



Flight manual

Appendix F.1

Utilization of Ultramagic bottom ends

This Appendix describes the utilization of Ultramagic S.A. hoppers, burners, cylinders, baskets and additional equipment with Schroeder fire balloons envelopes. Equipment mentioned in this supplement can be used for the combination with Schroeder envelopes. The envelope is the defining part of the hot air balloon, all Sfb specifications and provisions are applicable. Sfb provides the applicable UM supplements for a given envelope and bottom end configuration. This supplement is approved through major change approval 10073341.

1. General description

The operation and installation of Ultramagic S.A. (UM) bottom end equipment is comparable to the operation and installation of Theo Schroeder fire balloons GmbH (Sfb) bottom end equipment.

2. Limitations

All limitations are described in the Sfb flight and maintenance manuals. If limitations differ, the most conservative limitation is to be applied.

2.1. General:

- For repair, maintenance and modification of hot air balloon equipment, only original parts of the corresponding manufacturer must be used.
- The operational limitations stated in the Sfb flight manual and its supplements must be obeyed. Additional operational limitations applicable to UM equipment will be described in the corresponding section of this supplement.
- The maximum takeoff mass is described in the corresponding data matrices of the Schroeder fire balloons flight manual.
- The maintenance tasks mentioned in the UM maintenance manual and its supplements are applicable to the bottom end equipment. The specific reference will be mentioned in table 1.
- External fuel cylinders are not allowed. UM FM Supplement 54 does not apply
- Every piece of equipment must comply to and be utilized according to the limitations and requirements described in the following supplements and the Sfb flight manual.
- All equipment must be airworthy for flight.
- For a given envelope bottom end combination the flying wires must be installed by Sfb. For any other combination the envelope manufacturer must be consulted.
- The maximum number of occupants in any one compartment is 6

2.2. Rotation vents must be fitted to envelopes when used with partitioned baskets Operational limitations for MK-32 Burner

- Maximum cylinder pressure allowed for the use of the burner is 15 bar (218 psi). Note that this maximum pressure may be used where a large pressure drop off is expected during initial flight operation.
- For general operational use, a maximum pressure of 12 bar (174 psi) should be maintained.
- The maximum allowable altitude for safe burner operation is 18,000 ft (5500 m).

Mk-32 burner variant	Envelope size ranges (m ³)
Double	1590 - 6000
Triple	3400 - 8920
Quadruple	5100 - 14415

2.3. Operational limitations for CV Vista baskets

The following limitations are additional to those already contained in the Schroeder fire balloons flight manual appendix L.1:

- Each seat has an individual load limit of 150 kg (330 lb).
- Only an individual use of each seat is allowed.
- Rotation vents must be fitted to envelopes using the CV-08 Basket.

- Only double burners or larger can be used with the CV-08 Basket.
- A maximum of 4 cylinders can be carried on board.
- Cylinders must be strapped upright in the designated positions behind the seats.

2.4. Operational limitations for Tekno baskets

- CT-01 can be used with Sfb envelope volumes from 1200 m³ to 2200 m³
- CT-02 can be used with Sfb envelope volumes from 1200 m³ to 3000 m³
- CT-03 can be used with Sfb envelope volumes from 1200 m³ to 3000 m³
- 'Tekno' baskets are approved for flight using the following burners:
 - MK-21 Single
 - BMK-008 Single
 - MK-21 Double (only CT-02 and CT-03)
 - BMK-008 Double (only CT-02 and CT-03)
 - MK-32 Double (only CT-02 and CT-03)

2.5. Operating limitations for Solo and Duo hopper:

- The maximum surface wind speed for takeoff and landing is 10 knots.
- The SOLO may only be operated with the Ultramagic SOLO Burner type 2025-0000 or the PowerPlus Sport burner type 2031-0000. The DUO will be operated with the Ultramagic SOLO Burner with the standard coil of the Single burner MK-21 or with the PowerPlus Sport burner type 2031-0000.
- The standard equipment is with the Ultramagic 30kg SOLO Fuel Cylinder type 4004-0000, fitted with a padded jacket of minimum thickness 25mm. One for the SOLO and 2 cylinders for the DUO.
- The SOLO is allowed also to fly with a standard 20 Kg, 30 Kg or 40 Kg Fuel Cylinder with a T connection. The DUO is permitted also to fly with 2 standard 20 Kg, 30 Kg or 40 Kg Fuel Cylinder.
- In order to prevent heat damage to the envelope, the equipment must not be operated if the fuel pressure exceeds 8 Bar (120 psi).
- The equipment may only be operated with envelopes fitted with rotation vents.
- Detach the cylinder prior refueling to prevent the equipment from over-balancing.
- The harness quick release box must not be operated during flight. It may only be operated after landing, when the equipment has come to a complete stop and when the pilot judges it safe to vacate the seat.
- When used in Flyker mode, the equipment may only be used with the bicycle supplied by Ultramagic.
- No more than one person may occupy the seat at any one time with the SOLO and two persons for the DUO.

