ring groove which makes the cone too difficult to insert
- put on the spring (13) and cone case (8) with O-rings (11, 12)
- lubricate the thread with the silicone grease and screw the prepared assembly into the manifold block (1)
- place the distance washer (9), friction washer (8), MBV lever (7) and push in the lever pin
- verify the clearace between the lever (7) and washer, it should be at least 0.3 mm. If necessary, remove or replace the distance washers (9) so set the clearance 0.3 – 0.5 mm.
- secure the pin (6) with the circlip (5). If the circlip is too loose use a new one. s
- put on the handle tube (3) and secure it with screws (4) – 2x

6.5.3.5 Disassembling the whisper burner (WB) and pilot burner (PB)



◀ WB and PB assembly

1 - Manifold block (53116)
2 – WB / PB cone (53284)
3 – WB / PB spring (53275)
4 – WB / PB lever – left / right (53273, 53132)
5 – adjusting screw M3x4 (2853)
6 – WB / PB lever pin
7- lever base left / right (53286)
8 – adjusting screw M5x10)2974)
9 – distance washer (53180)
10 – WB / PB MBV cone case (53285)
11 – O-ring 18x2.5 (2931)

Disassembly:

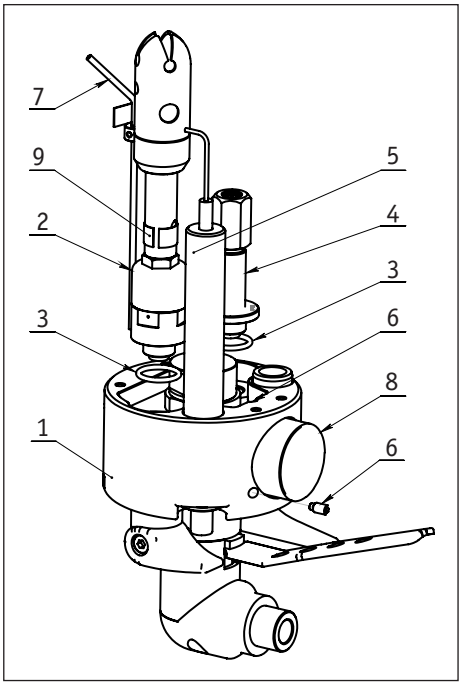
- loosen the screws (5) and (8), not necassary to unscrew them fully
- unscrew the lever pin (6), remove the lever (4) and lever base (7) with the distance washer (9)
- using the 13 mm tubular box spanner unscrew the WB / PB cone case (10) and remove it from the manifold block (1) together with the cone (2) and spring (3)

Assembly:

Note: Before the re-assembly clean the dirt and old grease from all the parts

- lubricate the WB / PB cone with the Molyduval Attila GR grease while avioding the grease to fill the O-ring groove which makes the cone too difficult to insert
- put on the spring (3) and cone case (10) with O-ring (11)
- lubricate the thread with the silicone grease and screw the prepared assembly into the manifold block (1)
- place the distance washer (9), lever base (7), WB / PB lever (4) and screw in the lever pin
- verify the clearace between the lever (4) and lever base (7), it should be at least 0.3 mm. If necessary, remove or replace the distance washers (9) so set the clearance 0.3 – 0.5 mm.
- set the lever base (7) into a correct position and secure with the screw (8)
- secure the lever pin (6) with the screw (5)

6.5.3.6 Disassembling the whisper burner (WB), pilot burner (PB), piezo ingniter and pressure gauge



◀ Manifold block with attached items

1 – Manifold block (53170)
2 – Pilot burner with pressure reducer (53118)
3 – O-ring 18x2.5 (2931)
4 – Whisper burner (53125)
5 – piezo igniter (53114)
6 – screw M5x10 (2833)
7 – suction tube (53207)
8 – pressure gauge (50524)
9 – throttle ring (53208)

Whisper burner disassembly andrRe-assembly:
- using the OK 17 spanner unscrew the WB (4) from the manifold block (1)
- place the O-ring (3) on the WB (4), lubricate the thread and O-ring with silicone grease
- screw the WB (4) into the manifold block (1) and fasten

Pilot burner disassembly and re-assembly:
- remove the suction tube, its attachment is detailed on the pic. 8
- using the OK 26 spanner loosen the PB with pressure reducer (2) in the lower part and unscrew from the manifold block (1)

- place the O-ring (3) onto the the WB pressure reducer body (2), lubricate the thread and O-ring with silicone grease
- screw the PB (2) into the manifold block (1) and fasten
- put on the suction tube (7), push it slightly to the surface of manifold block and fix its position

Piezo igniter disassembly and re-assembly:
- loosen the screw (6), no need to unscrew it fully
- remove the igniter (5) from the manifold block (1)

- lubricate the hole for igniter in the manifold block (1) with silicone grease and insert the igniter (5)
- set the position of the igniter (5) against the PB head, the igniter needle is to be placed 3-4 mm from the edge of the PB slot.

