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EASA.21J.140 (C593)

## 7.41 SAFIRE BURNER

### 7.41.1 General

This supplement shall be inserted in the Maintenance Manual, in Section 7: 'Supplements' with the revisions record sheet amended accordingly.

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

### 7.41.2 ENVELOPE REPAIRS

No Change

### 7.41.3 BASKET REPAIRS

No change.

### 7.41.4 FUEL SYSTEM REPAIRS

#### 7.41.4.1 Regular Maintenance

##### 7.41.4.1.1 Lubrication of Main Blast and Pilot Light Valves

If the control valves become stiff to operate the valve stem seals may require lubrication. For routine maintenance this can best be achieved by spraying a little silicone lubricant onto the exposed part of the stem for the Main Blast and Pilot Light Valves.

Alternatively apply a light smear of KSP125 grease onto the valve stem where it exits the valve housing. The valve should then be operated several times (with no fuel pressure applied) to work the lubricant down to the seals. For the Main Blast Valve this may require the Burner Handle to be removed. This is done by unscrewing the two hexagon socket bolts visible within the valve housing at each end of the handle.

##### 7.41.4.1.2 Lubrication of Main Blast and Pilot Light Control Handles

If the control handles become stiff to operate the handle mechanisms may require lubrication. A small amount of KSP125 grease should be applied to the pivots and sliding surfaces. The control should then be operated several times to work the lubricant into the mechanism. For the Main Blast control removal of the Burner Handle may be necessary, as described in 7.41.4.1.1.

## 7.41.4.1.3 Whisper Valve, Lubrication and Adjustment

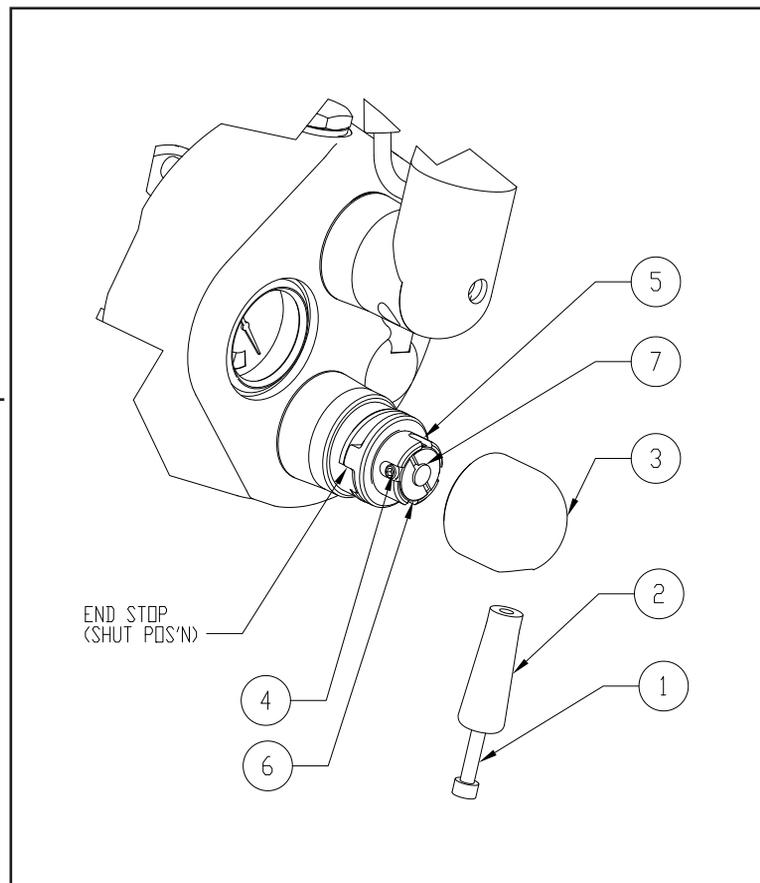
For lubrication or adjustment of the Whisper Valve, removal of the control handle/knob is required. This is done with the control handle in the closed position, by unscrewing the hexagon socket bolt (1) located within the blue handle (2).

The handle and knob (3) can then be lifted away to reveal the valve mechanism. A small amount of light oil or KSP125 grease should be applied to the stem and sliding surfaces. The control should then be operated several times to work the lubricant into the mechanism and seals.

