Supplement 2 - MK 10 Double, Triple and Quad Burner Maintenance

Section 1

1.0 Introduction

This supplement defines the maintenance and inspection requirements for the Ultramagic Mk 10 double, triple and quad burners.

The Airworthiness Limitations section is FAA approved and specifies maintenance required under §§43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

For US operations, only the items listed in 14 CFR Part 43, Appendix A may be accomplished as Preventative Maintenance items.

For U.S. operations, maintenance must be performed in accordance with the requirements of 14 CFR Part 43.3 Persons authorized to Perform Maintenance, Preventative Maintenance, Rebuilding, and Alterations.

For US operations please refer to Unit Conversion Table (Supplement 10), whenever necessary.

1.1 Applicability

The information contained in this supplement applies to all burners as defined by the following numbers.

Double Burner:	CR-A-0050 (liquid pilot light)
	CR-A-0060 (vapour pilot light)
Triple Burner:	CR-A-0070 (vapour pilot light)
	CR-A-0080 (liquid pilot light)
Quad Burner	CR-A-0090 (liquid pilot light)
	CR-A-0100 (vapour pilot light)

1.2 Replacement Parts and Procedures

The burner has been designed and constructed using carefully selected components and materials. In order to ensure the continued airworthiness of the burner, it is essential that only parts supplied by Ultramagic or by a supplier approved by Ultramagic be used. The use of parts from any other source is strictly forbidden.

Maintenance procedures must be carried out in accordance with the instructions contained in this manual.

1.3 Approved Maintenance and Inspection Personnel

In order to ensure the continued airworthiness of the burner, maintenance and formal inspection may only be carried out by Ultramagic, organisations approved by Ultramagic or by organisations approved by the national airworthiness authority in the country of registration.

1.4 Welding and Welders

If for any reason a repair requires the use of welding, the following limitations apply:

- All welding must be of the TIG (Tungsten Inert Gas) electric arc type.
- All welding must be carried out by a coded welded approved to the appropriate standard by the national airworthiness authority in the country of registration.

1.5 Maintenance Records

Whenever maintenance work of any kind is carried out on the burner, the work must be inspected and approved by a person or organisation approved by the national airworthiness authority in the country of registration. Maintenance work must be recorded by a suitable entry in the equipment maintenance record and must include the following information:

- A description of the work performed.
- The completion date of the work.
- The name of the person (and organisation if applicable) performing the work.
- The name of the inspector approving the work.

1.6 Technical Support

If technical assistance is required, contact Ultramagic. Always quote the burner part and serial numbers.

1.7 Safety

When connected to a fuel cylinder, the burner is capable of generating a very large, high temperature flame. Exercise care when carrying out maintenance work and observe the following rules.

- Always wear protective eyeglasses.
- Observe the usual rules for the handling of LPG.
- When test firing, wear suitable protective gloves.
- Always make sure that the burner has been completely vented of fuel before removing any components.
- Always make sure that the burner is cool before commencing work.
- Never look down onto the coil when the burner is connected to a fuel cylinder or when pressure remains inside the burner.
- When test firing, never stand down wind of the burner.
- Prior to test firing, make sure that the area is clear of personnel and animals.
- When test firing, make sure that the burner is properly supported and not able to fall or tilt unexpectedly.
- Never smoke or allow naked flames or other sources of ignition near the burner.
- Always use the correct tool for the job

Section 2

2.0 Technical Description

2.1 General

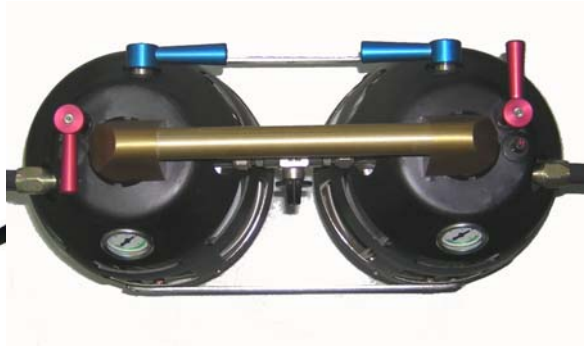
Fuel is supplied to the burner through the flexible hoses. The fuel is distributed to the various valves and pressure gauge in readiness for use.

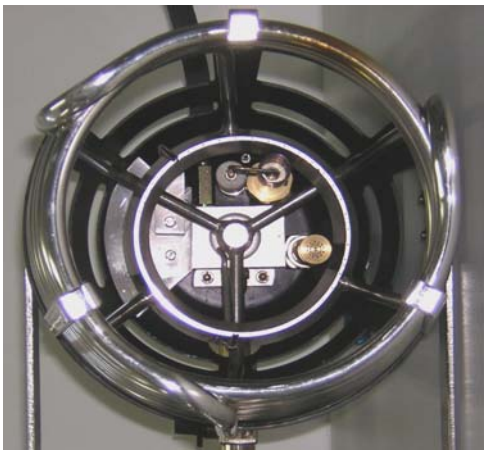
Each burner "pot" is fitted with the following major features:

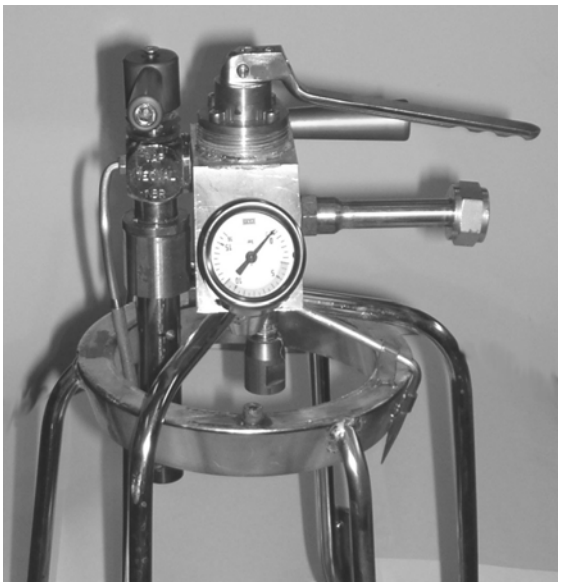
- Burner can.
- Main Burner Vaporising coil
- Fuel hoses
- Main valve assembly
- Liquid valve assembly.
- Pilot regulator valve assembly
- Igniter Assembly
- Pressure gauge assembly.
- Liquid fire jet assembly.
- Pilot light assembly.
- Slurper tube assembly.

Note that all burner maintenance work must be conducted in a clean environment.
The burner is available in single, double, triple and quad variants.
The burners are constructed on a modular basis and utilise common components and assemblies. For simplicity therefore, the double burner will be described and the differences associated with the triple and quad will be described separately.
The double burner may be seen in the general views below and the feature and functions detailed above are described in the following paragraphs:

Mk 10 Burner – General views







2.1.1 Burner Can

The burner can is an aluminium spun and machined construction. It provides a degree of mechanical protection to the components mounted inside the burner. The can is mounted onto the valve block using screw fixings and provides the mechanical support for the vaporisation coil.

2.1.2 Vaporisation Coil

The vaporisation coil is connected to the outlet of the main valve by means of a screw connector into the valve block. The function of the coil is to preheat the fuel before leaving the jet ring in readiness for combustion. The coil is a three start, welded assembly and is constructed from stainless steel tube, a special jet ring with fixed jets, coil supports and a mounting adapter.