Pressure gauge disassembly and re-assembly:
- loosen the screw (9), no need to unscrew it fully
- unscrew the pressure gauge (8) from the manifold block (1), hold the gauge carefully on the metal side

- wrap the pressure gauge thread with PTFE tape and screw it into the manifold block
- fix the gauge in correct position with the screw (9)

6.5.3.7 Pressure reducer disassembly and re-assembly

Pressure reducer disassemby:

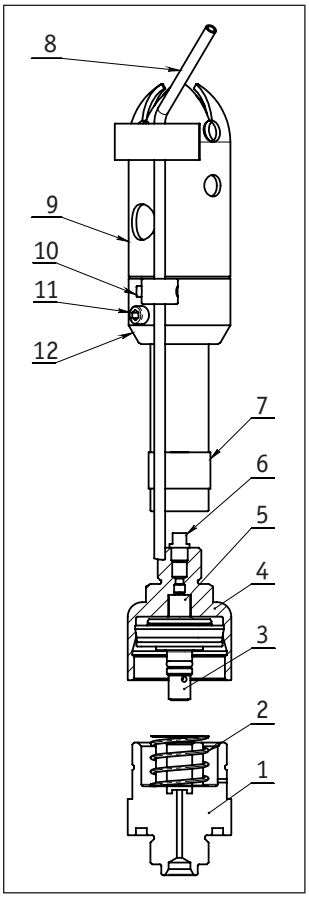
- unscrew the PB from the pressure reducer
- unscrew the PR cup (4) from the chamber nut (1). The thread is secured by Loctite 243.
- remove the piston (3) carefully

Pressure reducer assemby:

- while re-assembling lubricate the PTFE wiping seal with CARBAFLO BBL 50 and insert the piston (3) carefully into the piston chamber (4).
- place the spring (2) and screw both piston chambers together. Secure the thread with Loctite 243.

PB without the pressure reducer

In general the arrangement of PB with and without pressure reducer (supplied by a vapour phase) is the same. The differential piston and pressure equalisation hole is nor used.



Pressure reduced assembly ▶

1 – PR chamber nut (53281)
2 – PR spring (53165)
3 – Difference piston (53123)
4 – PR cup (53137)
5 – PR filter (2828)
6 – Pilot burner jet (2795)
7 – Throttle ring (53208)
8 – Suction tube (53207)
9 – Pilot burner head (53117)
10 – Adjusting screw M3x4 (2853)
11 – Adjusting screw M5x10 (2853
12 – Pilot burner leg (53141)

6.5.3.8 Pilot burner fuel filter replacement

Filter I
Fuel filter is glued into the piston chamber, see pic. 8.

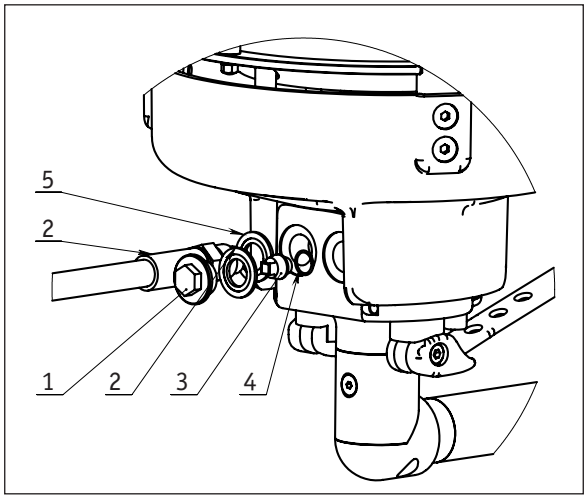
Filter II – only at on the pressure reducer version
Unscrew the filter plug (see pic. 9), unscrew the filter. Lubricate the filter thread with Molyduval Atilla GR grease prior to assembly.