If the Whisper Valve fails to shut-off it requires adjustment as follows:-

1. With the control knob removed, turn the valve mechanism until the end stop at the low end of the ramps on the blue housing is in contact.
2. Using a hexagon key unscrew the grub screw (4) that retains the valve cam (5) to the adjuster (6) and valve stem (7). Making sure the other parts do not rotate, remove the grub screw.
3. Using the slot on the top face of the adjuster, carefully rotate it by  $\frac{1}{4}$  of a turn clockwise while holding the cam against the end stop. Re-fit the grub screw using the same slot in the cam as before.
4. Rotate the valve mechanism and check the amount of free movement before the ramp begins to lift the valve stem. The free movement should be approximately about  $10^{\circ}$  from the end stop.
5. If the ramp action begins to engage at less than  $10^{\circ}$ , repeat stage 3 until the correct angle is achieved.
6. With the adjustment set, ensure that the grub screw is centred so that neither end protrudes outside of the cam outer diameter.

After lubrication and/or adjustment refit the knob and handle and secure with the hexagon socket bolt, fully tightened.



▲ Safire Whisper Valve

#### 7.41.4.2 LIQUID PILOT LIGHT

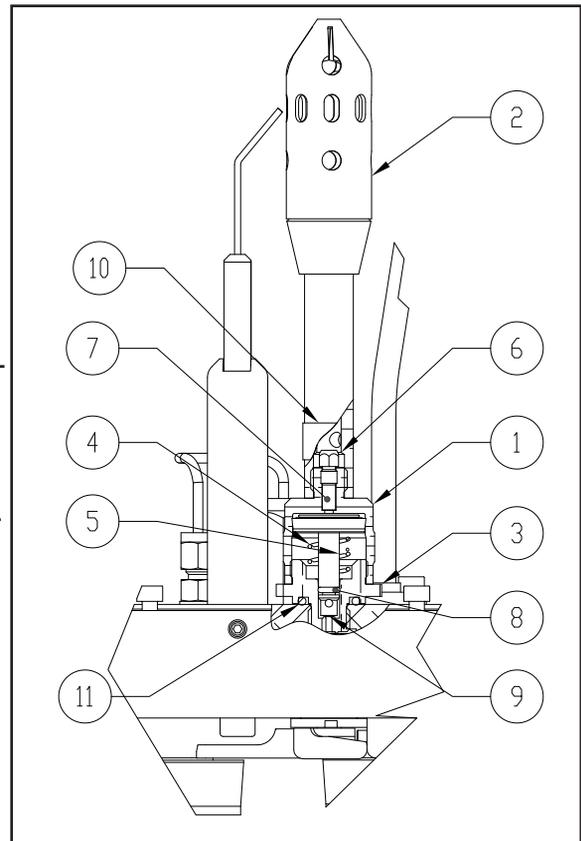
##### 7.41.4.2.1 General Description

The Liquid Pilot Light consists of a flame tube mounted on a pressure regulator/vaporiser, which is in turn mounted on top of the manifold valve block. The regulator automatically maintains a constant pilot light flame size regardless of fuel pressure and altitude. The system contains an integral filter to remove any particles from the fuel supply.

Contamination of the Liquid Pilot Light system usually manifests itself as a progressive reduction in pilot flame size. If the flame size decreases, then the regulator and jet should be dismantled and cleaned before the next flight.

##### 7.41.4.2.2 Regulator Assembly, Stripping and Cleaning

To clean the regulator assembly and jet proceed as follows:-



▲ Safire Liquid Pilot Light

1. Unscrew the hexagon regulator housing (1) together with the pilot light flame tube (2), using the special ring spanner (CB4099). This will either separate the regulator upper housing (1) from the lower fitting (3) or extract the complete regulator assembly from the valve block.

**CAUTION:** Take care not to damage the igniter electrode during removal of the regulator assembly.

2. Unscrew the regulator upper housing from its lower fitting (if necessary), and carefully remove the spring (4) and piston assembly (5).

**WARNING:** Do not tightly clamp the regulator upper housing (1) in a bench vice or other tool as this can distort the part causing incorrect operation.

3. Unscrew the flame tube (2) from the regulator upper housing to reveal the pilot light jet (6).
4. Unscrew the jet to reveal the filter (7). If either of these items appears to be blocked or contaminated then they should be replaced with new parts, or thoroughly cleaned using a hydrocarbon solvent before being refitted.
5. Inspect the inside of the regulator upper housing and the piston assembly for contamination, and carefully wipe clean using a soft lint-free cloth if necessary.