When the main valve is opened, fuel enters the coil at is base. The fuel rises to the top of the coil and then descends through the coil spiral until it exits through the jet ring.

2.1.3 Fuel Hoses

The fuel hoses link the burner to the fuel cylinders. They are terminated with a choice of either Rego or Tema self-sealing connectors. The hoses are specially selected to withstand the operational fuel pressures and the wear and tear associated with use and handling. The fuel hose is supplied as a pre-fabricated assembly using armoured hose and swaged end fittings.

The process of swaging the end fitting onto the hose requires the use of special tooling. The use of any fuel hose other than that supplied by Ultramagic is therefore strictly forbidden.

Tema connection

Rego connection

Mk10 Liquid hose fitting at burner end.

2.1.4 Main Valve Assembly

The main valve is used to control the main burner function of the burner by the activation of a “squeeze” type handle. The valve is of a plunger type and uses a special sprung loaded rubber seal bearing against a machined seat in the valve block to create the seal. The seal is connected to a stem by a rotating joint. When the valve handle is operated, a cam action causes the stem and seal to lift off the seat in the valve block, thus allowing the flow of fuel.

The stem is housed in a machined brass valve body. A pressure tight seal is achieved between the stem and valve body with the use of a primary and secondary “O” seal. The bonnet is sealed to the valve block using a bonded washer.

The stem is secure to the handle by means of a round pin and circlip.

As the valve handle is operated, the cam on the end of the handle bears against a nylon thrust washer. This washer provides a smooth operation and resists the wear associated with the cam action.

2.1.5 Liquid Fire Valve Assembly

The liquid valve is a tecval manufacture.

- The valve handle is a 90 degree on/off type action.
- The handle is attached to the stem using a countersunk hexagon head screw.

2.1.6 Liquid Pilot Regulator Valve Assembly

The liquid pilot regulator valve assembly consists of tecval valve fitted with a brass-bodied regulator. This combined assembly incorporates the fuel regulation and vaporisation necessary for pilot light operation and the means of switching on and off the flow of fuel. The valve is mounted in a precision-machined bore in the side of the valve block. The regulator is screwed into the valve and sealed using ptfe tape.
Operation of the valve is through the rotation of a handle through 180 degrees. The handle is attached to the stem using a countersunk hexagon head screw. The liquid pilot valve is fitted with a vent tube assembly, which allows the fuel remaining in the valve at shut off to be automatically vented off.

2.1.7 Igniter Assembly

The Igniter Assembly consists of a piezo igniter and an electrode assembly. The electrode assembly is made of 3 main parts. These being an aluminium threaded portion which the piezo screws into, a ceramic closed tube with a hole in one end and an electrode tip which is secured to the ceramic tube. These parts are supplied as a complete assembly. The electrode tip is adjusted by means of it being screwed and is locked with a nut. The distance is set to make firm contact with the piezo when assembled in the burner can.

When assembled, the piezo igniter makes contact with the electrode thus allowing the transmission of the high voltage to the electrode tip.

Upon operation of the piezo igniter button, a high voltage spark is produced between the electrode and the side of the pilot light causing the pilot light to ignite.

2.1.8 Pressure Gauge Assembly

The pressure gauge is mounted by screwing into the side of the valve block and protrudes through the burner can. A pressure tight seal is achieved with the use of a copper seal and loctite. The seal interfaces to a precision machined bore in the valve block. When in position, the inlet to the gauge is positioned in a tapping from the main fuel feed within the valve block. The gauge therefore provides an indication of the fuel cylinder pressure as soon as the fuel cylinder valve is turned on.

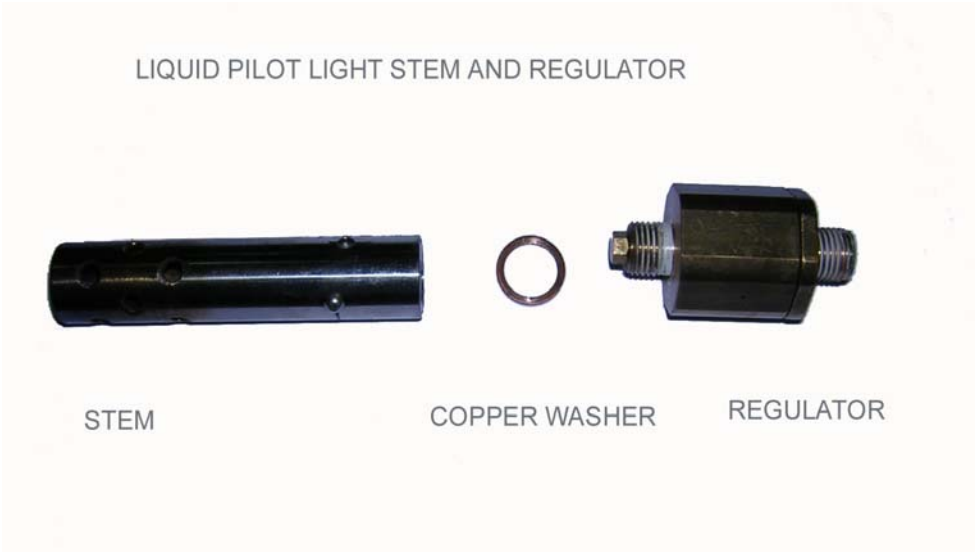
The face of the gauge is provided with a colour coded banding indicating the safe operating pressure range of the burner.

2.1.9 Liquid Fire Jet Assembly

The liquid fire jet assembly is mounted on the upper face of the liquid fire valve. The jet controls the flow of fuel when the liquid valve is operated. The assembly consists of a machined jet stem body fitted with multiple holes at the outlet with an adapter allowing the jet to be secured to the valve body and brass diffuser fitted with a mesh inside. The parts are sealed together using loctite and the assembly is sealed to the liquid fire valve body in a similar fashion.

2.1.10 Pilot Light Stem

The pilot light assembly is mounted on the upper face of the Liquid regulator and is supplied with a small flow of vapour fuel from the regulator. The assembly consists of a stainless steel stem where the fuel is burnt and a jet installed in the regulator. The stem is sealed to the regulator using a copper washer and ptfe tape.

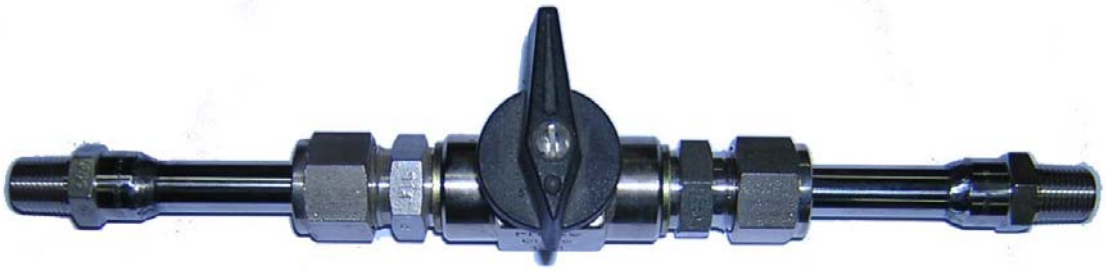


2.1.11 Slurper Tube Assembly

There are two slurper tubes on a Mk10 burner. One is permanently secured to the coil jet ring and collects from the top of the valve block. The other is mounted on the upper face of the valve block and is secured using one of the screws, which also secures the cover plate. This slurper tube collects from the bottom of the can. The function of the slurper tube is to “suck” water formed during the combustion process from the valve block and dispel it into the main burner jet. The outlet of the tube is placed directly in the fuel stream exiting the jet ring. When the main burner is fired, the flow of fuel over the tube causes low pressure to be created in the tube with the result that any water below the tube is sucked up and vented into the jet stream.

