

**SECTION 4 - FUEL SYSTEM REPAIRS**

**4.5 STEALTH / SHADOW BURNER (ADDITIONAL)**

**4.5.9 Valve Seal replacement**

**4.5.9.1 General Information**

The text of this supplement is written for competent persons who are familiar with standard engineering workshop practices.

All the operations described in this supplement are intended to be performed in a clean workshop environment.

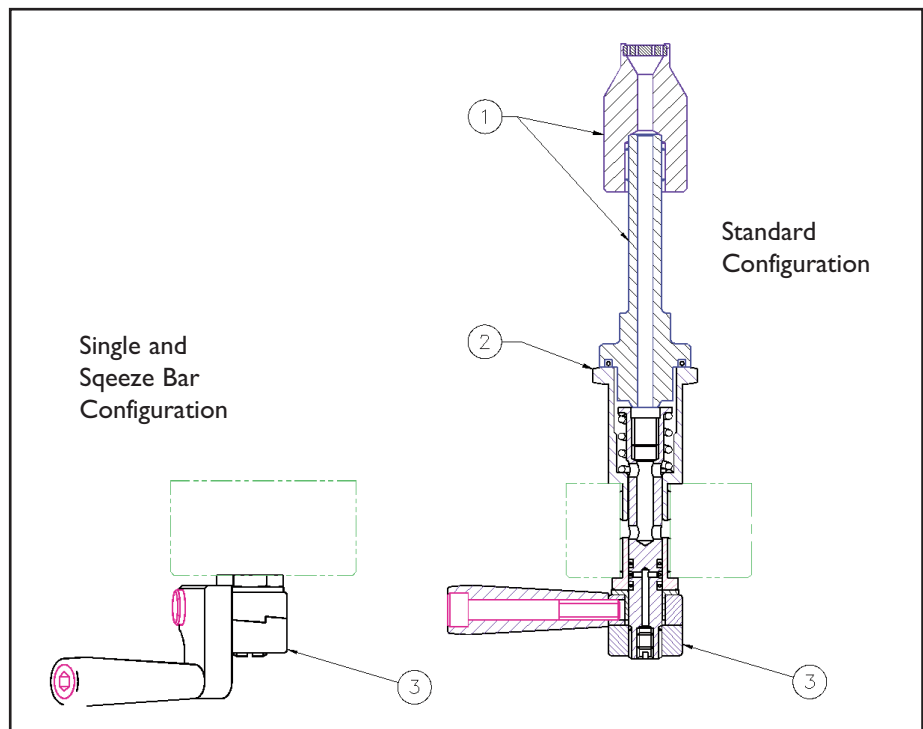
In addition to standard workshop equipment the following special tools are required:-

- |              |  |
|--------------|--|
| CB-2438-1000 | Bonanno Stealth Tool                     |
| CB-2438-2000 | Crowfoot Spanner                         |
| CB-2438-6000 | Seal Bullet - Blast Valve/ Whisper Valve |
| CB-2438-7000 | Seal Bullet - Pilot Valve                |

**4.5.9.2 Whisper Valve**

**4.5.9.2.1 Disassembly**

**Note:** Super Shadow Single and Multiple burner configurations with 'squeeze bar action' operation are fitted with the handle extension as illustrated in Figure I.



▲ Figure I Shadow / Stealth Whisper Valve

**Remove the Upper and Middle Valve Bodies (Fig. 1 item 1):**

The upper and middle valve bodies (item 1) are removed by restraining the valve lower body (item 2) using a 27 mm spanner and undoing the middle and upper body as one unit using a 12 mm spanner on the flats above the base of the middle body.

**Caution:** It is essential to restrain the lower body or the stem will be irreparably damaged.

**Remove the Valve Stem:**

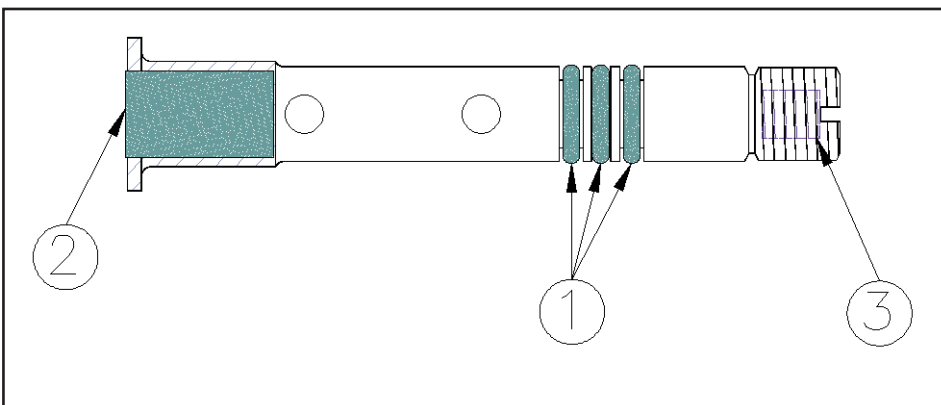
Using a 3 mm Allen key, undo the grub screw retaining the lower cam (item 3).