6. Check that the rubber seal (9) on the end of the piston and the rubber O-ring (8) are secure and in good condition. If either is damaged they must be replaced.
7. When all parts have been checked and cleaned the pilot light system can be reassembled. Apply a very thin smear of KSP125 grease to the piston sealing ring (white) and O-ring. Carefully refit the piston assembly into the regulator upper housing, taking care not to damage the sealing ring on the screw thread inside the housing.
8. Refit the regulator spring (4) and screw the two parts of the regulator together.
9. Refit the pilot light flame tube onto the regulator ensuring that the parts are tightly screwed together, and that the air regulator (10) is covering only one of the two intake holes.
10. Refit the pilot light assembly into the valve block, ensuring that the static sealing ring (11) is correctly in position.
11. Tighten the pilot light flame cup (1) until it is possible to set the tip of the igniter electrode such that a spark of 4-6 mm jumps to the edge of one of the slotted holes in the flame cup.
12. Test the pilot light system when completed, checking for external leaks, reliable ignition from the piezo igniter and normal flame size and appearance.

#### 7.41.4.3 VAPOUR PILOT LIGHT

##### 7.41.4.3.1 General Description

The Vapour Pilot Light consists of a flame tube mounted on a fitting containing the jet and filter, which is in turn mounted on top of the manifold valve block. The vapour fuel is supplied through a pressure regulator (installed on the fuel cylinder) which automatically maintains a constant pilot light flame size regardless of fuel pressure and altitude.

Any contamination of the Vapour Pilot Light system usually manifests itself as a sudden reduction in pilot flame size. If this occurs then the pilot light jet and filter should be dismantled and cleaned before the next flight.

##### 7.41.4.3.2 Removal and Cleaning of Vapour Pilot Jet and Filter

1. Unscrew the pilot light flame tube (1) from the jet holder fitting (2) to reveal the jet (3).

**CAUTION:** Take care not to damage the igniter electrode during removal of the pilot light flame tube.

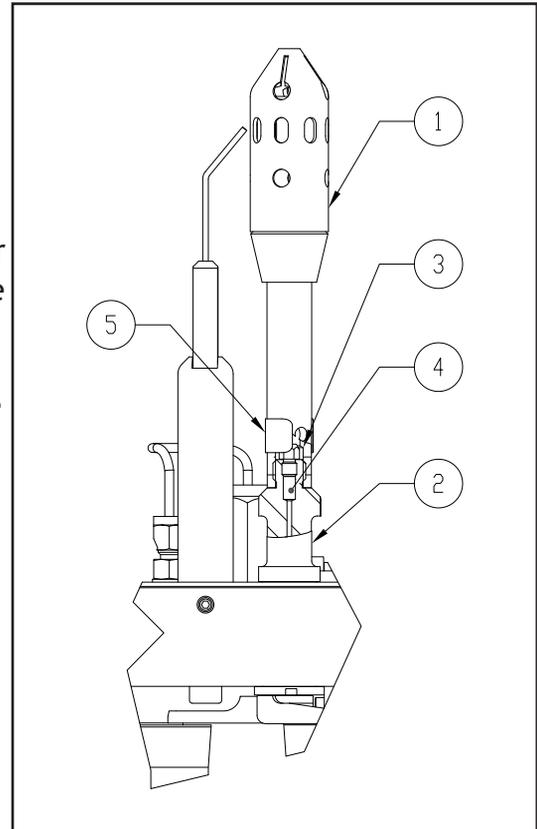
2. Unscrew the pilot light jet.
3. Tilt the burner to remove the filter element (4).

4. If either of these items appears to be blocked or contaminated then they should be replaced with new parts, or thoroughly cleaned using a hydrocarbon solvent before being refitted.
5. Refit the pilot light flame tube ensuring that the parts are tightly screwed together, and that the air regulator (5) is covering only one of the two intake holes.
6. Tighten the pilot light flame cup until it is possible to set the tip of the igniter electrode such that a spark of 4-6 mm jumps to the edge of one of the slotted holes in the flame cup.
7. Test the pilot light system when completed, checking for external leaks, reliable ignition from the piezo igniter and normal flame size and appearance.