2.1.12 Crossover Valve

The crossover valve assembly consists of a stainless steel valve with union fittings connected to two stainless steel feed tubes. The crossover feed tubes are mounted in a precision-machined bore in the side of each valve block using ptfe tape. The crossover valve union fittings are secured to the feed tubes using stainless steel compression fitting components. When the crossover valve is opened fuel is allowed to pass from one burner to the other allowing both burners to be operated from one main blast valve.



2.1.13 Triple Burner

The MK 21 triple burner utilises identical components and assemblies to the double burner. In the triple configuration, an additional burner “pot” is added to the double thus forming an equilateral triangular configuration.

2.1.14 Quad Burner

The quad burner is effectively two double burners placed side by side. The burners are secured using a centrally mounted hanger assembly and the handles are replaced by a single “H” handle linking all four pots together

Section 3

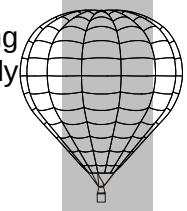
3.0 Preventative Maintenance

3.1 General

The burner should be subjected to periodic preventative maintenance check and preventative maintenance measures implemented if necessary. It is recommended that the period between inspections is once every three months or 25 hours operation, whichever is the sooner. The checks must incorporate the areas detailed below.

3.1.1 General Cleaning

Check for the excessive build up of sooty deposits on the vaporisation coil and can. Some accumulation of soot is inevitable and is not detrimental to the burner function. However, excessive deposits are indicative of inefficient fuel combustion. If this is considered to be the case, the burner must be returned to Ultramagic.



Sooty deposits may be removed from the burner can and coil using a suitable cleaning solvent. When using a solvent, follow the manufacturers' safety instructions, particularly with regard to the use of breathing apparatus and ventilation.

3.1.2 Vaporisation Coil

3.1.2.1 Main Jets

Check the main jets in the coil jet ring for excessive soot deposits and for the presence of foreign bodies within individual jet holes. Blocked jets can cause a reduction in the fuel flow rate and thus lead to an increase in the operating temperature of the coil. This could result in damage to the coil especially when operating at low fuel pressure. In the event that blocked jets are detected, they must be cleaned as specified in section 4.1.2.2

3.1.2.2 Coil Fixings

Check the fixings in the coil supports. Loose fixings must be tightened as described in section 4.1.2.3

Check the fixings securing the coil supports to the burner can. Loose fixings must be tightened as described in section 4.1.2.4

3.1.2.3 Coil Tubing

Check the tube used in the construction of the coil for damage including signs of cracking, serious indentation and deterioration of welded joints.

Serious indentation cannot be repaired and the coil must be replaced as described in section 4.1.2.1

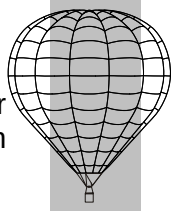
If the coil tube has cracked or a welded joint has failed, the coil must be returned to Ultramagic for investigation. Replace the coil as described in section 4.1.2.1

3.1.3 Pilot Light Strength

Check the strength and height of the pilot light flame. A weak or short flame is indicative of a blockage or partial blockage of the pilot light jet or a fault with the pilot regulator. In the event that the pilot light flame is considered to be unacceptable, clean the pilot light jet as described in 4.1.7. If this fails to improve the pilot light flame, check the function of the pilot regulator as described in section 4.1.7.

3.1.4 Igniter spark

Check the strength of the igniter spark. A weak spark will make pilot like ignition difficult or impossible when using the igniter. If it is considered that the igniter spark is weak, adjust the spark gap as described in section 4.1.9. If this fails to improve the spark, then refer to igniter maintenance section 4.1.9.



3.1.5 Fuel Hoses

Check the condition of the fuel hoses. Look for any signs of abrasion, kinking or other forms of damage. If any of the above is detected, the hose must be replaced in accordance with the instructions in section 4.1.3.

Fuel hoses must be obtained from Ultramagic. For safety reasons, fuel hoses are supplied assembled with the connector and pressure tested.

3.1.6 Pressure Gauge

Check the function of the pressure gauge as follows:

- Make sure that the burner is fully vented. Visually inspect the position of the gauge pointer and check that it is indicating zero pressure.
- Connect the burner to a fuel cylinder or a 7 Bar (100 psi) compressed air supply. Visually inspect the position of the gauge pointer and check that it is correctly indicating the pressure.

Upon completion of the test, ensure that the burner is safely vented.

If either of the above tests indicates that the gauge is faulty, the gauge must be replaced in accordance with the instructions in section 4.1.8.
Note: The pressure gauge is a sealed item with no serviceable parts. No attempt must be made to repair a faulty gauge. Gauge repair is by replacement only.

3.1.7 Burner Mounting

3.1.7.1 Double Burner

Check that all fixings used in the support of the burner and mounting to the load frame are secure. Tighten the fixings if necessary.

3.1.7.2 Triple and Quad Burners

Check that all fixings used in the support of the burner and mounting to the load frame are secure. Tighten the fixings if necessary.

Check the condition of the central hanger assembly for signs of damage including serious indentation, distortion, cracking or weld deterioration.

Serious indentation or distortion cannot be repaired and the hanger must be replaced.

Where cracking or weld deterioration is detected, the hanger must be returned to Ultramagic for inspection.

Section 4

4.0 Repair and Maintenance

4.1 General

This section describes the procedures necessary to enable the removal, repair and replacement of the various assemblies used within the burner. Maintenance other than that detailed in the Section 3 (Preventative Maintenance) 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 burner functions. Remember, “If it ain’t broke, don’t fix it”!

Whenever a part or assembly whose removal breaks the pressure integrity of the burner is removed and replaced, the re-assembled joint(s) must be subjected to a pressure test. Connect the burner to a 7Bar (100 psi) compressed air supply and test the joint using soapy water. If bubbles are detected during the test, there is a leak, which must be rectified before further burner use.

4.1.1 Burner Can

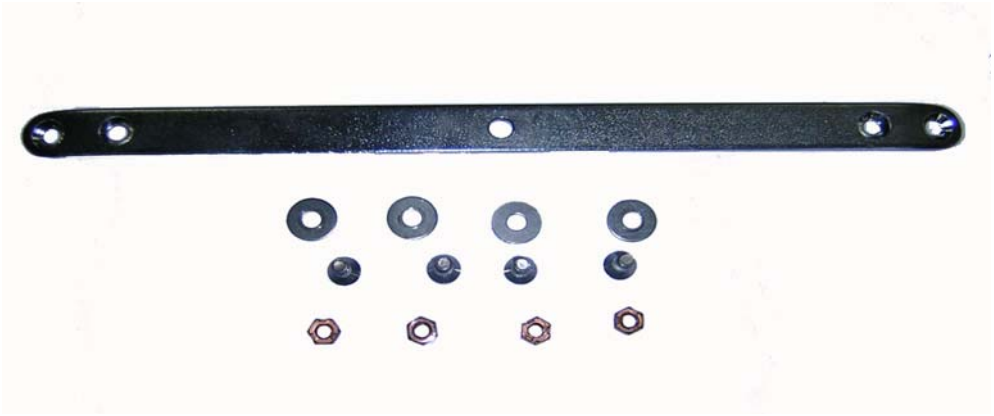
The burner can is an aluminium spinning with holes machined and is of a relatively robust construction. Some indentation or abrasion to the can is acceptable provided that the integrity of the fixings supporting the coil, valve block or burner mountings are not compromised and that the gimbal action of the burner is unaffected.