CAUTION:

On version with vapour hose supply (without the pressure reducer) a blidening bolt (number 689) must be installed instead of the fuel filter. Otherwise the liquid phase would penetrate into the vapour phase circuit.

Fuel filter placement ▶

1 – Filter II plug (53209)
2 – Fuel hose
3 – Filter (1137)
4 – O-ring 10x1 (2827)
5 – Sealing washer (2765)



6.5.4 Troubleshooting

6.5.4.1 Pressure gauge repairs

Replace a non-working pressure gauge with a new one.

A loose glass should be bonded with cyanoacrylate glue.

If a needle doesn't point at zero pressure while disconnected fuel supply and Main Blast Valve open remove the glass and set the needle correctly. It is necessary to pull the needle out and push its axe in the opposite direction at the same time to prevent damage to the gauge mechanism.

After adjusting the needle position make sure the pressure gauge works correctly by pressurising it to at least 0.5 MPa. Use nitrogen for pressurisation and verify the pressure with another correct pressure gauge.

6.5.4.2 Condensate suction tube

If the suction if insufficient check whether the tube is not blocked or has deformed ends. If necessary adjust its position. Loosen the fixing screw and push the tube just to the bottom of the manifold block. The upper end of suction tube must be oriented in the axis of any of the burner jets and approximately one half the jet should be covered while seen from above.

6.5.4.3 Pilot burner and piezo igniter

If the amount of flame is too small or too big adjust by regulating the amount of intake air, see para 4.6. The amount of air can be regulated by adjusting the position of throttle ring - opening and closing the intake holes. Never close the hole fully.

If the burner extinguishes despite the fuel pressure is correct and pressure reducer working clean the Pilot Burner jet. On burner with the Pilot Burner fed by vapour fuel check the dispersing gauze which must not be blocked with dirt or carbon deposit. If so, replace it with a new one. Wash the fuel jet with petrol and blow with compressed air.

If still the pilot burner doesn't work well check the fuel filters. Remove the filter, wash it with petrol and blow with compressed air. If the filter is too dirty it should be replaced.

Filter I. stage see pic. 9, filter II. stage see pic. 8.

6.5.4.4 Cleaning the pilot burner pressure reducer

While fed by a low-quality fuel the pilot burner function may be degraded due to blocking the pressure reducer with oil segregated from the fuel. This is indicated by a weak flame and the jet stained with oil.

Remove the pressure reducer, disassemble it and clean. In the upper part is glued a fuel filter. Wash the whole part in petrol an dry well. When disassembling and assembling the burner pay attention not to damage the piston seal by the thread. Never use alkalic solvents for cleaning the piston.

A damaged piston seal is indicated by a fuel escaping from the deaerating hole in pressure reducer body Always use a new piston instead trying to replace the damaged seal. Before inserting the piston into the pressure reduced body lubricate the seal with a thin layer of PTFE lubricant CARBAFLO BBL 50.

NOTE:

A pressure reducer only little dirty can be cleaned by operating on a clean propane which forces the oil out. Let the Pilot Burner burn for at least 2 hours. It is recommended to adjust the flame after cleaning.

6.5.4.5 Main blast valve

Main blast valve control is too stiff or even jammed or the valve doesn't seal enough:

1. Check the movement of the valve control lever mechanism. Change the damaged parts and lubricate the mechanism with Molyduval Attila GR grease.
2. Check the condition and lubrication of the valve cone seal and cone case. If damaged replace the whole cone. Lubricate the friction surface and seals with Molyduval Attila GR grease.
3. Check condition of the face seal and manifold block sealing seats (sedlo armatury?) If the sealing ring is damaged replace the whole cone and clean well the bearing surfaces.
4. Check the MBV spring for permanent deformation. If the valve doesn't seal while shut replace the spring with a new one.

Fuel leakage around the lever mechanism, fuel pressure gauge, fuel hose connection or fuel filter II plug.

1. Check condition of the sealing rings and cone case. If the sealing is damaged replace the whole cone. Lubricate the friction surface and sealing rings with Molyduval Attila GR grease.
2. Check condition of pressure gauge seals. Replace the PTFE tape on the gauge thread, screw the gauge, tighten and fix the correct position with the screw.
3. Check whether the fuel hose is well tightened and condition of the USIT sealing washer on the fuel hose connection thread. If necessary replace the sealing the sealing washer and tighten the hose.
4. Check condition and tightness of the fuel filter cover. If damaged replace the sealing washer with a new one and tighten the cover.

