MAINTENANCE MANUAL SUPPLEMENT NUMBER 15

IMPROVED REGULATOR AND PILOT LIGHT FUEL FILTERING ON THE MK 21 BURNERS

Section 1

1.0 Introduction

This supplement defines the maintenance and inspection requirements for the range of Ultramagic MK 21 burners when fitted with the improved Regulator Valve and Pilot Light fuel filters.

Sections 1 to 5 detail the maintenance procedures and the parts used. Section 6 details the annual / 100 hour inspection and test requirements.

The burner when fitted with the improved filtering uses many common components to the standard MK21 burner already detailed in the Maintenance Manual. Only those areas, which are different to those already detailed in the Maintenance Manual, are described in this supplement. All other limitations, instructions and safety information contained in the Maintenance Manual remain applicable.

1.1 Applicability

The information contained in this supplement applies to the Ultramagic range of MK 21burners, when fitted with the improved filtering, as defined by the following drawing numbers:

Single Burner:	2021/0000
Double Burner:	2022/0000
Triple Burner:	2023/0000
Quad Burner:	2024/0000
Solo Burner:	2025/0000
Duo Burner:	2026/0000

1.2 Replacement Parts and Procedures

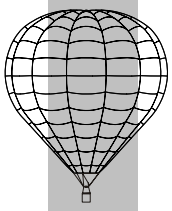
See Maintenance Manual.

1.3 Approved Maintenance and Inspection Personnel

See Maintenance Manual.

1.4 Welding and Welders

See Maintenance Manual.



1.5 Maintenance Records

See Maintenance Manual.

1.6 Technical Support

See Maintenance Manual.

1.7 Safety

The following safety instructions are additional to those already contained in the Maintenance Manual:

- Before initiating any maintenance work on the burner, ensure that the burner is fully vented of fuel and that it is disconnected from any fuel supply.

Section 2

2.0 Airworthiness Limitations

2.1 Approval Statement

This supplement provides the maintenance information for the MK21 burner when fitted with the improved regulator and pilot light filters, as required by EASA CS 31 HB.82 and FAR 31 section 31.82.

2.2 Mandatory Replacement Time

See Maintenance Manual.

2.3 Inspection Interval

See Maintenance Manual.

Additional inspection requirements for the improved filtering are defined in Section 6 of this Supplement.

Section 3

3.0 Technical Description

The improved filtering consists of two filters. The first filter is a sintered bronze construction and is fitted directly in front of the fuel inlet to the Pilot Regulator Valve. The new filter replaces the mesh filter previously used in the same location. The second filter takes the form of two mesh disks fitted in the bulkhead coupling used to secure the Pilot Light Assembly to the burner valve block.

The pilot light filter is now fitted as standard and was introduced on burner serial number 738. The regulator valve filter is now fitted as standard and was introduced on burner serial 766.

The use of the improved filtering is recommended for all burners especially in locations where the fuel quality is known to be poor. To retrofit the filters, refer to Ultramagic Technical Instruction 007.

The regulator and pilot light filters may be seen in Figures 1 and 2 respectively.