If it is considered that the can must be replaced, proceed as follows:

- Ensure that the burner is safely vented before commencing.
- Remove the fuel hose as described in section 4.1.3.
- Remove the handle bar assembly as described in section 4.1.5.
- Remove Main valve assembly as described in section 4.1.5.
- Refer to figures 1 & 2, Undo and remove the two burner side strips (-37)


Figure 1


Figure 2



BU10-37 Side strip
BU10-38 Side strip attachment screw
BU10-39 Side strip attachment nut
BU10-40 Side strip attachment washer

- Remove Crossover valve as described in section 4.1.11.
- Remove Crossover feed tube as described in section 4.1.11.
- Remove the igniter assembly as described in section 4.1.9.
- Remove the pilot light handle and valve nut and washer.

BU10-12 liquid pilot valve

BU10-14 pilot light handle

- Remove liquid fire handle item 18.

BU10-18 Liquid fire handle

- Remove pressure gauge as described in section 4.1.8.

- Remove can slurper tube item 48 and cover plate item 46.

BU10-48 Slurper tube BU10-49 Slurper tube screw. BU10-46 Cover plate BU10-47 Screw

- Remove coil to can attachment screws shown in section 4.1.2.4.
- Remove Valve Block lock ring item 35 using either a C wrench or by tapping gently anti clockwise using a soft thin bar. (See figures 3 & 4)

Figure 3

Figure 4

BU10-35 Block lock ring.

- Release and remove the condensate seals item 50 from hose and cross over valve positions on can.

BU10-50 Condensate seal

- Carefully remove the can from the valve block and coil assembly. Take special care not to damage the aluminium threads of the valve block lock ring position. (see figures 5 & 6)

Figure 5

Figure 6

- Clean the areas of the valve block and valves where they have been sealed to prevent passage of water condensate
- Offer up the new can to check for fit. It may be necessary to relive the area where valves, hoses and tubes pas through the can. This should be carried out using a file. Ensure the surface is smooth when finished and that all areas are cleaned and reprotected thoroughly.
- Re-assembly is the reverse process of dismantling. Always use condensate seals and reseal the areas, which were previously sealed to prevent the passage of water condensate using silicon seal compound.
  NOTE - that if the vaporisation coil has been separated from the valve or if any of the valves have been removed from the block, they must be reassembled as described in the relevant sections.
  Where other sections are referred to for dismantling then the same section must be used for reassembly carrying out the appropriate tests.

4.1.2 Vaporisation Coil

Since serious indentation in the coil tube cannot be repaired and weld faults must be returned to Ultramagic for inspection, coil maintenance is limited to the following areas:

4.1.2.1 Coil Removal

- Ensure that the burner is safely vented before commencing.
- Remove the can as described in section 4.1.1.
- Remove the liquid pilot light stem as described in section 4.1.7.
- Remove the liquid pilot light regulator as described in section 4.1.7.
- Remove the liquid pilot light valve from the valve block. (this is recommended but not absolutely necessary) see section 4.1.7.
- Remove the liquid fire jet stem and diffuser as described in section 4.1.6.

- Remove the liquid fire valve (this is recommended but not absolutely necessary) see section 4.1.6.
- Mark the existing exact position of the coil relevant to the valve block using a pencil on the block.
- Place the valve block in a vice with the coil upright. Ensure that the jaws of the vice are suitably protected so as not to damage the valve block.
- Unscrew the coil from the valve block. A soft wooden bar may be used to assist by passing through the coil to act as a lever. (See figure 7)
- Clean up the valve faces and check for damage, paying particular attention where the various valves and tubes are fitted.
- Install the new coil in the valve block using loctite and a new copper seal washer. The coil should be tightened into the block to ensure a gas tight seal whilst also maintaining the exact position as that of the coil, which has been removed.

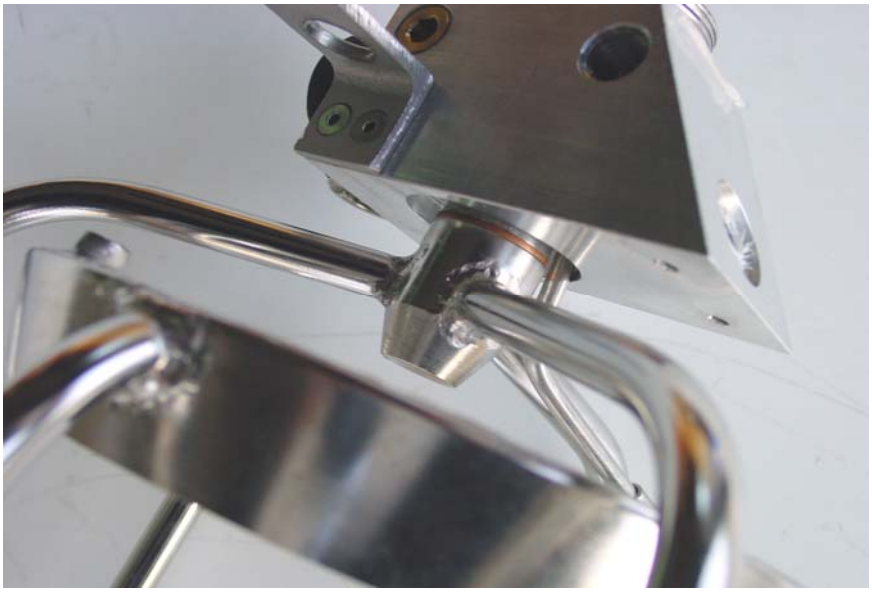


Figure 7 - View showing coil to valve block seat arrangement with copper seal.
(Note - Small bracket is only installed with vapour pilot light systems)

- The joint between the coil and the valve block must be tested to ensure that there are no leaks. Attach a 7 Bar (100 psi) air line to the valve block and check for leaks using soapy water. If any leaks are detected, they must be corrected before further continuing any further.
- (If removed) Refit the liquid pilot and liquid fire valves using new seals and loctite.
- The joints between the valves and the valve block must be tested to ensure that there are no leaks. Attach a 7 Bar (100 psi) air line to the valve block and check for leaks using soapy water. If any leaks are detected, they must be corrected before further continuing any further.
- Reassemble the burner in the reverse order to that dismantled using new seals throughout.
- Carry out a further pressure test. Attach a 7 Bar (100 psi) air line to the burner. Open the main valve and check for leaks using soapy water. If any leaks are detected, they must be corrected before further burner use.