6.5.4.6 Whisper burner valve and pilot burner valve

Whisper valve control is too stiff or even jammed or the valve doesn't seal enough:

1. Check condition of the sealing rings of the WB / PB cone and guiding surfaces of the WB / PB cone case. If the seal is damaged replace the whole cone. Clean the friction surfaces and lubricate the sealing rings with Molyduval Attila GR grease.
2. Check condition of the cone face seal and a bearing surface. If the seal is damaged replace the whole cone.
3. Check movement of the valve control mechanism. Change the damaged parts and lubricate the mechanism with Molyduval Attila GR grease.

Fuel leakage around the lever mechanism, on the upper side of manifold block around the whisper burner leg

1. Check condition of the sealing rings of the WB / PB cone and guiding surfaces of the WB / PB cone case. If the seal is damaged replace the whole cone. Clean the friction surfaces and lubricate the sealing rings with Molyduval Attila GR grease.
2. Check condition of the sealing ring and of the bearing surface. Replace the damaged sealing rings. Clean the sealing surfaces and grind off a possible burrs.

6.5.4.7 Pilot burner and piezo igniter

Pilor burner valve control is too stiff or even jammed or the valve doesn't seal enough, fuel leakage around the control lever:

The design of pilot burner mechanism is similar to that of whisper burner so follow the instruction given in para 5.6.

Pilot burner flame is uneven or distinguishes fully:

1. Check cleanness of pilot burner and pressure reducer.
2. Check position of the piezo igniter needle. Clean carbon deposit from the ceramic part. Set the correct position of the needle. Replace the non-working igniter with a new one.

6.5.4.8 Repair of leakage in junction of the descent tube / manifold block

When a leakage is detected replace the sealing rings with new ones. Do not release the stainless steel nut at the descend tube end. Unscrew the screws fixing the manifold block and remove the block. Lubricate the new sealing rings according to 6.5.2.1.

6.5.4.9 Vaporising coil, metal covers and lamellas

If deformed, straighten the deformation by knocking or prising with a hardwood rod. Only small deformations within approximately 3mm may be repaired. Strength test must be carried out after each repair involving shaping of vaporising coil, see para 7.4.

6.5.4.10 Swing burner socket

If damaged, replace the rubber washers or swing sockets with a new ones.

6.5.4.11 Adjustable height burner frame

If the adjusting arm can't maintain a fixed height it is necessary do adjust or pressurize the gas strut. This can be done by an authorised gas strut supplier or by burner manufacturer.
In case the burner frame or the gas strut is damaged so the burner height can not be fixed, replace the damaged parts with new ones.

6.5.5 Restrictions

Repairs which involve opening the fuel system, including replacement of 'O'-rings and rubber seals, must be carried out by BALÓNY KUBÍČEK spol. s r.o. or an organisation with approved in writing by BALÓNY KUBÍČEK spol. s r.o. to make these repairs. These repairs include

- Replacement of fuel hoses and connecting quick couplers
- Repairs to a vaporiser including replacement of individual jets
- Repairs to a manometer
- Repairs to blast valves, whisper burners and pilot burners
- Repairs to the pressure reducer of a whisper burner
- Repairs to a crossover valve
- Repairs to threaded joints sealed with PTFE tape or sealing lubricant

Repairs covered by para 6.5.4, including the pressure testing burner coil must be carried out by BALÓNY KUBÍČEK spol. s r.o. spol.s.r.o. or an organisation with approved in writing by BALÓNY KUBÍČEK spol. s r.o. to make these repairs.

6.6 Equipment repairs

6.6.1 Tempilabel and melting link

Do not repair / remove a damaged tempilabel, sew a new one next to it. Replace a melted link with a new one.

6.7 Instrument repairs

While repairing and servicing individual instrulents follow the instructions in the maintanace manual for a particular device.

6.7.1 Repairs of individual instruments

For maintenance and repairs of individual instrument follow the instructions in maintenance manual for the specific item.

6.8 Kubicek Fuel Cylinders Maintenance and Repairs

6.8.1 General

This chapter provides instructions for service and maintenance of fuel cylinders Kubicek KB72L and KB97L, both Master and Standard variant. All techniques and procedures described below apply to both KB72L and KB97L that only differ in the length of cylindrical section, therefore in the volume.