Solo/Duo combination

Envelope size m ³	Hopper	Lmax
1200	SOLO	300
	DUO	400
1400	DUO	450
1600	DUO	450
1800	DUO	450
2000	DUO	450

Lmax = Maximum Lift (kg) authorised

2.6. Operational limitations for MK21 Burner, Butane Fuel Variant

WARNING : When the burner is configured for use with butane fuel, propane fuel must not be used.

- When a burner has been configured for use with nitrogen pressurised butane fuel, do not use heated butane fuel as this may result in a loss of power. Burners configured for use with nitrogen pressurised fuel are identified with a label attached to the fuel hose.
- The cylinder fuel pressure must never exceed 12bar.
- Heating of cylinders is no option.
- Butane fuel must not be used with the MK21 optional fit, electrically operated main blast valve.
- When operating the burner with butane fuel, do not exceed an altitude of 5000m (16400ft).

2.7. Operational limitations for MK-21 Electric main valve

- When the fuel pressure exceeds 12 bar (175 psi), the electrical system must be switched off and the Isolation Valve must be closed.
- Prior to refueling the fuel cylinders, ensure that the Receiver Box is switched OFF, the cable assembly is disconnected from the burner or Receiver Box and that the transmitter is safely stowed and incapable of inadvertent or accidental operation.
- The battery may only be recharged using the battery charger supplied by Ultramagic.

2.8. Operational limitations for BMK-008

- The maximum allowable altitude for safe burner operation is 21340ft (6500m).
- The burners may only be stored in conditions where the ambient temperature is within the range -25 to +50 degrees Celsius.

BMK-008 Burner variant	Envelope Range m ³
Single	1200 – 2600
Double	1800 - 6000

2.9. Operational limitations for BMK-050

- The maximum allowable altitude for safe burner operation is 21340ft (6500m).
- The burners may only be stored in conditions where the ambient temperature is within the range -25 to +50 degrees Celsius.

BMK-050 Burner Variant	Envelope range m ³
Double	3000 - 6000
Triple	4000 - 10500
Quadruple	6000 - 28252

3. Emergency procedures

For emergency procedures refer to Sfb flight manual; additional procedures are described in the corresponding section of the Flight manual or the UM flight manual supplements below:

3.1. Burners

MK-21 electric burner	UM FM Supplement 5
MK-21 Cruise control valve	UM FM Supplement 14
MK-21 Butane fuel configuration	UM FM Supplement 15
Powerplus Mini sport burner BMK-008	UM FM Supplement 17
Powerplus maxi burner BMK-050	UM FM Supplement 18
Vapour pilot light for MK-21	UM FM Supplement 21
MK-32 burner	UM FM Supplement 50
MK-32 burner; Oxygen assisted	UM FM Supplement 51

3.2. Baskets and hoppers

Solo/Duo hoppers	UM FM Supplement 9
Tekno baskets	UM FM Supplement 38
CV "Vista" baskets	UM FM Supplement 48

3.3. Cylinders

FuelTek system

UM FM Supplement 37

4. Standard procedures

No changes; refer to Sfb flight manual; additional procedures are described in the corresponding section of this manual supplement. For the operation of UM Equipment refer to the documents mentioned in Section 3 of this supplement.

5. Calculation of load capacity

No changes; refer to data matrices of the Sfb flight manual; weights of UM equipment can be taken from tables in section 6 of this supplement.

6. Description of the Equipment

For detailed description of the UM equipment refer to the flight manual and the flight manual supplement listed in Section 3. The following tables of this section hold a brief description of important equipment properties.