4.1.2.2 Main Jet Cleaning

The main jets are drilled directly into the upper surface of the jet ring. Jet cleaning is best accomplished with the coil removed from the burner as described in section 4.1.2.1

Figure 8

To clean the jets, refer to figure 8 and proceed as follows:

- Insert a suitable metal pin into the jet hole.
- Refer to figure 9, remove any debris by undoing and removing the plug and copper washer items 65 and 66 on the under side of the jet ring and blowing out with a blast of air. Always fit a new copper washer item 66.

Figure 9
Jet ring clean and drain plug position

BU10-65 Jet ring screw
BU10-66 Jet ring copper seal

4.1.2.3 Tightening of Coil Support Strip Screws

- Referring to figure 10, using an Allen key, tighten the coil support fixings (-51), if necessary.

Figure 10 – BU10-51 Coil strip screw

4.1.2.4 Tightening of Coil to Can Attachment Screws

- Referring to figure 11, using a flat bladed screwdriver, tighten the coil to can attachment screws (-36), if necessary.

Figure 11

BU10-36 Coil to can attachment screws

4.1.3 Removal and replacement of Fuel Hose.

To replace a fuel hose, refer to figures 12, 13 & 14 and proceed as follows:

- Using an open-ended spanner, undo the hose from the valve block. Note: it may be necessary to remove and replace the condensate seal (-50) (see can removal section 4.1.1)

Figure 12
Mk10 Liquid hose fitment

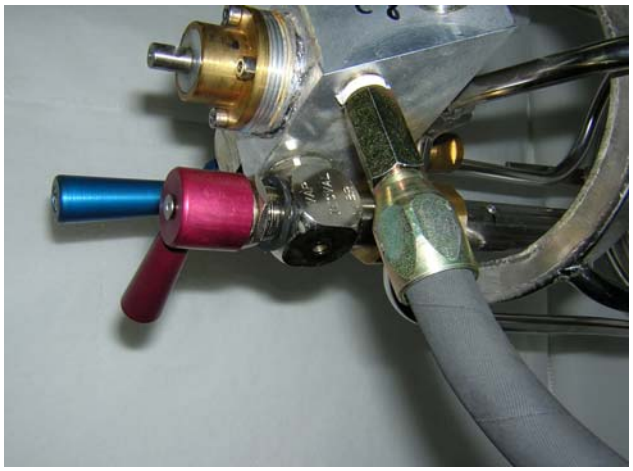


Figure 13
Mk10 Liquid hose fitment (Can removed for clarity)

Figure 14
Mk10 Liquid hose fitting at burner end.

- Replace the hose with a new one if necessary. When ordering a replacement hose, refer to parts catalogue and specify the length and end fitting required.
- Always fit new ptfe tape prior to assembly.
- Ensure that the hose to valve block joint is tight.
- Pressure test the hose by connecting the fuel connector to a 7 Bar (100 psi) compressed air supply. Check the joint between the fuel connector and the hose and the joint between the hose and the valve block. The joints may be checked using soapy water and watching for bubbles when the air pressure is applied. If any bubbles are observed, then there is a leak, which must be rectified before further burner use.

4.1.4 Condensate seal

BU10-50 Condensate seal

The condensate seals are fitted to prevent any condensation in the bottom of the can from dripping on the pilot or passengers. These may be fitted to the hose, crossover tube and liquid fire valve positions. They are installed using silicon seal compound between the seal and the can.

4.1.5 Main Valve Assembly

To remove and strip down the main valve assembly refer to figure 15 & 16 and proceed as follows:

- Remove main valve handle bar assembly (–43) by removing 4 off allen screws (–44) and 2 off screw plates (-45)

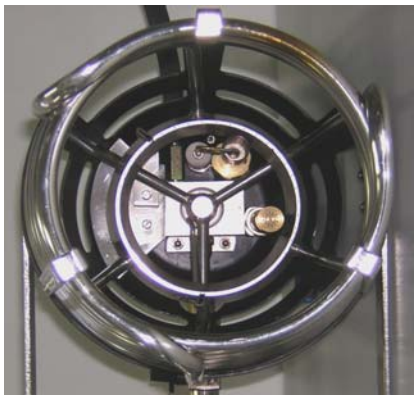
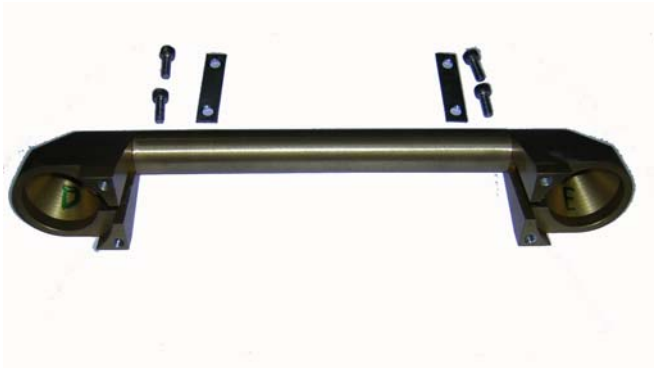


Figure 15



BU10-43 Handle bar assembly
BU10-44 Handle bar screw
BU10-45 Handle bar screw plate.

Figure 16 - View showing handle bar removed

- Remove main valve handle circlip (-22) and pivot pin (-22) to enable valve handle assembly (-21) to be removed.

BU10-21 Main valve handle assembly
BU10-22 Main valve handle pivot pin

BU10-19 Main Valve
BU10-20 Main valve screw
BU10-23 Main valve handle circlip

- Remove main valve screw (-20) and carefully lift out valve out of valve block.
- Refer to figure 17 and strip down the valve and check for contamination and signs of wear. Check the inside of the valve body bore for signs of scratching. If any scratches are noted, then the valve body (-25) must be replaced.
- Check the rubber seal in the valve cushion assembly (-32) for signs of damage or shrinkage. A small circular witness mark on the seal surface is normal and indicates the position of contact between the seal and the valve block. If the seal is damaged or shows signs of shrinkage, it must be replaced. For safety, the seal is supplied as a complete assembly as the cushion and no attempt should be made to replace the seal only.
- Refer to figure 18 and check the valve stem for signs of scratches or damage. If the stem is scratched or damaged, it must be replaced. Check the condition of the “O” seals (-33) fitted to the stem. If either of the seals shows signs of deterioration or damage, they must be replaced. The secondary stem seal (-27) should also be replaced.

Figure 17

BU10-24 Main valve thrust washer
BU10-25 Main valve body
BU10-26 Main valve body seal
BU10-27 Main valve secondary stem seal
BU10-28 Main valve stem washer
BU10-29 Main valve spring
BU10-30 Main valve stem assembly
BU10-32 Main valve cushion assembly

Figure 18
BU10-33 Main Valve stem seal 1

- Re-assembly of the valve is the reverse procedure of disassembly. Prior to re-assembly, apply a thin smear of silicon grease to the valve bore and to the valve stem seals. Always fit a new valve body seal (-26) and circlip (-23)
- After re-assembly of the valve into the block, the gap between the nylon thrust washer (-24) and the valve handle must be checked. A gap of between 0.25mm and 0.5 mm must be present. This gap may be achieved by adjusting the screw in the valve handle assembly (-21). Failure to set this gap may result in a failure of the valve to switch off the main burner after operation.
- When the valve has been re-assembled into the valve block, the valve to block joint and the position where the valve stem exits the valve body must be pressure tested. To achieve this, connect the burner to a 7 Bar (100 psi) air supply and check the joints using soapy water. If any bubbles are detected, then the problem must be rectified before further burner use.