6.8.2 Precautions

WARNING:

Prior to loosening any of the threaded joints on the cylinder fittings, the cylinder must be emptied from residual fuel:

1. *If possible, burn the maximum fuel by the burner, then disconnect the fuel hoses.*
2. *Place the fuel tank in the ventilated outdoor area and vent the residual fuel by opening the maxfill valve.*
3. *Purge the cylinder with nitrogen*

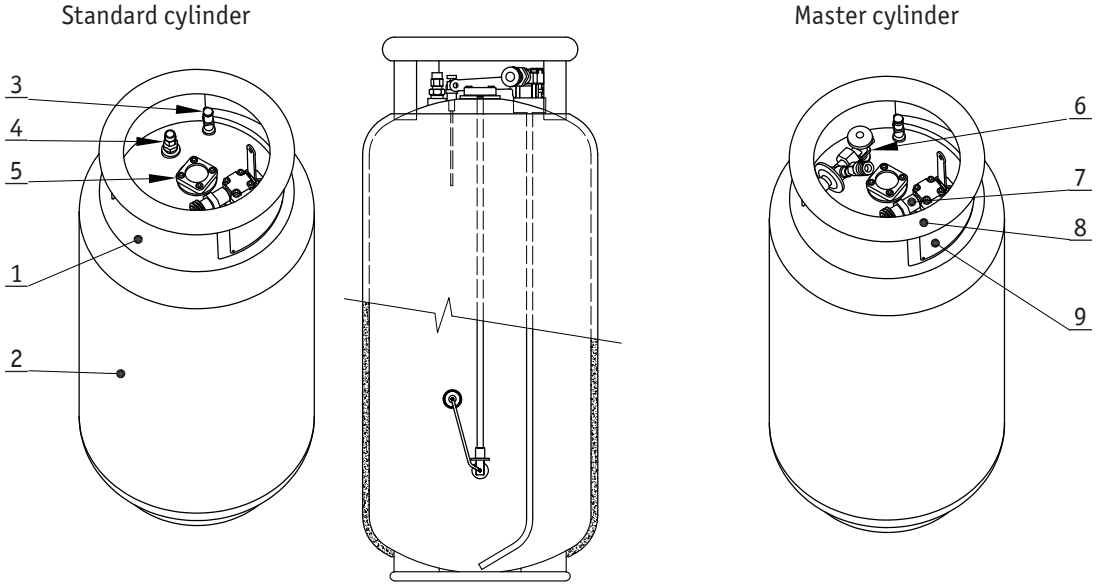
CAUTION:

It is essential that fuel cylinder burner repairs and inspections are carried out in a clean environment. The presence of dirt or chemicals may damage movable parts, rubber seals or bonded joints and cause contamination of the fuel, fuel leakage due to improper sealing.

6.8.3 Thread Sealing Means

The male conical threads are sealed either by EverSeal 183 sealant or by PTFE tape. If supplied as spare parts the EverSeal is already pre-applied, cured and prepared for installation. In case of re-installation of a removed part, clean the residual of the EverSeal with a soft steel brush and apply the EverSeal 183 on the male thread and let it cure before installation. Follow the instrutions for the EverSeal 183. If the EverSeal is not available, use PTFE tape according to instruction provided in section 5.2.2.

6.8.4 Main Parts of Fuel Cylinder



▲ **Main Parts of Fuel Cylinder**

Main parts of fuel cylinder

1 - Steel cylinder body
2 - Protective padding with outer jacket (*55137* for KB72L, *55138* for KB97L)
3 - Maxfill valve (*55133.01* for KB72L, *55133.02* for KB97L)
4 - Pressure relief valve (*3466.00+55130.00*)
5 - Fuel content gauge
6 - Vapour take-off including pressure relief valve (Master cylinders)
7 - Liquid take-off
8 - Rubber handhold (*55136.00*)
9 - Data plate

6.8.5 Standard Maintenance Techniques

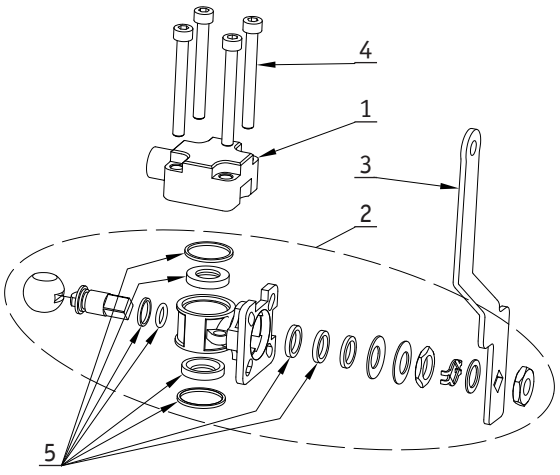
Replacement of Rubber Handhold
If damaged or worn the rubber handhold can be easily pulled out from the upper steel ring and a new rubber handhold ring put on without any tools.