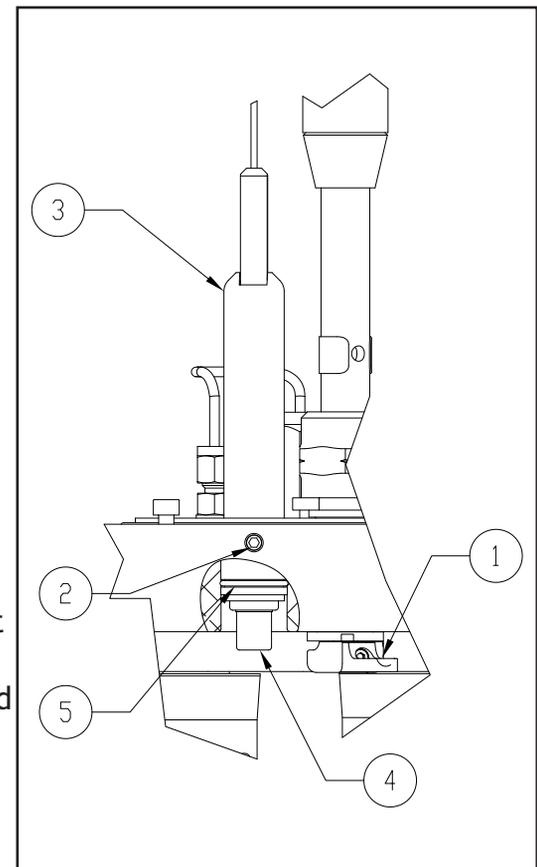
#### 7.41.4.4 Replacement of the Piezo Igniter

In the event of failure of the piezo igniter the whole igniter assembly should be removed from the burner for repair.

1. Move the pilot light valve handle (1) to the 'on' position to reveal the piezo igniter housing.
2. Using a 3 mm hexagon key loosen the grub screw (2) in the side of the manifold valve block.
3. Extract the igniter assembly (3) out through the base of the valve block.
4. With the assembly removed from the burner, unscrew the piezo push-button unit (4) to remove all the internal parts of the assembly.
5. Replace any defective items and carefully re-insert the parts into the housing, ensuring that the flats on the electrode correctly locate within the slotted hole of the housing.
6. Tighten the igniter unit into the housing.



▲ Safire Vapour Pilot Light



▲ Safire Piezo Igniter

7. Check the O-ring (5) is in good condition and lightly smear with KSP125 grease. Re-fit the assembly into the valve block, and push in fully.
8. Adjust the position of the electrode tip to ensure the spark gap is 4-6 mm and the spark jumps to the edge of one of the slotted holes of the flame cup.
9. Tighten the grub screw loosened at stage 2 to securely hold the igniter assembly within the manifold block.

#### **7.41.5 SAFIRE MAIN BURNER JETS**

Burner jets may be removed for cleaning, inspection or replacement using a socket spanner. The copper washer underneath the jet must be replaced each time the jet is removed. The jets should be tightened to a maximum of 17 Nm (12 lb.ft).

Regular inspection will reveal any loose or missing jets. Any jets which are loose should be removed and refitted using a new copper washer.

#### **7.41.6 CROSSFLOW VALVE (TRIPLE AND QUAD BURNERS ONLY)**

Minor leaks from the handle of the valve may be cured by tightening the stem:-

1. Remove and discard the 'Nyloc' nut that retains the handle.
2. Apply Loctite 270 Studlock or equivalent to the threads of the spindle.
3. Using a new 'Nyloc' nut, tighten the nut onto the spindle, checking the ease of rotation of the handle. The handle should move easily, but with noticeable friction. Over-tightening the nut will make the valve stiff to operate and will cause premature wear of the seals.

Other faults will require replacement of the valve.

#### **7.41.5 INSTRUMENT REPAIRS**

No change.

**7.41.6 MAINTENANCE SCHEDULE**

No change.

**7.41.8 REPAIR PARTS AND MATERIALS**

**7.41.8.4.12 Safire Burner**

Part Number	Description
CB-0214-0006	Copper Washer
CB-4040-0000	Main Jet Assembly
CB-4057-0000	Igniter Electrode
CB-4099-0000	Safire, Ring Spanner (Special)
CB-8546-0000	Vaporiser Outlet Filter, Liquid Pilot Light
CB-8550-0000	Liquid/Vapour Pilot Light Jet
CB-8624-1000	Liquid Pilot Light Regulator Service Kit
CB-8506-1000	Igniter Seal Kit
CB-8505-0000	Piezo Igniter Unit
CB-8614-1000	Pilot Light Valve Service Kit
CB-8612-1000	Main Valve Service Kit
CB-4017-1000	Safire Whisper Valve Service Kit

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