4.1.6 Liquid Fire Valve Assembly

Removal, inspection and maintenance of the liquid valve assembly consists of a number of stages as follows.

Stage 1 - If the valve is not leaking but there are signs of restriction, which is causing a small, flame then one should first check to see if the liquid fire diffuser is blocked. Refer to figure 21 and proceed as follows:

Figure 19

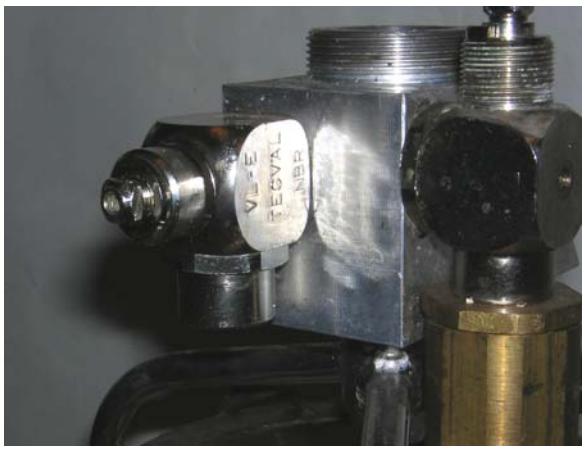


Figure 20

Figure 21 liquid fire assembly

BU10-15 liquid fire diffuser with mesh

BU10-16 liquid fire jet stem.

- Remove the diffuser item 15 and jet stem item 16 from the valve as an assembly.
- Check the valve outlet for contamination.
- Clean through the valve using compressed air.
- Separate the diffuser from the jet stem and again check for contamination
- Clean as required and blow out using compressed air.
- Reassemble using ptfe tape and carry out a burn test.

- If the problem still exists then the liquid fire valve must be replaced.
- Also if the liquid fire valve is found to be faulty by leaking then it should also be replaced as there are no servicable parts.
-

Stage 2 – where the liquid valve is found to be faulty and therefore requires replacing. Refr to figures 19 & 20 and proceed as follows.

- Remove the burner can as described in section 4.1.1 to gain access.
- Remove the diffuser item 15 and jet stem item 16 from the valve as an assembly.
- Remove the liquid valve item 17 and replace with a new valve using ptfe tape.

BU10-17 liquid fire valve

- Reassemble the diffuser and jet stem to the new valve using ptfe tape.
- When the valve has been re-assembled into the valve block, the valve to block joint and the position where the valve stem exits the valve body must be pressure tested. To achieve this, connect the burner to a 7 Bar (100 psi) air supply and check the joints using soapy water. If any bubbles are detected, then the problem must be rectified before further burner use
- Reassemble the burner as described in section 4.1.1
- Carry out a further pressure test. Attach a 7 Bar (100 psi) airline to the burner. Open the main valve and check for leaks using soapy water. If any leaks are detected, they must be corrected before further burner use.

4.1.7 Liquid Pilot Light Assembly

Liquid pilot light assembly

Removal, inspection and maintenance of the liquid pilot light assembly consists of a number of stages as follows.

Stage 1

If the pilot light flame is weak carry out the following test to determine where the faults lies.

- Ignite the pilot light and check the flame for strength. It should give a consistent flame and be able to withstand being vigorously blown against.
- Carry out this test a number of times checking in each case that the valve shuts off cleanly.
- Check the valve and all assembly joints for signs of leaks.
- Vent off the system and fully purge the burner of all traces of propane.
- Remove the igniter assembly item 2 as described in 4.1.9.
- Remove the top half of the valve vent tube item 13 or loosen and move it to one side to gain access. (see figure 22)

Figure 22

BU10-13 liquid pilot vent tubes

- Using a small “Tommy bar” remove the pilot light stem item 6 to gain access to the pilot jet item 7. It is possible to leave the regulator item 4 in place in the valve. However if they both come out together then this is not a problem.

BU10-4 liquid pilot regulator

BU10-5 Washer

BU10-6 liquid pilot stem

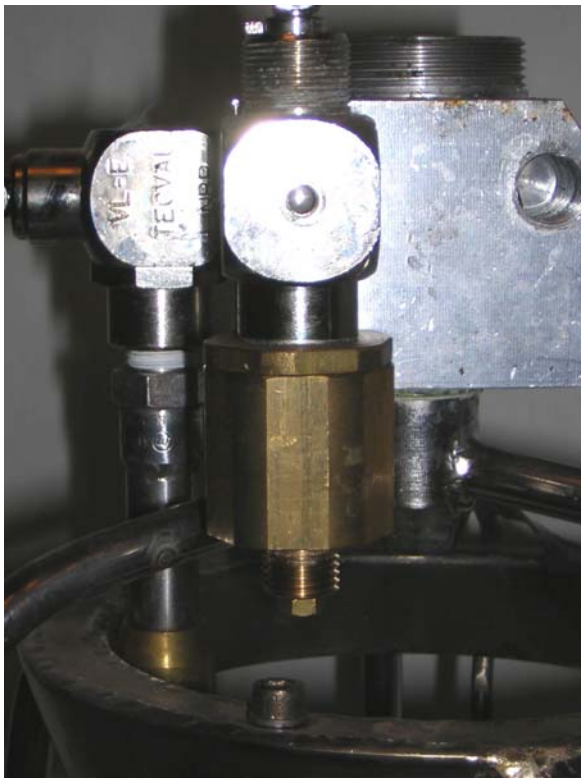


Figure 23

BU10-7 liquid pilot jet

- Refer to figure 23 and remove the pilot jet item 7 and check to ensure that the hole in the jet is clear.

- If the jet is blocked then clear using a very fine wire or blow through with compressed air.
- Replace the jet taking care not to overtighten. And reassemble in the reverse order.
- Carry out the tests on the pilot light as before.
- If the problem still exists then the pilot regulator item 4 will require investigation. This is best achieved at the Ultramagic factory so a complete relacement unit should be installed. Always fit a new copper washer item 5.
- When installing the new regulator care should be taken to ensure that no dirt or debris is allowed to get into the area betwen the valve and the regulator.
- Check the joint between between the regulator and the valve for leaks. Then reassemble as before.
- Should the pilot light valve be leaking or blocked then this will require replacing as there are no servicable parts.
-

Stage 2 – where the liquid valve is found to be faulty and therefore requires replacing. Proceed as follows.

- Vent off the system and fully purge the burner of all traces of propane.
- Remove the igniter assembly item 2 as described in 4.1.9.
- Remove the top half of the valve vent tube item 13 or loosen and move it to one side to gain access.

- Using a small “Tommy bar” remove the pilot light stem item 6 to gain access to the pilot jet item 7. It is possible to leave the regulator item 4 in place in the valve. However if they both come out together then this is not a problem.
- Remove the regulator item 4.
- Remove the can as described in section 4.1.1 to gain access.
- Refer to figure 24 and remove the liquid pilot valve item 12 and replace with a new valve using loctite.