Replacement of Protective Padding
Untie the cords in the upper and lower edge of the fabric jacket and pull, loosen the edges and pull the jacket upwards to remove it from the cylinder. Then remove the protective foam upwards.

The re-installation is made in reverse order.

Replacement of seals in Rego coupling
If damaged or worn the rubber seals in the male coupling of the liquid phase take-off can be easily removed fo replacement. Use a flat scrwedriver to exctract the seals. Install the new seals. (Face seal *3300.00*, Rear seal *3305.00)*.

Replacement of Liquid Take-off (B)



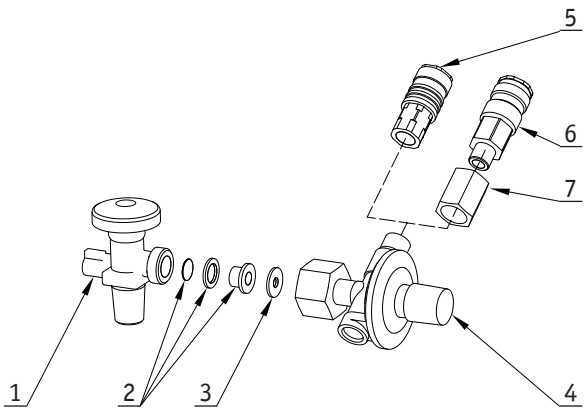
Liquid Take-off Assembly

1 - Liquid phase ball cock top (*55115.01* for Rego coupling, *55115.02* for Tema coupling)
2 - Liquid phase ball cock top (*55134.00*)
3 - Liquid phase cock handle (*55135.00*)
4 - 4 x bolt M6x55 A2 DIN 912 (*3314.00*)
5 - Set of PTFE seals (3186.01)

Disassembly:
- unscrew the bolts (4) and remove the cock top (1)
- extract the PTFE seals (5) from the ball cock body
- if necessary, remove the handle after releasing its nut

Assembly:
- proceed in the reverse order as at disassembly
- install a new set of PTFE seals, pay attention not to damage the edges
- secure the bolts with Loctite 243

Replacement of Vapour Take-off (Master cylinders)



Vapour Take-off Assembly

1 - Vapour phase valve including pressure relief valve (*3188.00*)
2 - Set of seals (*3056.00*)
3 - Sealing ring (*3057.00*)
4 - Pressure regulator (*3352.00*)
5 - Tema coupling (*3133.00*)
6 - Dynaquip coupling (*3061.00*)
7 - Dynaquip coupling fitting (*3060.00*)

The entire assembly can be dismantled by unscrewing any of the threaded joints. The vapour valve including pressure relief valve is subjected to a mandatory replacement during the 10-year inspection.

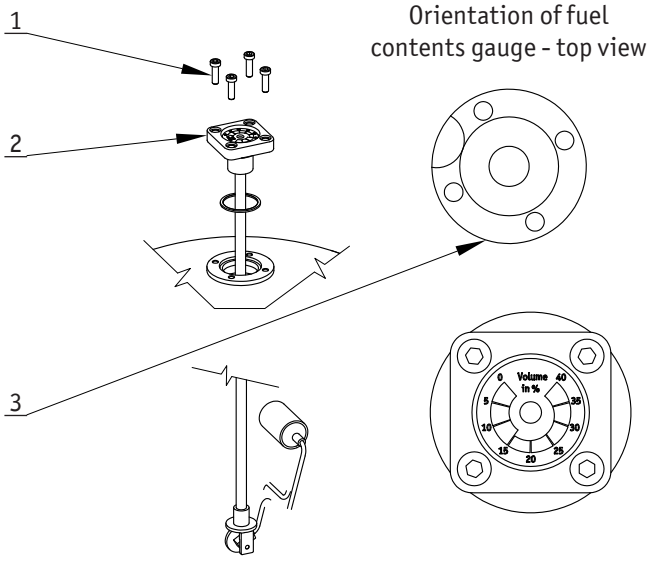
During a reassembly the threads on vapour phase valve and fuel hose couplings are to be sealed with the Everseal.

