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## 8.7 ULTRAMAGIC 'BOTTOM ENDS'

### 8.7.1 GENERAL INFORMATION

This supplement shall be inserted in the Flight Manual, in Section 8: 'Supplements' with the revisions record sheet amended accordingly.

Information contained herein supplements, or in the case of conflict, supersedes that contained in the basic Flight Manual. For Limitations, Procedures, and Performance Data not contained in this supplement, consult the basic Hot Air Balloon Flight Manual.

Throughout this supplement the term "Cameron" refers to envelopes, burners and cylinders manufactured by Cameron, Lindstrand Hot Air Balloons Limited, Sky and Thunder & Colt.

All references to the Ultramagic Flight Manual refer to Flight Manual Ref FM04, Revision 26 or later approved revision.

This supplement consists of ten pages.

Supplement 7.7 to Maintenance Manual issue 10 is required to ensure continued Airworthiness.

### 8.7.2 LIMITATIONS

#### 8.7.2.3 Fuel

3. Maximum cylinder pressure is 12 bar (175 psi) for all burner types except MK-32 which is 15 bar (218 psi)
4. With the MK-21 Electric Burner, if fuel pressure exceeds 12 bar (175 psi), the electrical system must be switched off and the Isolation Valve must be closed.

#### 8.7.2.3.1 Fuel pressures

2. The minimum fuel pressure must be 6 bar when the MK21 Burner is used with envelopes of volume 450,000 ft<sup>3</sup> or greater.
3. The minimum fuel pressure must be 6 Bar when the MK32 burner is used with envelopes of volume greater than 500,000 ft<sup>3</sup>.

#### 8.7.2.4 Minimum Burner Requirements

##### 8.7.2.4.1 MK-2, MK-10 and MK-21 Burner

Burner Configuration	Permitted Envelope Volume
Single	25,000 ft <sup>3</sup> (708 m <sup>3</sup> ) - 105,000 ft <sup>3</sup> (2974 m <sup>3</sup> )
Double	56,000 ft <sup>3</sup> (1586 m <sup>3</sup> ) - 210,000 ft <sup>3</sup> (5947 m <sup>3</sup> )
Triple	105,000 ft <sup>3</sup> (2974 m <sup>3</sup> ) - 300,000 ft <sup>3</sup> (8496 m <sup>3</sup> )
Quad Mk2, Mk10	180,000 ft <sup>3</sup> (5098 m <sup>3</sup> ) - 425,000 ft <sup>3</sup> (12036 m <sup>3</sup> )
Quad Mk-21	180,000 ft <sup>3</sup> (5098 m <sup>3</sup> ) - 550,000 ft <sup>3</sup> (15574 m <sup>3</sup> )

##### 8.7.2.4.2 BMK-008 Powerplus Burner

Burner Configuration	Permitted Envelope Volume
Single	20,000 ft <sup>3</sup> (565 m <sup>3</sup> ) - 120,000 ft <sup>3</sup> (3398 m <sup>3</sup> )
Double	65,000 ft <sup>3</sup> (1841 m <sup>3</sup> ) - 210,000 ft <sup>3</sup> (5947 m <sup>3</sup> )

##### 8.7.2.4.3 BMK-050 Powerplus Maxi Burner

Burner Configuration	Permitted Envelope Volume
Double	180,000 ft <sup>3</sup> (5098 m <sup>3</sup> ) - 300,000 ft <sup>3</sup> (8496 m <sup>3</sup> )
Triple	250,000 ft <sup>3</sup> (7080 m <sup>3</sup> ) - 600,000 ft <sup>3</sup> (16992 m <sup>3</sup> )
Quad	350,000 ft <sup>3</sup> (9912 m <sup>3</sup> ) - 600,000 ft <sup>3</sup> (16992 m <sup>3</sup> )

##### 8.7.2.4.4 MK-32 Burner

Burner Configuration	Permitted Envelope Volume
Double	56,000 ft <sup>3</sup> (1586 m <sup>3</sup> ) - 225,000 ft <sup>3</sup> (6372 m <sup>3</sup> )
Triple	120,000 ft <sup>3</sup> (3398 m <sup>3</sup> ) - 315,000 ft <sup>3</sup> (8920 m <sup>3</sup> )
Quad	180,000 ft <sup>3</sup> (5098 m <sup>3</sup> ) - 550,000 ft <sup>3</sup> (15574 m <sup>3</sup> )

#### 8.7.2.15 BASKETS

- Only baskets with rectangular passenger compartments (excluding corner radii) may be used.
- Each Ultramagic basket has a maximum load, shown on the basket identification plate. This maximum load corresponds to the maximum mass that can be carried inside the basket and/or suspended from the basket structure, but excluding the mass of the empty basket itself.