Figure 24

BU10-12 liquid pilot valve

- When the valve has been re-assembled into the valve block, the valve to block joint and the position where the valve stem exits the valve body must be pressure tested. To achieve this, connect the burner to a 7 Bar (100 psi) air supply and check the joints using soapy water. If any bubbles are detected, then the problem must be rectified before further burner use
- Reassemble the burner as described in section 4.1.1
- Reassemble the pilot regulator, jet and stem and test for leaks.
- Reinstall the igniter assembly as described in section 4.1.9.
- Carry out a further pressure test. Attach a 7 Bar (100 psi) air line to the burner. Open the main valve and check for leaks using soapy water. If any leaks are detected, they must be corrected before further burner use.

4.1.8 Pressure Gauge Assembly

There are no user serviceable parts inside the pressure gauge and repair is by replacement only. However, the copper seal fitted on the base of the gauge may be replaced.

To remove the pressure gauge, refer to figures 25 to 28 and proceed as follows:

Figure 25

BU10-3 Pressure gauge and copper seal

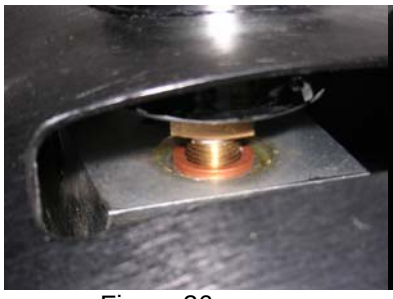


Figure 26

Figure 27

Figure 28

- The pressure gauge is screwed into the valve block and sealed with a copper washer. To unscrew the gauge access must be gained to the back of the gauge using a short thin offset wrench passing through the can hole as shown as well as directly inside the can.

Cut down 14mm wrench for removal of pressure gauge

- When replacing the gauge care must be taken to ensure that the gauge is sealed correctly whilst also maintaining the correct rotation.
- Having replaced the gauge, the assembly must be pressure tested. Do this by connecting the burner to a 7 Bar (100 psi) air supply and checking the joint with the valve block with soapy water. If any bubbles are detected, then the problem must be rectified before further burner use.

4.1.9 Igniter Assembly

Igniter Spark Strength

To check the igniter spark strength, refer to 29 & 30 and proceed as follows:

Figure 29

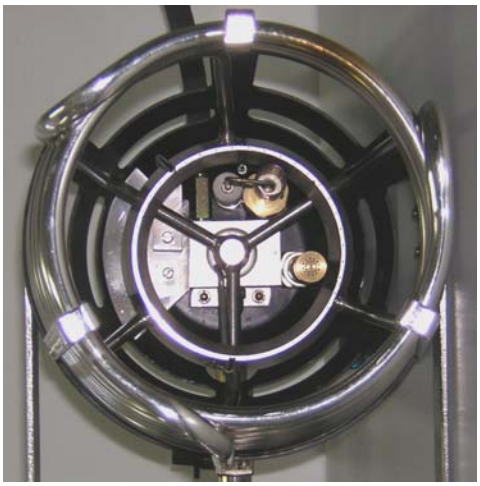


Figure 30

- Operate the igniter button and visually check for a good spark. The spark should be approximately 6mm long and bright blue in colour.
- If the spark is weak, adjust the distance between the electrode tip and the pilot light stem is approximately 6mm.
- Check that the piezzo igniter is tightly screwed into the electrode assembly
- Check that the electrode tip is tightly secured in the ceramic section of the electrode assembly.

Having completed the adjustments, check the spark strength. A good spark should be capable of igniting the pilot light within two attempts.

If the above procedure fails to improve the spark, then it is likely that the piezzo igniter unit item 1 will require replacing.

Igniter Maintenance

To remove and strip down the igniter assembly, refer to figure 31 and proceed as follows:

- Hold the piezo item 1 by hand or with soft faced grips. And unscrew the electrode assembly item 2 from inside the can.
- Reinstall with a new piezo taking care to ensure that it is secure whilst not over tightening which could result in damage to the piezo or the threads of the electrode assembly.
- Set the position of the electrode tip to ensure a gap of approximately 6mm between the tip point and the edge of the pilot stem.
- Check the operation of the igniter assembly by operating the button.

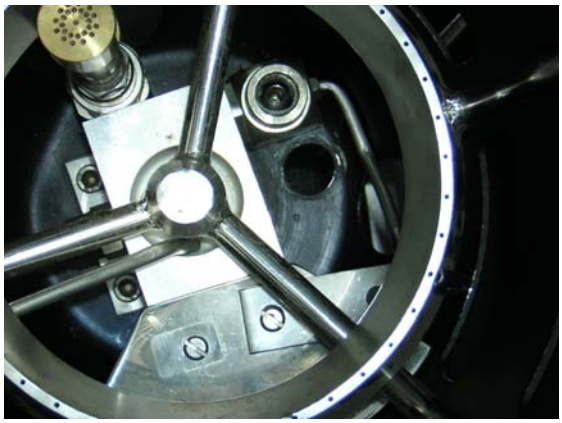


Figure 31 **BU10-2 Igniter electrode assy.** **BU10-1Piezo**

4.1.10 Slurper Tube Assembly

Very little adjustment or maintenance of the slurper tube assembly item 48 is required as the distance and position is set by its construction. However the tube should be set as shown in figure x so that it lines up correctly with the jet ring to ensure optimum performance.

Should the slurper tube assembly become damaged and require replacing then refer to figure 32 and proceed as follows.

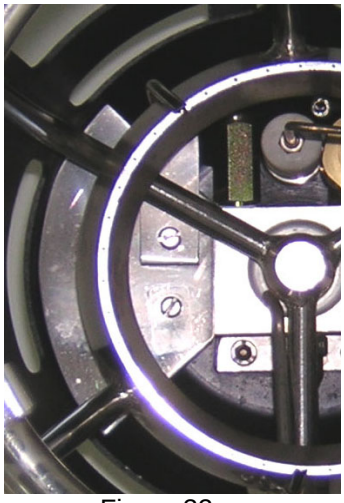


Figure 32 BU10-48 Slurper tube BU10-49 Slurper tube screw

- Remove slurper tube screw item 49 and remove slurper item 48.
- Instal a new slurper in the position as shown in figure x to ensure optimum performance.
- Ensure that the screw item 49 is tight.

4.1.11 Crossover Valve Assembly

The cross over valve requires no maintenance and has no serviceable parts. Therefore if it is found to be faulty then a new valve must be fitted. Refer to figures 33 to 36 and proceed as follows.

- Vent off the system and fully purge the burner of all traces of propane.

Figure 33 Crossover Valve Assembly

Figure 34 Crossover feed tube 1 each side

Figure 35 Crossover Valve Assembly

Figure 36 Crossover Valve Assembly

BU10-52 Cross over valve

BU10-53 Male union fitting - 2

BU10-54 ¼ bsp Dowty seal – 2

BU10-55 Crossover feed tube - 1 each side

- Hold the valve item 52 and the male part of the union item 53 attached to the valve secure and loosen the female part of the union attached to the crossover feed tube. If the Crossover tube is not to be removed then leave the female part of the union attached to the crossover tube.
- Repeat the process for the other side of the valve.
- Remove the valve complete with 2 male unions.
- Inspect the unions to ensure that they are undamaged.
- Remove the male unions from the valve if they are still serviceable.
- Install the unions in the new crossover valve using new seals item 54.
- Reassemble in the reverse order making sure that the unions are tight to ensure there are no leaks.
- Connect the burner to a 7 Bar (100 psi) air supply and check the joints using soapy water. If any bubbles are detected, then the problem must be rectified before further burner use.