Using a slim screwdriver (8mm blade), screw the valve stem clockwise through the upper and lower cams. This will cause the upper and lower cams to become free.

The valve stem and spring can now be extracted from the manifold block pushing the stem (by hand) from beneath the manifold block.

**Inspect the valve stem (Fig. 2):**

Remove and discard the three 'O'-rings (1). Inspect the rubber seal plug (2) for security and wear. The minimum permissible undercut of rubber plug below valve stem face is 0.5 mm.



**Note:** The rubber plug is bonded to the stem and is not available as a spare part. If the plug is loose, damaged or below the minimum undercut, the stem must be replaced.

▲ Figure 2 Shadow / Stealth Whisper Valve Stem

**4.5.9.2.2 Assembly**

Fit new 'O'-rings using KSP 125 Grease and the seal bullet. Remove the grub screw (3) from the base of the stem and the lubrication bore with KSP125 Grease. Replace grub screw.

Assembly is the reverse of disassembly.

**Caution:** Care should be taken not to over-tighten the valve stem on reassembly. The base of the valve stem should not protrude more than 0.5 mm below the lower cam prior to final adjustment.

Final adjustment should be performed in accordance with Section 4.5.1.3 of the base manual.

Test the burner for leaks and correct operation.

### 4.5.9.3 Main Valve

#### 4.5.9.3.1 Introduction

The main blast valve is supplied in four configurations:-

As part of a double or quad burner with an integral crossbar.

As part of a triple burner with an integral tee-handle cross bar.

As a single unit as the third burner of a triple burner system.

As part of twin blast valve system on the Single Super Shadow burner.

In addition the single triple and quad burners have the option of being operated by a handle below the crossbar (squeeze action) or by a bar above the crossbar (squeeze bar action).

#### 4.5.9.3.2 Disassembly

##### Remove the crossbar / tee-bar assembly (Fig 3 item 1)

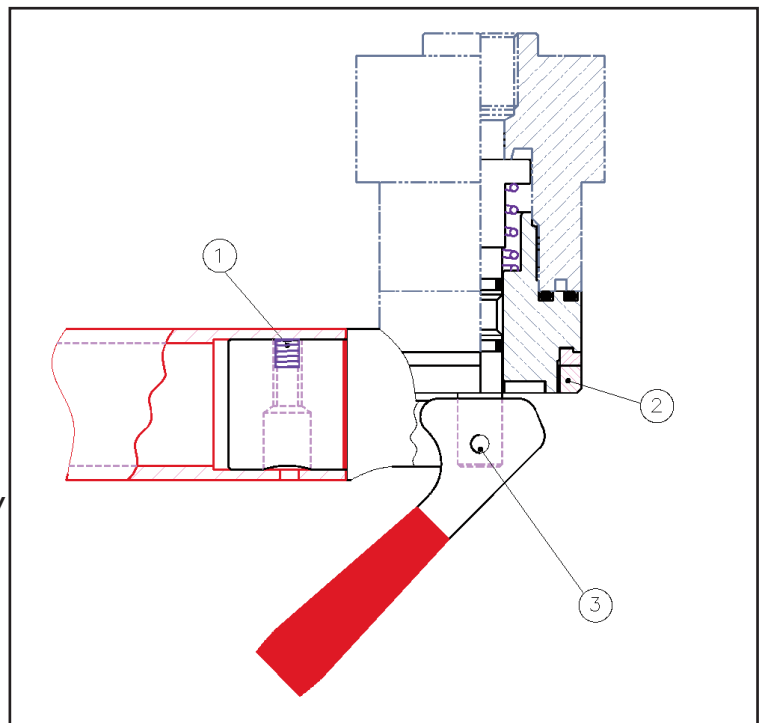
Using the Bonanno Stealth Tool, loosen the grub screws that retain the crossbar / tee-bar (1).

**Note:** If the unit is a single burner, or a single unit as the third burner of a triple burner system, this operation is not required.

Using the Bonanno Stealth Tool, loosen the blast valve crossbar / tee-bar lock ring (s) (2).

The dowel pin on the semicircular section of the spanner locates in the bore on the outer diameter of the retaining ring. Once the spanner has been correctly located it may be tapped using a soft faced mallet to loosen the lock ring.