Replacement of Pressure Relief Valve (Standard cylinders)
The pressure relief valve is an indivisible part with no replaceable items. If required, unscrew it from the cylinder body and install a new one. The thread is sealed with the Everseal.

Replacement of Maxfill valve
The maxfill valve relief valve is an indivisible part with no replaceable items. If required, unscrew it from the cylinder body and install a new one. The thread is sealed with Everseal. The output nozzle is to be oriented towards an opening in the upper protecting sleeve.

Replacement of Fuel Concents Gauge

The fuel contents gauge can be removed after unscrewing its screws (1). During reinstallation pay attention to a correct alignment of its sealing ring and correct orientation - the upper part ot the dial ("Volume") must aim towards the liquid phase outlet as demonstrated at the picture. Use Loctite 243 for securing the bolts.



Orientation of fuel contents gauge - top view

Fuel Contents Gauge Installation

1 - 4 x bolt M6x20 DIN 912 A2 (*2735.00*)
2 - Fuel Contents Gauge (*55132.01 for KB72L, 55132.02 for KB97L*)
3 - Liquid phase flange

SECTION 7

7. Instructions

7. INSTRUCTIONS

7.1 General

The instructions regarding special procedures during inspections and repairs are contained in this section. Concerning the instructions involving measurement records in the written form, the particular certificates are drawn up and enclosed herein. While any certificate varying, its technical content must be retained.

7.2 Fabric Strength Test

The fabric test should be carried out to find out, whether the tested fabric is convenient (airworthy) for the following airborne service. This may be conducted directly on the envelope by using grab testers (the proprietary clamps are available from the manufacturer).

7.2.1 Test conduct

Standardly the envelope fabric is to be tested in these locations:

- About 2 m (6.5 ft) below the deflation system aperture rim, at 3 positions minimum, one time over a seam.
- If more fabric colours are used in this part of envelope, test each of them.
- If more than one type of fabric are used anywhere on the envelope (such as heavy fabric in addition to standard rip-stop), test each of them in its uppermost row of panels.

Besides the tests listed above the following envelope models require additional testing in these locations:

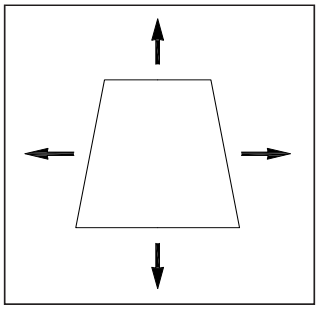
BB17GP, BB20GP	Minimum three different locations in the 4th and 5th row of panels above the mouth
BB20XR	Minimum three different locations in the row of panels above the 4th horizontal load tape

When grab testing fabric it is important to apply the stress evenly over a specific area of fabric. The fabric must be gripped with the jaw edges carefully aligned so that the same fibres are being pulled from each end. The load is to be applied in horizontal direction, i.e. parallel to the horizontal load tapes. The distance between the jaws must be 8 - 10 cm (3“ - 4“). The edges of the clamp must be parallel to the fabric so that the fibres are loaded evenly. The jaws must be tightened so that the fabric does not move. One clamp should be held stationary and the other pulled away from it with a spring balance.

The load applied on the tested fabric: **13 kg**.

7.2.2. Envelopes with windows

On envelopes fitted with transparent windows the load test also need to be performed over the entire window both in horizontal and vertical direction to inspect strength of the transparent foil and the seam. The clamps are to be attached to the surrounding fabric, not the window itself. The test load it the same af for fabric.



▲ **Grab test of the window**

7.2.3. Test evaluation

1. If the fabric withstands the specified pull and is not damaged, it is fully airworthy.
2. If the fabric fails between 10 and 13 kg fabric may be passed as airworthy with the following limitations:
   - The max admissible loading will be reduced by 20 % concerning all types.
   - Maximum wind speed for BB20XR take-off reduced to 5m/s (10 kts)
   - The balloon can only fly under favourable weather conditions.
   - The strength test must be periodically repeated either every 50 flight hours or 6 calendar months whichever comes sooner.
3. If the fabric fails below 10 kg then all the weak fabric must be replaced.

7.3 Leakage Test with Lather Solution

7.3.1 Preparation of lather solution

Mix 3 units of unpolluted water with one unit of whichever (ecological) detergent.