Regardless of the lift available resulting from section 5, the basket maximum load must not be exceeded at any time.

#### 8.7.2.18 Equipment Interchangeability

1. The burners and baskets manufactured by Ultramagic which may be used in combination with Cameron envelopes are listed in Section 8.7.9 of this supplement.
2. Cameron Burners may be combined with Ultramagic baskets when fitted in compatible frames (Refer to Table 9). The burner limitations from the base flight manual apply.

#### 8.7.2.19 Maximum Flight Altitude

1. The maximum allowable altitude for safe burner operation when using the BMK-008 and BMK-050 is 21340 ft (6500 m).
2. The maximum allowable altitude for safe burner operation when using the MK-32 is 18,000 ft (5500 m).

#### 8.7.2.20 Burner Storage Temperature

1. The BMK-008 and BMK-050 burners may only be stored in conditions where the ambient temperature is within the range -25 to +50 degrees Celsius.

#### 8.7.2.21 W-2.8 'Mini Worthington' Vapour Cylinder

Sufficient provision of fuel must be carried on board to supply the pilot lights. When full, a W-2.8 Cylinder is able to supply vapour to a pilot light for 10 hours. If using a cylinder with double-outlet to feed two burners, this time is reduced by a half.

A minimum of two independent sources of fuel for the vapour pilot lights must be available at any time. A single small vapour cylinder with a double outlet is not considered an independent source. A master cylinder pressurized with inert gas (e.g. Nitrogen) is not usable as vapour supply.

W-2.8 cylinders may only be filled with LPG. No pressurisation of the cylinder with inert gas is permitted.

### **8.7.3 EMERGENCY PROCEDURES**

The following procedures supersede the corresponding emergency procedures in the main manual where the following burners are fitted:

#### **8.7.3.11.1 Pilot Light Failure MK-2, MK-10, MK-21, MK-32**

##### **8.7.3.11.1.1 Single Burner Unit**

If for any reason the pilot light should go out, try to relight it immediately with the piezoelectric ignition system, matches or other igniters. In case of failure to re-ignite proceed as follows:

1. Close the vapour and liquid take-off valve(s) on the corresponding cylinder.
2. Open completely the blast valve on the burner.
3. Open slightly the liquid take-off valve on the cylinder on the same side to allow a small flow of propane.
4. Ignite the main burner, and regulate the flame using the liquid valve on the cylinder, taking care not to allow it to extinguish.
5. Land as soon as possible

##### **8.7.3.11.1.2 Burner with Additional “Quiet” Burner**

1. Open the valve on the “quiet” burner very slightly and ignite it.
2. Adjust the level of the “quiet” burner to act as an adequate pilot light.
3. Continue to use the main burner as usual, carefully monitoring the “quiet” burner valve for freezing. If freezing occurs, follow 8.7.3.11.1.1.
4. Land as soon as possible.

##### **8.7.3.11.1.3 Double, Triple or Quadruple Burner Unit**

1. Continue the flight with another burner while trying to re-ignite. If further pilot lights fail, proceed as described in 8.7.3.11.1.1 or 8.7.3.11.1.2, whichever is appropriate.
2. Land as soon as possible.