**Note:** The tool cannot be used with the single burner. In this instance a suitable drift should be used.



▲ Figure 3 Shadow / Stealth Main Valve

Manoeuvre the blast valve handles to allow removal of the crossbar / tee-bar assembly.

### **Remove the valve handle.**

Using a suitable drift, push the blast valve handle retaining pin (3) from its bore and release the blast valve handle.

**Note:** If the burner is a single unit as the third burner of a triple burner system the blast valve handle is retained by a grub screw (1.5 mm Allen key) which requires loosening before the blast valve handle retaining pin can be removed.

**Note:** If the burner is fitted with a squeeze bar handle, the valve handle is replaced by a simple operating cam.

### **Remove the valve centre body.**

Using the Bonanno Stealth Tool, loosen the blast valve centre body using the same method as described previously for loosening the locking rings.

The blast valve stem and spring may now be removed from the valve centre body.

#### **4.5.9.3.3 Assembly**

Inspect the main seal for damage or wear. If the main seal requires replacement, the screw and washer should be assembled to the seal pad before the seal pad is assembled to the valve stem. The retaining screw should be locked using a high strength locking compound (e.g. Loctite 270).

Fit new 'O'-rings to the valve stem using KSPI25 Grease and the seal bullet.

Fit new 'O'-rings to the valve centre body using KSPI25 Grease.

Fit a new 'O'-ring to blast valve lubrication port screw.

### **Assemble the spring and valve stem to the valve centre body.**

Care should be taken not to damage the 'O'-rings by the use of excessive force.

Ensure the 'O'-rings of the valve stem are lubricated with KSPI25 grease before insertion.

Once the stem and spring have been inserted, the lubrication reservoir can be filled via the lubrication port.

The KSPI25 grease should be squeezed into the port until it can be seen at the leak duct on the upper face of the valve body.

The lubrication screw can then be reassembled to the valve body.

**Note:** The lubrication screw should not be fully tightened. It should only be screwed in until it is parallel (flush) with the valve body.

**Reassemble the valve centre body to the manifold block.**

Lubricate the 'O'-rings at the mating face with KSPI25 grease and refit the blast valve to the manifold block. Tighten using the Bonanno Stealth tool.

**Refit the valve handle.**

Clean the retaining pin.

Align the bore in the blast valve handle (or operating cam) with the bore in the valve stem and refit the retaining pin.

Ensure the pin is located centrally and does not protrude from either side.

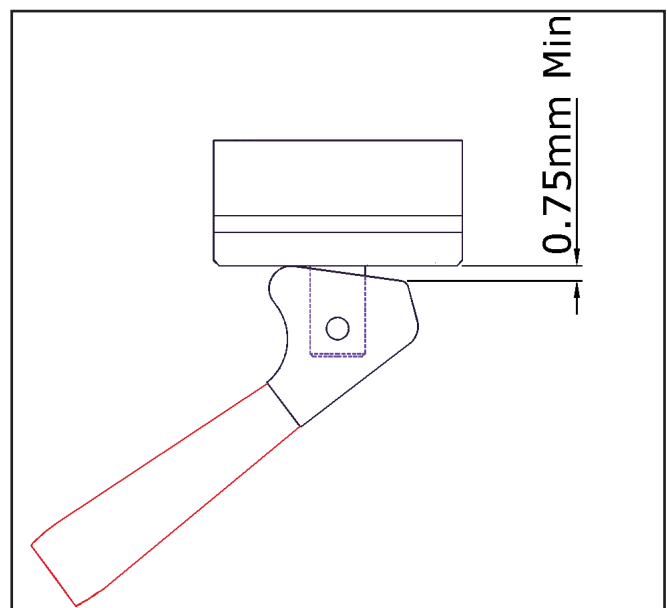
**Note:** If the burner is a single unit as the third burner of a triple burner system the grub screw will need to be tightened (1.5 mm Allen key) and locked with a suitable thread locking compound (e.g. Loctite 222).

**Valve clearance check.**

If a new anti-friction washer has been used is essential that the free movement in the blast valve action is checked prior to final assembly. Failure to perform this check can result in the blast valve sticking in the open position.

Using a set of standard metric 0-1.00 mm feeler (blade) gauges, insert a 0.6 mm feeler gauge between the blast valve handle and the anti-friction washer - Refer to Figure 4

The feeler gauge should be inserted from the side of the blast valve handle and should be placed under the full length of the handle. It should not be necessary to force the feeler gauge under the handle.



▲ Figure 4 Main Valve Clearance Ccheck

If the feeler gauge cannot be inserted freely, the anti-friction washer thickness must be adjusted by replacing the anti-friction washer with a similar washer of a different thickness.

**Reassemble the crossbar / tee-bar assembly.**

Assembly is the reverse of disassembly.