7.3.2 Application of lather solution

The leak detection should be carried out using a wide paintbrush (coating no pouring) or a sprayer on the tested part at the place of supposed leakage. The tested part must be exposed to the testing overpressure of 12 bar as minimum. Any leaks will be shown by the presence of bubbles. The min. observing period of the bubble initiation is 5 minutes.

7.4 Strength test of burner coils (compression test)

7.4.1 Preparation

1. Remove the coil from the burner unit so that the coil and jet ring can be tested in isolation.
2. Replace all the jets with blanking plugs (jets without holes).
3. Clean the coil.
4. Connect the vaporiser to the testing device.

7.4.2 Conducting the test

1. Fill the testing device and coil. Remove air from the system by loosening a blanking plug and retightening it when all air is removed.
2. Increase the pressure in the coil to 3 Mpa with pressurised nitrogen.
3. After 3 minutes at this pressure knock the vaporiser surface with a hard object (for example with a spanner) and watch to see that there are no visible tears, deformations or cracks.
4. Lower the pressure and let the water out of the coil by loosening of the blanking plugs. When the water is out, tighten the plug.

7.4.3 Evaluation of the result

1. Pressurise the coil with nitrogen to a pressure of at least 1.2 Mpa. Dip the vaporiser to a container with water.
2. Watch to see if there is any leakage / emergence of bubbles, that would indicate loosness or cracks in the coil.
3. The coil is considered to be sound if these tests show no defects or damage.

NOTE:

Authorised repair stations can order connecting parts and necessary to cunduct these tests from BALÓNY KUBÍČEK spol. s r.o.

7.5 Test/Trial Flight

The approved organisation considers and required possibly the test/trial flight carrying out. This decision is based on the technical balloon condition in accordance with current requirements and rules of the operator's local CAA. The range and authorisation of trial flights performing follow the valid regulations of the operator's national CAA. The manufacturer carries out ordinarily test flights according to the Certificate on Serial Flight Test/Renewal of Certificate of Airworthiness enclosed bellow.

CERTIFICATE

ON SERIAL FLIGHT TEST / RENEWAL OF CERTIFICATE OF AIRWORTHINESS (according to CAA-TI-008-k/98)*

Owner / Operator: _

Registration:	Type:	Manufacturer:	Serial No.:	Year of production:
Certificate of Airworthiness No.:			Last valid till:	Renewed till:

Balloon technical data:	Date:	In total since production:			since last annual inspection:		
		h	min	starts	h	min	starts

Technical inspection of the balon:

Envelope	Type:	Serial NO.:		
Heating unit	Type:	Serial NO.:		
Basket	Type:	Serial NO.:		
Equipment				
Fuel consumption				

The Balloon is from view of completeness and correctness of certificates and documents and keeping maintenance system and technical condition:

☐ airworthy concerning a test flight / airborne operation

☐ not airworthy concerning a test flight / airborne operation

_ _

Confirmation by approved organisation *(stamp and signature)*	Date of inspection *(C of A renewal)*	Confirmation by CAA *(stamp and signature)*

* inapplicable facts should be crossed out

FLIGHT TEST

Date	Launch field	MLS altitude	Air temperature	QNH	Wind direction/speed

Time of climbing towards 100m		Empty weight (without fuel cylinders)	
Envelope air temperature (climb of 0 m/s)		Full weight of cylinders	
Temperature after 30s		Load weight	
Descent after 30s		Take - off weight	
Fuel pressure			

Altitude AGL with the balloon descending at the 2 m/sec vertical velocity while heating was starting		Altiitude loss	
Altitude AGL with the balloon climbing at the 1 m/sec vertical velocity while heating was completed		Time of heating:	

Operation of the parachute/ Smart Vent:	Operation of the rotation vent:	Operation of the rip panel:

Further observations, notices or found out failures:		
Take - off time:	Landing field and time:	Flight time:

Conclusion

The flight test of the balloon has been conducted in compliance with the approved scheme. Considering the balloon performances and also the functioning of all components, the balloon has.

☐ a/ met

☐ b/ met since the found failures elimination

☐ c/ failed
the requirements of airworthiness.

Pilot in command technical inspector

Certificate received on behalf of: Date: Signature: _ _ _ _ _ _ _ _ _

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SECTION 8

8. Supplements

8. SUPPLEMENTS

8.1 Introduction

This Section containes necessary supplemets with information requisite for continued airworthiness of the balloon differed in further equipment or other deviations from standard balloon realisation.

8.2 List of Supplement

Date of Insertion	Supplement No.	Name of Supplement

8.3 Supplements

None

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