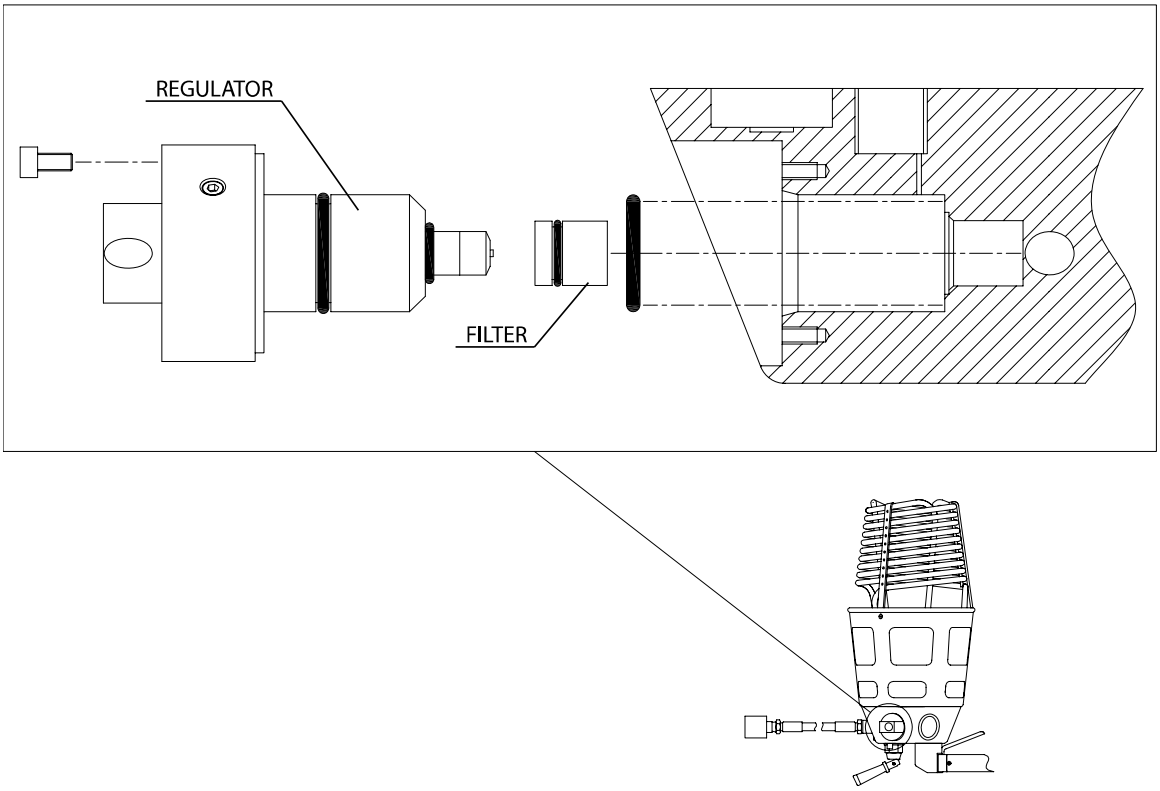


Figure 1
Regulator Valve Filter

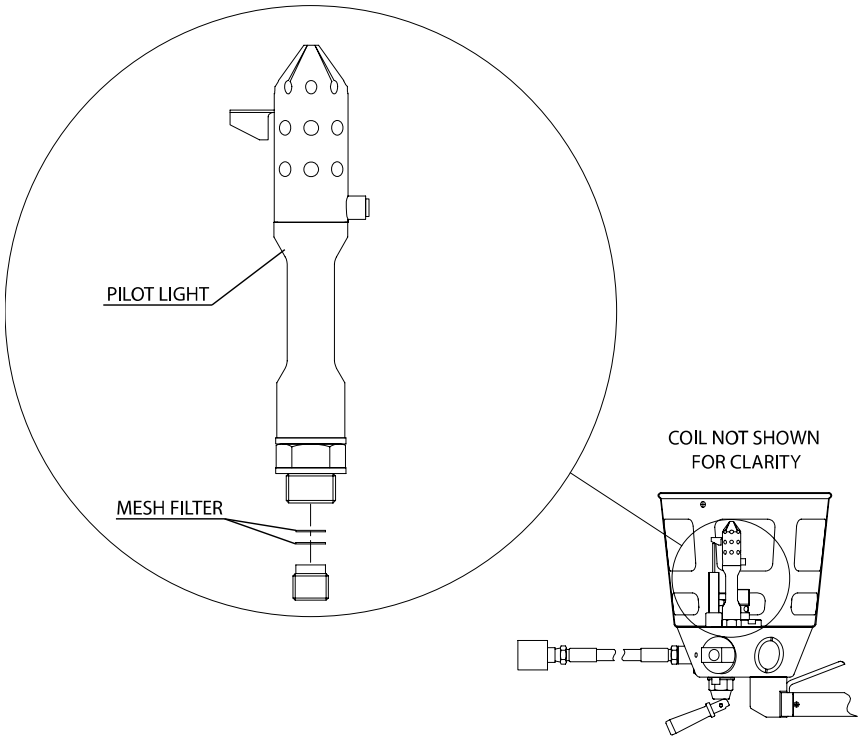


Figure 2
Pilot Light Filter

Section 4

4.0 Preventative Maintenance

4.1 General

All preventative maintenance is as described for the MK 21 Burner in the Maintenance Manual with the following additions:

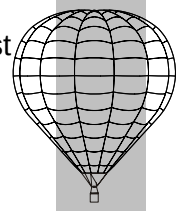
4.1.1 Weak Pilot Light Flame

Check the strength of the pilot light flame. A weak or short flame is indicative of one, or a combination of the following problems:

- A partial blockage of the pilot light jet.
- A partial blockage of the fuel outlet hole in the regulator valve body.
- A failure of the regulator piston to move forward under the force of the piston spring.
- A blocked regulator filter.
- A blocked pilot light filter.

In the case of the blocked pilot light jet, the jet will need to be removed and cleaned or replaced. Refer to the Ultramagic Maintenance Manual for instructions.

In the case of the partial blockage of the fuel outlet hole in the regulator valve body and the failure of the regulator piston to move forward under the force of the piston spring, the regulator will need to be removed and stripped down. Refer to the Ultramagic Maintenance Manual for instructions.



If it is determined that the regulator or pilot light filters are blocked then they must be removed and cleaned or replaced. Refer to Section 5 for further instructions.

4.1.2 Large Pilot Light Flame

Check the strength of the Pilot Light flame. If the flame is seen to be very large, or occasionally flares to a large flame and then recovers, or if it is considered that the flame is “spitting”, then the cause of the problem may be as a consequence of one or a combination of the following problems:

- Presence of contamination inside the regulator ball housing preventing the small viton ball from sealing correctly.
- Excessive friction preventing the regulator piston from smooth and free movement inside the regulator body.
- Presence of contamination preventing the large “O” seal between the regulator body and the valve block bore from creating a perfect seal.
- Presence of contamination between the regulator body fixing flange and the mating face of the valve block bore, preventing the regulator from seating correctly.
- Damage to the regulator bore fixing flange face preventing the regulator from seating correctly.
- Partial or temporary blockage of the pilot light jet.

In the first two cases, the regulator must be removed, stripped down and the problem resolved. For instructions relating to the removal and strip-down of the regulator, refer to the Ultramagic Maintenance Manual.

Check for any contamination inside the regulator ball housing. If any contamination is found it must be removed.

If excessive friction of the piston is noted, remove the piston and lubricate the piston seal and the inside of the regulator with a **THIN** smear of Molycote 111 silicon grease. If this fails to resolve the problem, contact Ultramagic for further instructions. Do not use excessive quantities of the grease as this can cause jet blockage.

In case three, refer to the Ultramagic Maintenance Manual and remove the regulator. Remove the “O” seal from inside the valve block and clean it carefully. Check for any signs of damage to the seal. Damaged seals must be replaced. Check the inside of the valve block regulator bore. Make sure that all areas of the bore are perfectly clean and free from any contamination such as small particles of swarf etc.

In case four, refer to the Ultramagic Maintenance Manual and remove the regulator. Check for any contamination on the reverse side of the regulator mounting flange which might prevent the regulator from seating fully on the valve block. Check the mating face of the valve block bore for any signs of contamination, which might prevent the regulator from seating fully.

In case five, refer to the Ultramagic Maintenance Manual and remove the regulator. Check the valve block regulator bore mounting face for any signs of damage such as burrs, particularly on the mounting flange edge, which might prevent the regulator from seating fully. If any significant damage is detected, contact Ultramagic for further instructions.

In case six, the pilot light jet must be removed and cleaned or replaced. Refer to the Ultramagic Maintenance Manual for instructions.