Burners

Burner	Single	Double	Triple	Quad
MK-2				
Total Mass (kg)	14	19	25	
MK-2 Super				
Total Mass (kg)	15	21	28	36
MK-10				
Total Mass (kg)	15	21	28	35
MK-21				
Total Mass (kg)	17	24	34	43
MK-32				
Total Mass (kg)		23,5	33	41,5
PowerPlus BMK-008				
Total Mass (kg)	12	21		
PowerPlus MaxiBMK-050				
Total Mass (kg)		20	30	41

Standard Baskets

Model	C-0	C-1	C-2	C-3	C-4	C-5	C-6
Length (m)	0,7	1,2	1	1,3	1,6	2,2	1,8
Width (m)	0,8	1	1	1,1	1,2	1,4	1,3
Height (m)	1,06	1,1	1,1	1,1	1,15	1,15	1,15
Typical empty mass (Kg)	55	67	62	79	100	192	141

Model	C-7	C-8	C-9	C-10	C-11	C-12
Length (m)	2	2,6	3	1,45	3,5	4,25±0.25
Width (m)	1,4	1,5	1,6	1,15	1,7	1,6±0,1
Height (m)	1,15	1,15	1,15	1,15	1,15	1,15
Typical empty mass (Kg)	174	220	285	95	356	457

Tekno baskets

Basket	CT-01	CT-02	CT-03
Length* (m)	1	1,2	1,2



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Width (m)	0,8	1	0,8
Wall height (m)	1,1	1,1	1,1
Empty Mass* (kg)	35	49	38
Min Karabiners Strength (kN)	0,9	2,5	0,9

* Fuel cylinders, burner and burner frame not included

Basket spec.			
Model	max. load (kg)	Capacity	
		Cylinders inside basket	Maximum Occupants
CT-01 Tekno	401	max. 4	1
		2	2
CT-02	581	max. 4	2
		max. 3	3
CT-03	450	max. 4	1
		max. 2	2

CV Basket

The CV-08 basket can be used with fire balloons G envelopes with a Volume of 3000 m³ to 6000 m³. Consider the following table for flight preparation.

Basket spec.				Capacity		
Model	Width (m)	Length (m)	max. load (kg)	Cylinders	Pilo/Crew	Passengers
CV-08	1,5	2,6	1200	4 max. 3	1 max. 2	max. 4 max. 4

Cylinders

Cylinder type	Empty mass	content	all over mass
	[kg]	[kg]	[kg]
VA 50	15	21	36
VA 70	18	29	47
V 20	14	20	34
V 30	19	27	46
V 30, high	18	29	47
Worthington, Alu	14	18	32
M20 or M20D	15	20	35
M30 or M30D	20	30	50
M40 or M40D	24	40	64

For actual basket and burner weights view weighing report.

7. Maintenance and care

For maintenance and care refer to the latest Sfb maintenance manual and its appendices.

8. Equipment

The following tables define the combinations of Sfb envelopes with UM baskets, burners and the min number of cylinders for application.

Size (m³)	1200	1600	1800	2000	2200	2600
Burner	MK-2; MK-2 Super MK-10; MK-21; MK-32 & BMK-008					
Single	x	x	x	x	x	x
Double		x	x	x	x	x
Baskets						
C0	x	x				
C1	x	x	x	x	x	x
C2	x	x	x	x	x	x
C3			x	x	x	x
C4					x	x
C10			x	x	x	x
Min.Cyl.	2	2	2	2	2	2

Size	3000	3400	3600	4000	4250	4500
Burner	MK-2; MK-2 Super MK-10; MK-21; MK-32 & BMK-008					
Double	x	x	x	x	x	x
Triple	x	x	x	x	x	x
Baskets						
C1	x	x	x			
C2						
C3	x	x	x	x	x	
C4	x	x	x	x	x	x
C5		x	x	x	x	x
C6		x	x	x	x	x
C7		x	x	x	x	x
C10	x	x	x	x	x	x
Min.Cyl.	2	2	2	2	2	2

Size	5000	6000	7000	8500
Burner	MK-2/MK-2 Super MK-10 and MK-21 BMK-008 & BMK-050			
Double	x	☀		
Triple	x	x	x	☀
Quadruple	x	x	x	x
Baskets				
C5	x	x	x	x
C6	x			
C7	x	x		
C8	x	x	x	x
C9	x	x	x	x
C11		x	x	x
C12				x
Min.Cyl.	2	2	3	3

x Compatible configuration

☀ Only MK-21; MK-32; BMK-008 and BMK-050

8.1. Minimum basket space requirements

The following table provides guidance on the number of persons that may occupy each basket type (including crew), taking into account the space available and the number of fuel cylinders on board. Basket occupancy shall not take precedence to loading limitations. Figures given must not be exceeded. On Partitioned baskets, pilot compartment capacity is shown in brackets (pilot included). Occupancy figures listed above include the pilot (and crew, if any). In partitioned baskets, occupants must be evenly distributed. For space calculations with more than 6 cylinders on board, contact Sfb. Further to occupancy calculations, easy access to hand holds must be ensured for all the occupants at any time. Observe additional room restrictions (i.e. carrying wheelchairs / seats on board); contact Sfb if in doubt.