#### **8.7.3.11.2 Pilot Light Failure BMK-008 and BMK-050**

If for any reason the pilot light should go out, try to re-light it immediately using the piezoelectric ignition system, matches or other igniters. In case of failure to re-ignite, proceed as follows:

1. Close the vapour and liquid take-off valve(s) on the corresponding fuel cylinder.
2. Open the main valve on the burner to the first position and depress the emergency-lock button on the side of the handle post so that the main valve is held in the open position.
3. Open slightly the liquid take-off valve on the associated fuel cylinder to allow a small flow of fuel.
4. Ignite the main burner and regulate the flame using the liquid take-off valve on the cylinder to act as an adequate pilot light.
5. Continue to use the liquid fire burner as usual but carefully monitor the burner and cylinder valves for signs of freezing.
6. Land as soon as possible.

#### **8.7.3.12 Icing of the regulator on systems using a vapour pilot light.**

When the fuel cylinders are horizontal during inflation, the regulator on the vapour take-off may be fed not with gas, but with liquid propane. If the time taken for inflation is too long, ice may form, which could extinguish the pilot light. If this happens, shut down the vapour take-off valve at the cylinder. Wait until all the liquid in the regulator and connections has burned off, and the ice melts, then reopen the valve and re-ignite the pilot light.

#### **8.7.3.13 MK-21 Electric Burner**

##### **8.7.3.13.1 Loss of Electrical Valve Operation**

In the event that the electrical valve fails to operate, switch off the power at the Receiver Box. Close the Isolation Valve. Continue to operate the burner using the manual controls as normal. Land as soon as possible.

##### **8.7.3.13.2 Failure of Electric Valve to Turn Off**

In the event that the burner fails to extinguish after operating the electric valve, turn off the fuel supply at the cylinder. When the main burner flame has extinguished, operate the appropriate transmitter button and make sure that the Solenoid Valve is fully vented. Close the Isolation Valve. Turn off the electrical system by operating the pushbutton on the Receiver Box. Re-open the cylinder valve and check to ensure that no fuel is leaking from the solenoid valve. Continue to operate the burner using only the manual controls. Land as soon as possible.

### 8.7.3.13.3 Failure of Solenoid Valve to Close

High fuel pressures or debris in the fuel can prevent the Solenoid Valve closing. This can result in the failure of the main valve to turn off or a slow leak of fuel from the Solenoid Valve Exhaust. In the event that the main valve fails to turn off proceed as detailed in 8.7.3.13.2. In the event that fuel leaks from the solenoid exhaust, turn off the Isolation Valve. Operate the appropriate transmitter button to fully vent the Solenoid Valve. Turn off the electrical system by operating the pushbutton on the Receiver Box. Continue to operate the burner using only the manual controls. Land as soon as possible.

## 8.7.4 NORMAL PROCEDURES (ADDITIONAL)

### 8.7.4.4 TAKE OFF

#### Pre-Take-off Checks (additional)

##### Burner Test

(BMK-008 / BMK-050 only)

Operate the main burner in the first and second positions. Check for correct ignition of the main burner (first position) and then the main and liquid burner (second position).

Operate the main valve and press the emergency lock button on the side of the handle post. Check that the main valve is held in the open position. Release the lock by gently squeezing the main valve handle.

##### Burner Test (Hydraulic remote control only)

If a hydraulic remote-control valve is fitted, this should be connected and tested.

The valve on the burner should open fully when the hydraulic handle is depressed.

### 8.7.4.11.2 Refuelling a W-2.8 'Mini Worthington' Vapour Cylinder

The W-2.8 small Vapour cylinder uses the same coupling for refilling and gas withdrawal. The regulator assembly must be removed prior to the refill. Ensure the handwheel valve on the cylinder is closed and the circuit vented. Undo the nut securing the regulator to the main valve with a suitable 7/8" or 23mm spanner (note that the thread is left-handed), and connect the hose from the fuel source.

Monitor the fill by using the FLLG built into the valve assembly. Depending on the valve, the FLLG may be operated by hand or by using a suitable flat blade screwdriver (6mm minimum). The valve may be additionally fitted with an internal overfill prevention device, the fuel level must be controlled using the FLLG.

Once filling is complete check the fuel level again using the FLLG to ensure that the cylinder is full. During filling the FLLG often expels a small amount of liquid from the incoming fuel stream which can lead to the cylinder being under-filled.

When the cylinder is full, the regulator assembly must be refitted by following the reverse procedure described above, including a leak test prior to flight.