Section 5

5.0 Repair and Maintenance

5.1 General

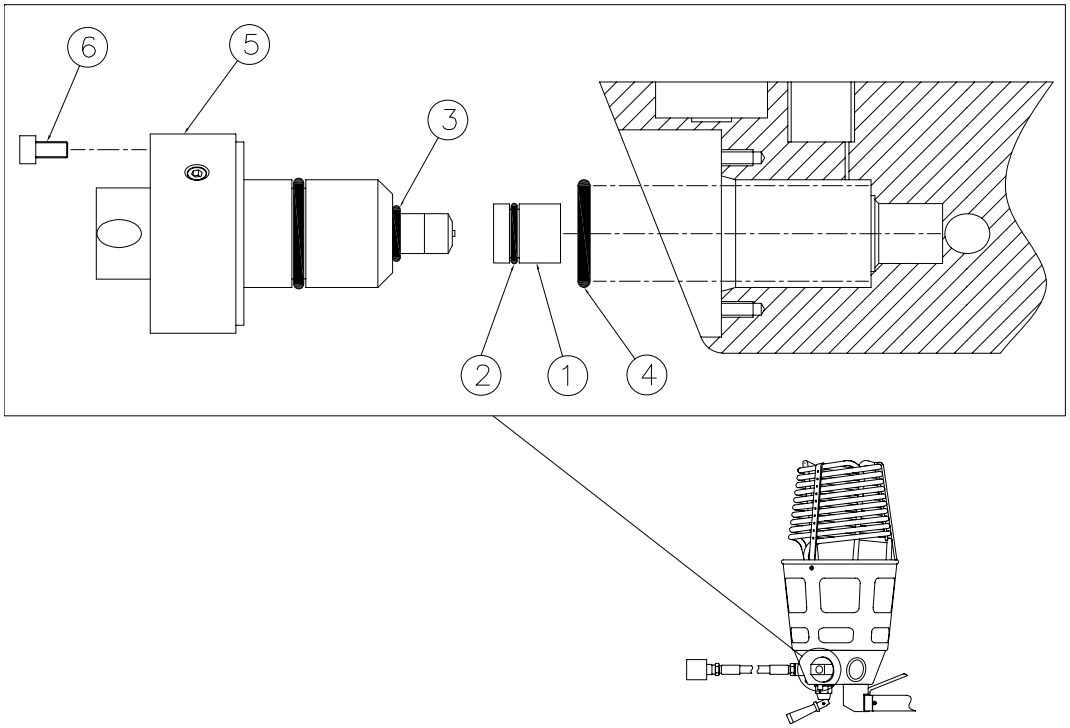
This section describes the procedures necessary to enable the removal, repair, cleaning and replacement of the components used in the regulator and pilot light filters.

Maintenance other than that detailed in Section 4, (Preventative Maintenance) and Section 6, (Annual / 100 Hour Inspection) should not be carried out unless it is clear that there is a fault or there is a noticeable deterioration in the performance of any part of the equipment functions.

Unless otherwise stated, maintenance specified in this section may only be carried out by Ultramagic or by a maintenance organisation approved by the airworthiness authority in the country of registration.

5.2 Regulator Valve Filter

The regulator valve filter is fitted inside the burner valve block regulator bore. To remove the filter, refer to Figure 3 and proceed as follows:



ITEM	DESCRIPTION	DRG / PART NUMBER
1	REGULATOR FILTER	2022-0321
2	12 ID x 1.5 THICK HIGH NITRIL “O” SEAL	MA-FE-0625
3	8 ID x 2 THICK HIGH NITRILE “O” SEAL	MA-FE-0607
4	21 ID x 3 THICK HIGH NITRILE “O” SEAL	MA-FE-0622
5	REGULATOR ASSEMBLY	2022-0800
6	M4 X 8 ST STL HEX DRIVE, CAP HEAD SCREW	MA-FE-0505

Figure 3
Regulator Filter

- Before commencing work, ensure that the burner is completely vented of fuel and that it is not connected to any fuel supply.
- Refer to the Ultramagic Maintenance Manual and remove the Regulator Assembly (Item 5) from the burner valve block.
- Withdraw the Regulator Filter (Item 1) from inside the bore using a suitable sharp pointed tool as shown in Figure 4 below.