**Check the main valve for leaks and correct operation.**

Using a leak detector spray, with the valve under pressure, test for leaks:-

At the joint between the manifold block and the blast valve centre body.

At the base of the valve stem (where the valve stem enters the valve body).

Ensure that no propane is escaping through the leak duct (the vertical stainless steel tube in the burner can adjacent to the centre column of the coil).

Ensure the clearance is maintained between the blast valve handle and the cross bar / tee-handle after repeated operation.

**4.5.9.4 Pilot Valve****4.5.9.4.1 Disassembly**

**Note:** The pilot light system can be fed by liquid or vapour.

Refer to Fig. 5

**Remove the flame tube assembly**

Using a 3 mm Allen key, undo the grub screw (1) on the side of the pilot light flame tube and remove the tube (2).

**Remove the Liquid Regulator/ Vapour Jet Stand.**

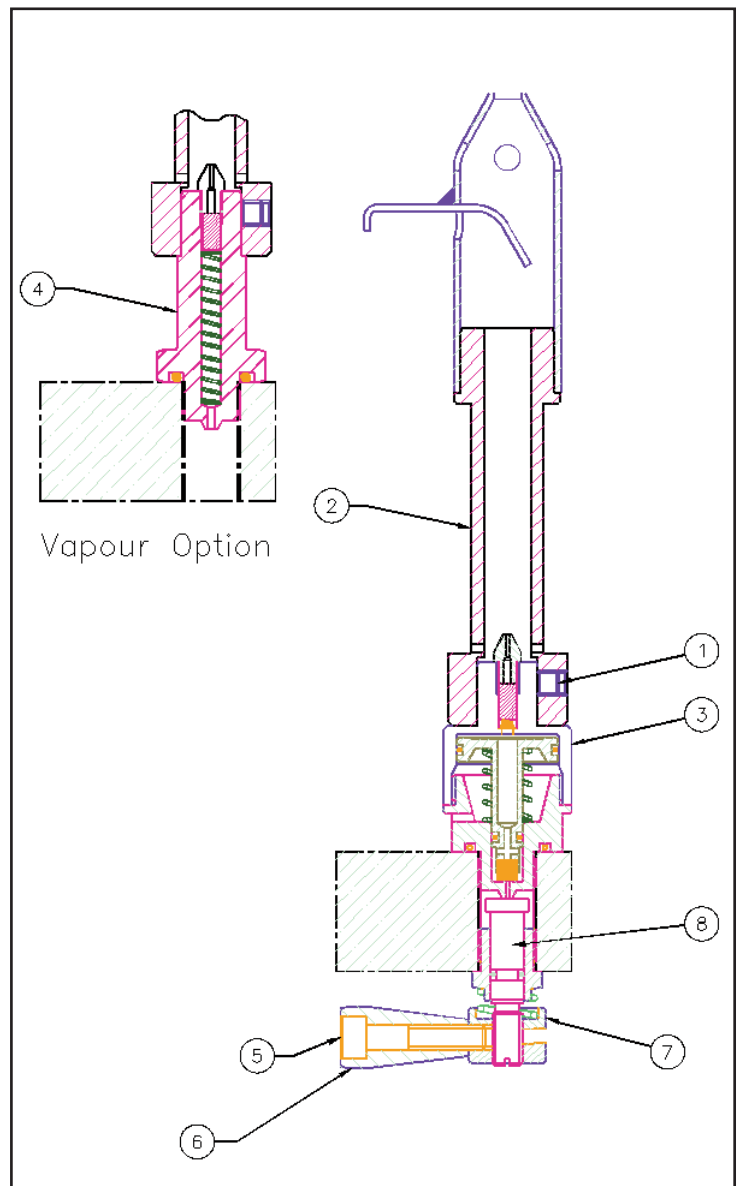
Using the crowfoot spanner, undo and remove the liquid regulator (3).

or

Using the crowfoot spanner, undo and remove vapour pilot light stand and jet (4).

**Remove the pilot light valve handle**

Using a 5 mm Allen key, undo the Allen screw (5) in the pilot light valve handle (6).



▲ Figure 5 Pilot Valve Assembly

### Remove the cam and valve stem

Screw the valve stem through the cam and allow the cam (7) to be removed.

The valve stem (8) can now be withdrawn through the burner can.

#### 4.5.9.4.2 Assembly

Fit a new 'O'-ring to the valve stem using KSPI25 Grease and the seal bullet.

Assembly is the reverse of disassembly.

**Caution:** Care should be taken not to over-tighten the valve stem on reassemble. The base of the valve stem should not protrude more than 0.5 mm below the lower cam prior to final adjustment.

Final adjustment should be performed in accordance with Section 4.5.1.4 of the base manual.

Test the burner for leaks and correct operation.

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