			Number of cylinders														
			M20/Worthington					M-30					M-40				
			2	3	4	5	6	2	3	4	5	6	2	3	4	5	6
Basket type	C-0	O	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-
	C-2	O	3	2	2	1	-	2	2	1	1	-	2	2	1	1	-
	C-1	O	3	3	3	2	2	3	3	2	2	1	3	2	2	1	1
	C-3	O	4	4	4	3	3	4	4	3	3	2	4	3	3	2	2
	C-10	O	5	5	4	4	4	5	5	4	3	3	5	4	4	3	3
	C-4	O	6	6	5	5	5	6	5	5	4	4	6	5	5	4	4
	C-6	O	6	6	6	6	6	6	6	6	6	6	6	6	6	6	5
		S	6 (2)	6 (2)	6 (1)	6 (1)	6	6 (2)	6 (1)	6 (1)	6	6	6 (2)	6 (1)	6	6	5
	C-7	O	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
		S	6 (4)	6 (3)	6 (3)	6 (3)	6 (2)	6 (4)	6 (3)	6 (3)	6 (2)	6 (1)	6 (3)	6 (3)	6 (2)	6 (2)	6 (1)
		D,ST	6 (2)	6 (1)	6 (1)	6 (1)	6 (1)	6 (2)	6 (1)	6 (1)	6 (1)	6 (1)	6 (1)	6 (1)	6 (1)	6 (1)	6 (1)
	C-5	D,ST	8 (3)	8 (2)	8 (2)	8 (2)	8 (1)	8 (3)	8 (2)	8 (2)	8 (1)	8 (1)	8 (3)	8 (2)	8 (1)	8 (1)	8 (1)
		DT	8 (3)	8 (2)	8 (2)	8 (2)	8 (1)	8 (3)	8 (2)	8 (2)	8 (1)	8 (1)	8 (2)	8 (2)	8 (1)	8 (1)	8 (1)
	C-5L	D,ST	10 (1)	10 (1)	10 (1)	10 (1)	10 (1)	10 (1)	10 (1)	10 (1)	10 (1)	10 (1)	10 (1)	10 (1)	10 (1)	10 (1)	10 (1)
		DT	8 (2)	8 (2)	8 (2)	8 (1)	8 (1)	8 (2)	8 (2)	8 (1)	8 (1)	8 (1)	8 (2)	8 (2)	8 (1)	8 (1)	8 (1)
	C-8	D,ST	10 (2)	10 (2)	10 (2)	10 (1)	10 (1)	10 (2)	10 (2)	10 (1)	10 (1)	10 (1)	10 (2)	10 (2)	10 (1)	10 (1)	10 (1)
		DT	12 (1)	12 (1)	12 (1)	12 (1)	12 (1)	12 (1)	12 (1)	12 (1)	12 (1)	12 (1)	12 (1)	12 (1)	12 (1)	12 (1)	12 (1)
	C-8L	D,ST	10 (2)	10 (2)	10 (2)	10 (1)	10 (1)	10 (2)	10 (2)	10 (1)	10 (1)	10 (1)	10 (2)	10 (2)	10 (1)	10 (1)	10 (1)
		DT	12 (1)	12 (1)	12 (1)	12 (1)	12 (1)	12 (1)	12 (1)	12 (1)	12 (1)	12 (1)	12 (1)	12 (1)	12 (1)	12 (1)	12 (1)
	C-9	D,ST	12 (2)	12 (2)	12 (2)	12 (1)	12 (1)	12 (2)	12 (2)	12 (2)	12 (1)	12 (1)	12 (2)	12 (2)	12 (2)	12 (1)	12 (1)
		DT	12 (2)	12 (2)	12 (2)	12 (1)	12 (1)	12 (2)	12 (2)	12 (2)	12 (1)	12 (1)	12 (2)	12 (2)	12 (2)	12 (1)	12 (1)
	C-11	DT	16 (3)	16 (3)	16 (3)	16 (2)	16 (2)	16 (3)	16 (3)	16 (2)	16 (2)	16 (1)	16 (3)	16 (3)	16 (2)	16 (1)	16 (1)
	C-12	DT	-	24 (4)	24 (3)	24 (3)	24 (3)	-	24 (4)	24 (3)	24 (3)	24 (2)	-	24 (2)	24 (2)	24 (1)	24 (1)

Basket styles: O = open; S = pilot compartment; D = double partition; ST = single T; DT = double T

9. Annotations

1. Basket measures may vary up to $\pm 0,075$ m:
2. For each burner unit with independent fuel supply, one cylinder must be installed in the basket for each flight.
3. The number of fuel cylinders is restricted by the number of fasteners inside the basket.