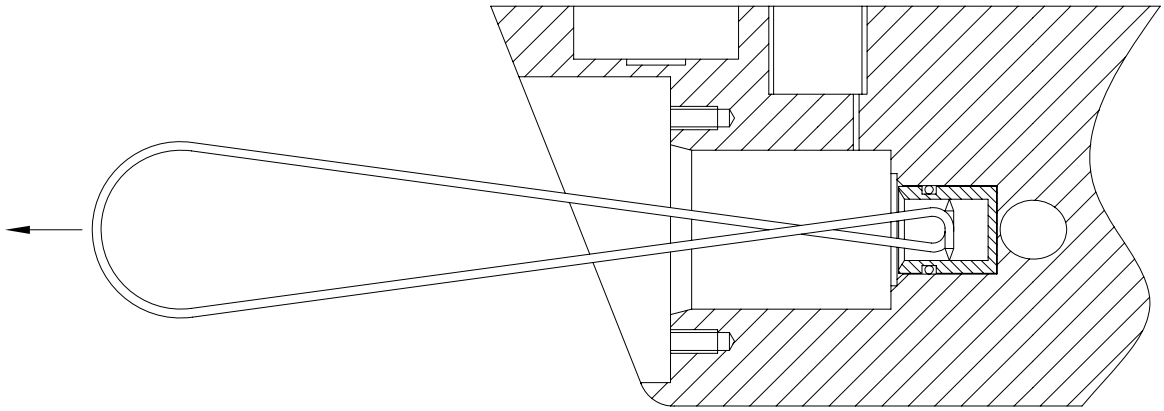
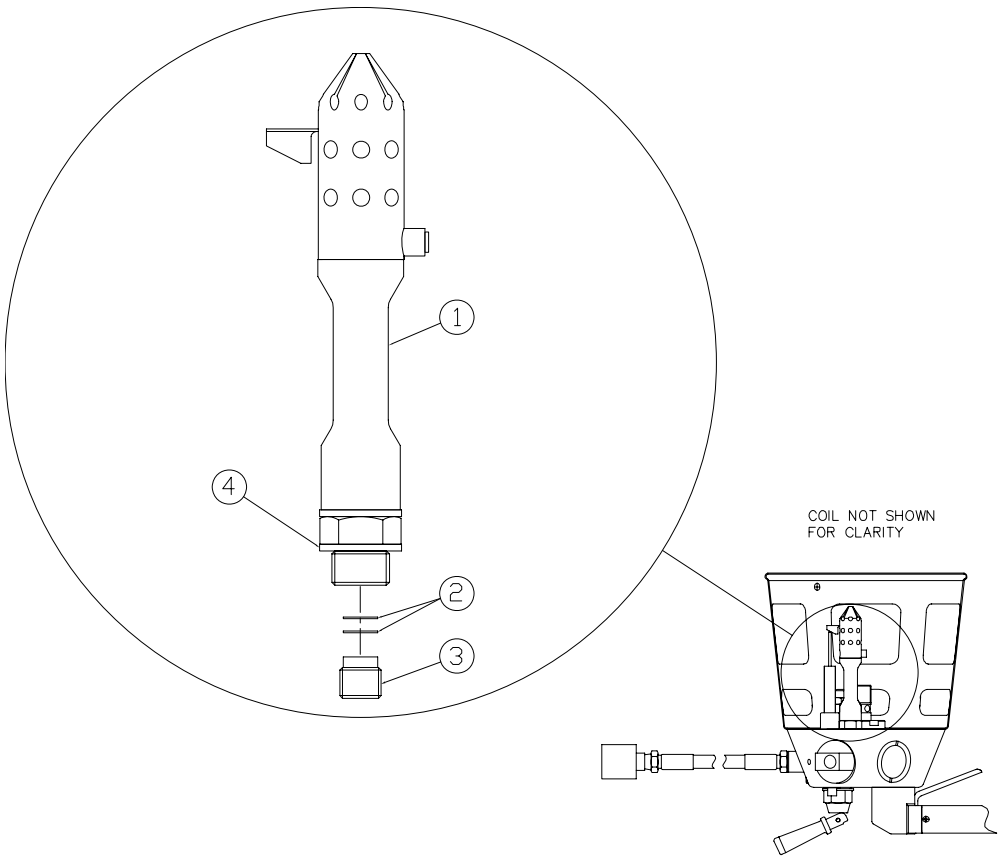