5.0 Vapour Pilot Light Configurations.

5.1 General

The vapour pilot configured Mk10 burners are similar to the liquid pilot light burners described with the exception that they have an additional low pressure hose supplying pre regulated vapour from the master cylinder to a vapour pilot light systems. The pilot light assembly is of a simpler design and construction and requires less maintenance..

The burner cans have an extra hole machined in them to allow the passage of the vapour hose. The can part numbers are the same as those fitted on a liquid pilot system but with the addition on a V added to the end to identify them as vapour system.

The valve blocks have a blank fitted where the liquid supply is given to the vapour valve and a small bracket is secured to the block to mount the vapour pilot valve. Valve block part numbers are the same as those fitted on a liquid pilot system but with the addition on a V added to the end to identify them as vapour system blocks.

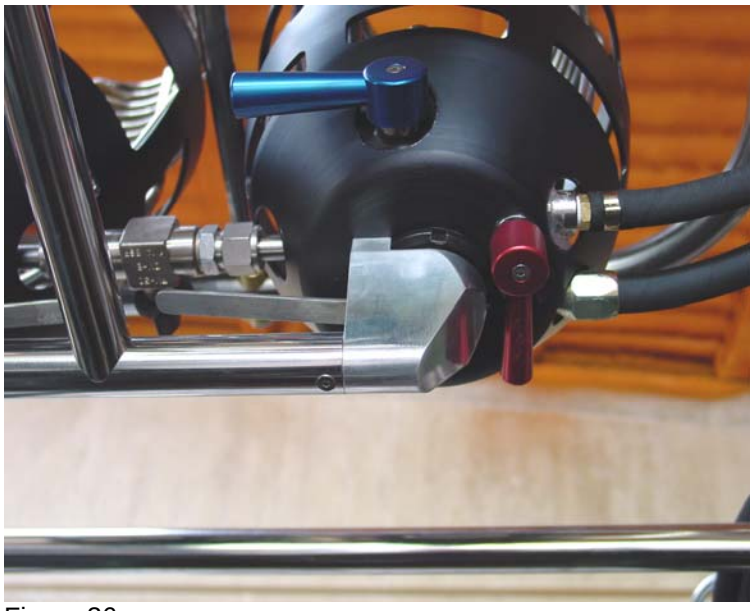


Figure 36
General view from underneath a Quad burner fitted with vapour pilot lights showing valve and hose positions.

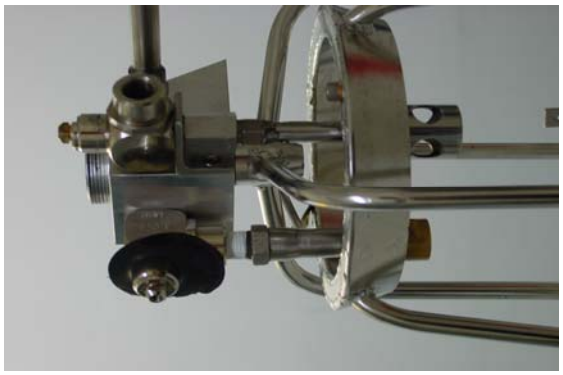


Figure 37
View showing installation of vapour pilot light valve and assembly

Figure 38
View showing vapour valve mounting bracket

5.2 Technical description - Vapour pilot light assembly

The vapour pilot light valve assembly consists of tecval valve fitted with an adaptor a vapour pilot light jet and a vapour stem assembly. This combined assembly incorporates the means of burning the pre-regulated vapour propane received from the master cylinder and the means of switching on and off the flow of fuel. The valve is mounted in an aluminium bracket secured to the side of the valve block. The adaptor is screwed into the valve and sealed using ptfe tape. The jet is screwed into the adaptor and the pilot light stem assembly is screwed onto the adaptor and sealed using ptfe tape. Operation of the valve is through the rotation of a handle through 180 degrees. The handle is attached to the stem using a countersunk hexagon head screw.

Figure 39

Figure 40

BU10-58 Vapour pilot stem assembly

BU10-59 Vapour pilot jet

BU10-60 Valve adaptor

Figure 41

BU10-56 Vapour pilot valve (left)
BU10-56 Vapour pilot valve (right)

5.3 Preventative maintenance

5.3.1 Pilot Light Strength

Check the strength and height of the pilot light flame. A weak or short flame is indicative of a blockage or partial blockage of the pilot light jet or a fault with the valve. In the event that the pilot light flame is considered to be unacceptable, clean the pilot light jet as described in 5.4 If this fails to improve the pilot light flame, then check the function of the pilot regulator on the master cylinder.

5.4 Repair and maintenance -Vapour Pilot Light Assembly

Removal, inspection and maintenance of the vapour pilot light assembly consists of a number of stages as follows.

Stage 1

If the pilot light flame is weak carry out the following test to determine where the fault lies.

- Ignite the pilot light and check the flame for strength. It should give a consistent flame and be able to withstand being vigorously blown against.
- Carry out this test a number of times checking in each case that the valve shuts off cleanly.
- Check the valve and all assembly joints for signs of leaks.
- Vent off the system and fully purge the burner of all traces of propane.
- Remove the igniter assembly item 2 as described in 4.1.9.
- Using a small “Tommy bar” remove the pilot light stem assembly item 58 to gain access to the pilot jet item 59. It is possible to leave the adaptor item 60 in place in the valve.

- Refer to figure 41 and remove the pilot jet item 59 and check to ensure that the hole in the jet is clear.

- If the jet is blocked then clear using a very fine wire or blow through with compressed air.
- Replace the jet taking care not to over tighten. And reassemble in the reverse order.
- Carry out the tests on the pilot light as before.
- If the problem still exists then the vapour regulator on the cylinder will require investigation.
- Should the pilot light valve be leaking or blocked then this will require replacing as there are no serviceable parts.
-

Stage 2 – where the burner vapour valve is found to be faulty and therefore requires replacing. Procede as follows.

- Vent off the system and fully purge the burner of all traces of propane.
- Remove the vapour hose.
- Remove the igniter assembly item 2 as described in 4.1.9.
- Using a small “Tommy bar” remove the pilot light stem assembly item 58
- Remove the adaptor item60 and jet item 59.
- Remove the can as described in section 4.1.1 to gain access.
- Refer to figure 37 and remove the vapour pilot valve item 56/57 and replace with a new valve using loctite.
- When the valve has been re-assembled into the valve block bracket, the position where the valve stem exits the valve body must be pressure tested. To achieve this, connect the burner to a 7 Bar (100 psi) air supply and check the joints using soapy water. If any bubbles are detected, then the problem must be rectified before further burner use
- Reassemble the burner as described in section 4.1.1
- Reassemble the valve adaptor, jet and stem and test for leaks.
- Reinstall the igniter assembly as described in section 4.1.9.
- Carry out a further pressure test. Attach a 7 Bar (100 psi) airline to the burner. Open the main valve and check for leaks using soapy water. If any leaks are detected, they must be corrected before further burner use.