### 8.7.5 WEIGHT CALCULATIONS

No change.

### 8.7.6 BALLOON AND SYSTEMS DESCRIPTION

#### 8.7.6.3 Burner

Refer to applicable Ultramagic Flight Manual.

#### 8.7.6.4 Fuel Cylinders

Refer to applicable Ultramagic Flight Manual.

#### 8.7.6.5 Basket

Refer to applicable Ultramagic Flight Manual.

### 8.7.7 BALLOON MAINTENANCE, HANDLING AND CARE

Refer to applicable Ultramagic Flight Manual.

**NOTE:** The use - including handling, transportation and filling - of transportable gas cylinders manufactured prior to 2004 could be prohibited by legislation (e.g. ADR, RID, ADN) in many countries unless the cylinder has been reassessed for conformity against accepted design/manufacturing standards (e.g. pi-marked).

The owner/operator of the cylinder is responsible for establishing if compliance is required and ensuring that compliance is maintained. Cameron Balloons Ltd. is unable to provide advice on this matter and local guidance should be sought in the country of operation.

### 8.7.9 EQUIPMENT LIST

#### 8.7.9.2 Equipment List

Tables 7, 8 and 9 list the Ultramagic fuel cylinders, burners and baskets which may be used with Cameron envelope types.

**Table 7: Ultramagic Fuel Cylinders (additional)**

Cylinder Category	Cylinder Material	Cylinder Model	Weight Full
1a	Aluminium	W-2.8 (Mini Worthington)	7.5 kg
1	Aluminium	4100-U4-27 (Worthington)	34 kg
2	Stainless Steel	M-20/M-20D	35 kg
2	Stainless Steel	M-30/M-30D	50 kg
3	Stainless Steel	M-40/M-40D	64 kg
2	Titanium	T-25	36.5 kg

**Table 8: Ultramagic Burners**

Burner Category	Part No.	Burner Model
A	2003	MK-2 Single
A	2005	MK-2 Super Single
A	2011	MK-10 Single
A	2021	MK-21 Single
A	2031	BMK-008 Single
B	2002	MK-2 Double
B	2006	MK-2 Super Double
B	2012	MK-10 Double
B	2022	MK-21 Double
B	2022/100-0000-0200	MK21 Double Electric option
B/C	2062	MK-32 Double
B	2032	BMK-008 Double*
B/C	2052	BMK-050 Double*
C	2004	MK-2 Triple
C	2007	MK-2 Super Triple
C	2013	MK-10 Triple
C	2032	MK-21 Triple
B/C	2063	MK-32 Triple
C/D	2053	BMK-050 Triple*
D	2005	MK-2 Quadruple
D	2008	MK-2 Super Quadruple
D	2014	MK-10 Quadruple
D	2024	MK-21 Quadruple
D	2064	MK-32 Quadruple
D	2054	BMK-050 Quadruple*

**WARNING:** \* Refer to limitations for permitted envelope volume combinations.



**Table 9: Ultramagic Baskets**

Basket Category	Drawing Number	Applicable Cylinders	Applicable Load Frames
B	C-0	1,2,3	Refer to applicable burner Part Number
C	C-1	1,2,3	Refer to applicable burner Part Number
C	C-2	1,2,3	Refer to applicable burner Part Number
C	C-3	1,2,3	Refer to applicable burner Part Number
E	C-4	1,2,3	Refer to applicable burner Part Number
G	C-5	1,2,3	Refer to applicable burner Part Number
G	C-6	1,2,3	Refer to applicable burner Part Number
G	C-7	1,2,3	Refer to applicable burner Part Number, CB2470
I	C-8	1,2,3	Refer to applicable burner Part Number
K	C-9	1,2,3	Refer to applicable burner Part Number
D	C-10	1,2,3	Refer to applicable burner Part Number
O	C-11	1,2,3	Refer to applicable burner Part Number, CQ2124
Q	C-12	1,2,3	Refer to applicable burner Part Number*
Q	C14	1,2,3	Refer to applicable burner Part Number*

**NOTE:** \* These baskets may require special length flying wire sets (contact Cameron Balloons Ltd for information).

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