Figure 4
Regulator Filter Removal

- Remove the “O” seal (Item 2) from the filter and check the seal condition. Damaged seals must be replaced.
- Check the filter for signs of blockage and clean if necessary in a suitable solvent. If the filter is considered to be significantly blocked and cannot be cleaned, then it must be replaced with a new filter.
- Replacement is generally the reverse procedure to removal. Do not apply any grease to the filter seal, filter or inside the regulator filter bore, before re-fitting the seal to the filter and the filter assembly to the valve block. If lubrication is required to assist the replacement of the filter assembly inside the valve block, apply a little saliva to the seal.
- Before replacing the regulator assembly, check that the large seal fitted inside the valve block bore is clean and in good condition. Check also that there is no dirt in the bore, which might come in contact with the seal. Clean the bore if necessary.
- Replace the regulator assembly and pressure test as detailed in the Ultramagic Maintenance Manual.

5.3 Pilot Light Filter Removal

To remove the Pilot Light Filter, refer to Figure 5 and proceed as follows:



ITEM	DESCRIPTION	DRG / PART NUMBER
1	PILOT LIGHT ASSEMBLY	2022-0700
2	MESH FILTER	2022-0718
3	FILTER RETAINING NUT	2022-0717
4	3/8" BSP BONDED SEAL	REFERENCE ONLY

Figure 5
Pilot Light Filter Removal

- Remove the Pilot Light Assembly (Item 1) from the burner as specified in the Ultramagic Maintenance Manual.
- Using a pair of circlip pliers or similar, undo and remove the filter Retaining Nut (Item 3) from the pilot light bulkhead coupling.
- Carefully withdraw the mesh filters from inside the bulkhead coupling.
- Check the condition of the filters and clean if necessary using a suitable solvent. If the filters are considered to be heavily contaminated and cannot be cleaned, they must be replaced.
- Replacement is generally the reverse procedure to removal. Prior to replacing the filter Retaining Nut, apply a small quantity of Loctite 222 to the retaining nut threads.
- Pressure test as specified in the Ultramagic Maintenance Manual.
- Check the Igniter function as specified in the Ultramagic Maintenance Manual.
- Check the Pilot Light function as specified in the Ultramagic Maintenance Manual.

Section 6

6.0 Annual / 100 Hour Inspection Requirements

6.1 General

The burner must be subjected to an inspection by an inspector approved by the national airworthiness authority in the state of registration. The inspection must be carried out every 12 months or 100 hours use, whichever is the sooner.

The inspection requirements detailed below are additional to those already specified in the Maintenance Manual.

6.2 Inspection Requirements

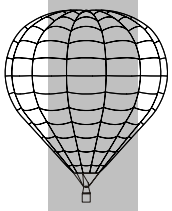
Carry out all functional tests as specified in the Maintenance Manual. In addition, check the following:

• Check the condition of the regulator and pilot light filters. Clean or replace as necessary.

Section 7

7.0 Troubleshooting

Symptom	Possible Cause	Corrective Action
Pilot light fails to ignite or weak flame.	Cylinder valve closed.	Open cylinder valve
	Regulator valve closed.	Open regulator valve.
	Regulator filter blocked.	Clean or replace filter.
	Regulator fuel outlet blocked.	Clean regulator fuel outlet.
	Regulator piston friction too great.	Refer to section 4.1.1
	Pilot light jet blocked.	Clean pilot light jet (see Maintenance Manual).
	Pilot light filter blocked.	Clean or replace filters.
Pilot light flame too large.	Contamination inside regulator ball housing.	Refer to section 4.1.2.
	Regulator piston friction too great.	Refer to section 4.1.2.
	Contamination of main “O” seal at front of regulator.	Refer to section 4.1.2.
	Contamination between regulator and regulator fixing face.	Refer to section 4.1.2.
	Damage to regulator mounting face.	Refer to section 4.1.2.
	Partial or temporary blockage of pilot light jet.	Clean or replace jet.
Pilot light fails to extinguish.	Failure of seal between valve body and burner valve block.	Replace seal. Check for contamination between seal and valve block bore.
	Contamination inside regulator ball housing.	Clean inside ball housing.



APPENDIX I

Vapour Pilot Valve

Annual / 100 Hour Burner Inspection Checklist

Requirement	Reference	Okay	Comments
Regulator and pilot light filter check.	6.2		