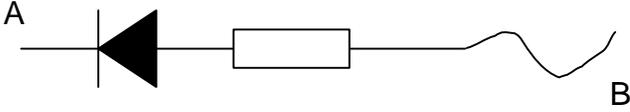


SYSTEM FAULT FINDING

Symptom or Fault	Tests & Diagnosis
<p>Important Note: When testing the spark only, or electronically testing the flame detection circuits, it is necessary to ensure that the air & gas supplies are isolated with manual valves. This will prevent air & gas entering the system if the valves should open during testing.</p>	
Torch fails to spark at the tip, but the 'Spark' LED lights on the Control Unit	The spark is occurring inside the torch tube. Strip down the torch and look for a damaged insulator or a source of tracking along the insulator surface, e.g. moisture or carbon deposits. Clean and dry the rod, and re-test.
Torch fails to spark, and the 'Spark' LED does not light. The air & gas valves also do not open.	The problem could be with either: <ol style="list-style-type: none"> 1. A faulty ignition coil 2. A short circuit on the torch, e.g. earthed electrode 3. Incorrect wiring to the control unit. 4. A PCB fault 5. A power supply transformer fault 6. If the spark gap is less than 1 mm, the spark may not be detected
Test for Ignition Coil:	Measure resistance of the coil: 0.6 ohms between two primary winding cores 600 ohms between primary winding core and the HT output. Primary winding on HTM Coil is between pins A & B. Pin C is earth. Secondary winding on HTM Coil between pin B & HT connection Primary winding on encapsulated coil between the two non-earth cores (brown & blue, or red & blue). Secondary winding on encapsulated coil between blue core & HT connection.
Test for torch assembly	Take torch apart, and check for short circuit and size of spark gap - should be 2.5 to 3.5 mm
Test for PCB Fault	Ensure that the PCB voltage selector switch is in the correct position. Since the spark output signal is a pulsed capacitor discharge, a normal multimeter will not record a meaningful voltage for the signal to the coil with the coil connected, and the output may only be checked with an oscilloscope. If this is available, the output should be 150V DC peak pulses, cycling with the mains power frequency.
Test for Power Transformer Fault	The voltages that should be present on the transformer windings are shown on the wiring diagram. These may be checked with a multimeter.
The torch sparks, and the spark LED lights. The valves fail to open	<ol style="list-style-type: none"> 1. Check if there is a voltage present on the output terminals of the PCB. If so, then the fault lies with either the wiring or a faulty solenoid coil. 2. The Integrated Circuit that accepts the flame signal, and operates the valve relay may be damaged, requiring replacement.
The torch sparks but fails to light	<ol style="list-style-type: none"> 1. If the spark gap is too small, i.e. 1.5 mm or less, there may be insufficient power to light the flame. 2. Are both the air & gas supplies available at the correct pressures? 3. The air-gas ratio may be incorrect - see premix unit manual 4. The torch burner head may be damaged, or the flame retention holes blocked, preventing the flame from stabilising.

Symptom or Fault	Tests & Diagnosis
<p>The torch lights, but fails to detect the flame</p>	<p>Possible causes:</p> <ol style="list-style-type: none"> 1. The ignition coil may be damaged: if there is a break in the secondary winding, the spark may still occur, but the low voltage (150 V) flame detection signal will not jump the broken connection: see coil check. 2. The electrode may not be positioned in the flame, i.e. it is centralised in the burner head - it should be within 3-4 mm of the side wall of the burner head. It must be in the flame to detect. 3. A fault with the PCB on any of a number of component parts. 4. The cable run from the control unit to the torch may be causing too many losses. Try the 'HIGH' flame sensitivity setting. Cable runs over 15 m should be in at least 1.5 mm² cores. 5. Is there a Burner Management System that is shutting the igniter down before the flame signal is established? The flame signal is not generated until approx. ½ second after the spark stops.
<p>The torch lights and detects the flame, but shuts down after a short time</p>	<p>Is the main burner air, in which the torch is positioned, preheated to a high temperature? It is possible for the tube & conductor rod to expand by several mm when the torch is off, sitting in the hot air flow. Since the tube and conductor rod grow by the same amount, the spark gap remains correct, as when the torch was set-up at ambient temperature. When the torch is lit, the flame is initially detected, but the cold air-gas flow over the conductor causes the rod to shrink, and may cause the electrode to be shorted-out against the burner head. In this case, an immediate re-start attempt will also fail.</p> <p>The remedy is to set a much larger spark gap between the end of the electrode & the flat face of the burner head, and to set the spark gap as 2.5-3.5 mm to the side wall of the burner head.</p>
<p>To check flame detection electronically</p>	<p>Manufacture a 'Diode Probe' with a 400k ohm resistor soldered to a diode. Solder a short (10 cm) piece of wire to each end of the chain. Place the end nearest the diode cathode to earth (e.g. burner head wall), and touch the anode end onto the electrode after a spark attempt, within 0.5 seconds of the spark stopping. If the diode probe is placed close to the electrode during the spark period, it will be damaged by the spark.</p> <p>The diode probe may be used directly onto the terminals of the PCB, touching the anode onto the terminal for the 'Blue' wire to the ignition coil. It may be that the diode probe gives flame indication on the PCB with the coil wiring disconnected, but does not work, when the coil wiring is connected. In this event the problem lies with either the torch, the ignition coil or the interconnecting cabling.</p> <div style="text-align: center; margin-top: 20px;">  </div>