SA8 Flame safeguard system

Installation and Operation Manual

This manual contains suggestions and guides that are provided in good faith. They are not to be read in lieu of the current national standards or guidelines.

This manual is intended for use by persons suitably qualified to work on gas and electrical systems. If in doubt, consult the relevant authority within your territory. Saflame Controls does not accept any responsibility for any injury or damage caused as a result of the use or abuse of this manual or equipment.

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Section 1
Description

SA8 Flame safeguard system

The SA8 is a semi-automatic safety system designed to monitor the status of a gas burner, and control the fuel supply accordingly. It is suitable for use in applications where a manual operation is required to ignite the burner.

An external system is required to provide proof of combustion air supply, where required, and chamber purging control. A minimum of 5 (Check local regulations) complete changes of the air within the plant chamber should be ensured. It is important to take into account the state of any valves or dampers in the air supply or flue when calculating the time required to supply the correct amount of purging air.

The SA8 system should not be used in applications where it may be required to automatically ignite a burner from either a time clock or PLC. In these applications, a fully automatic system is required. Neither semi-automatic nor fully automatic systems are suitable for use in systems where it is required to re ignite a burner that has locked out. Under this circumstance you should consult your local gas authority.

Compliance

The following standards have been applied to this product.

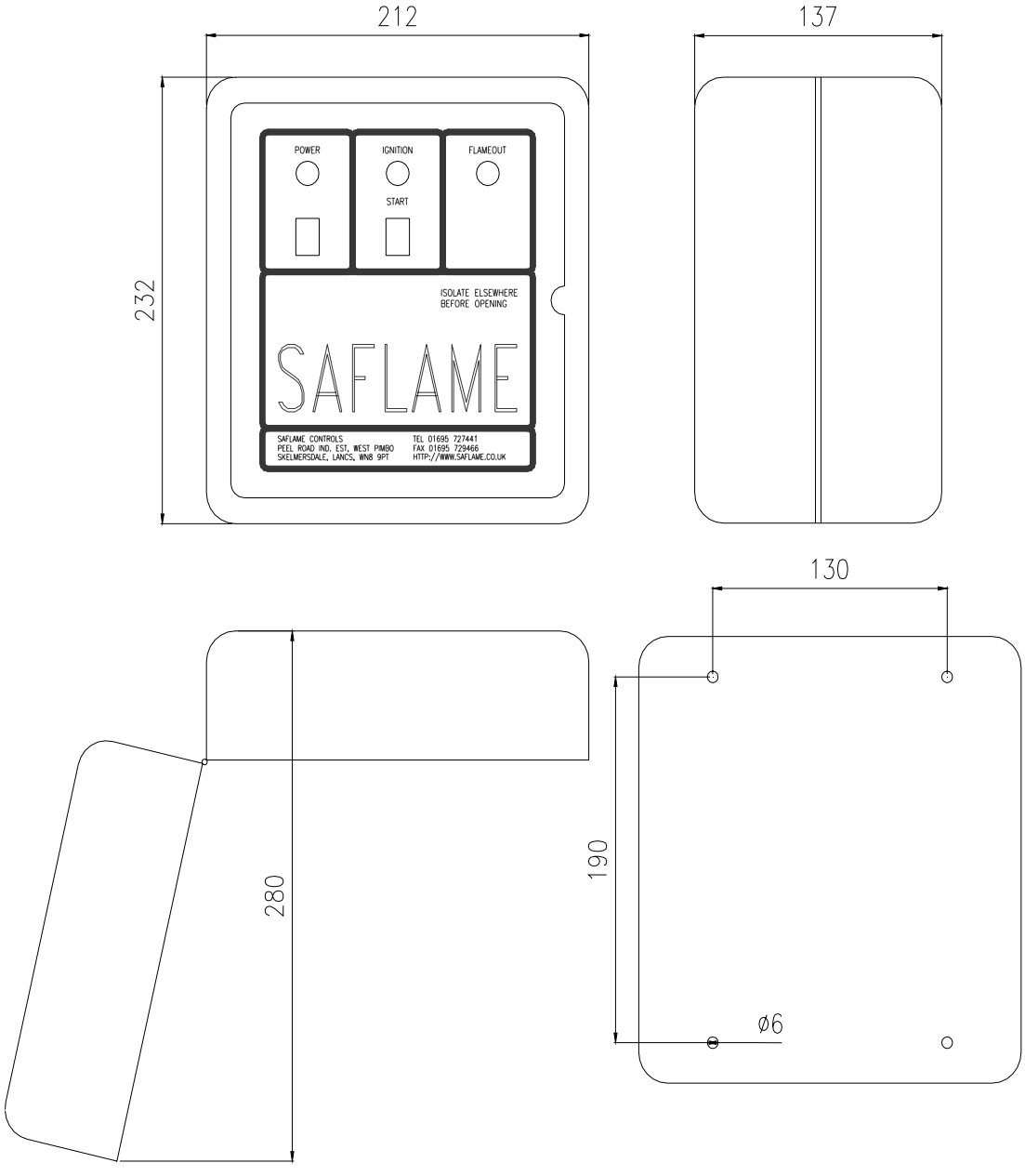
EN 55011,	EMC emissions
EN 50082-2	EMC susceptibility
EN 60335-1	Low voltage directive
IM12	Institution of gas engineers

Variations from previous versions

This is the first version of the SA8 to utilise a PCB motherboard. This board is used to provide both the mechanical mounting for the majority of the components and the electrical connections. The enclosure is now larger and is fitted with a finger proof locking screw. The ability to easily change between 110V and 230V supplies has been incorporated. Only a link change on the control card and the fitting of the correct ignition transformer is required.

Unlike all previous versions, the flame signal can now be referenced to the supply earth rather than neutral. (see section on compatibility)

Section 2
Dimensions



Power requirements

Link selectable, 110V or 230V (Both +- 10%) 50/60Hz
4 Watts + Valve load

An Earth (PE) connection is required for both safety and function. The Earth connection is the return path for both the ignition spark and the flame probe. If this connection is not sound, the system may not be able to ignite the burner.

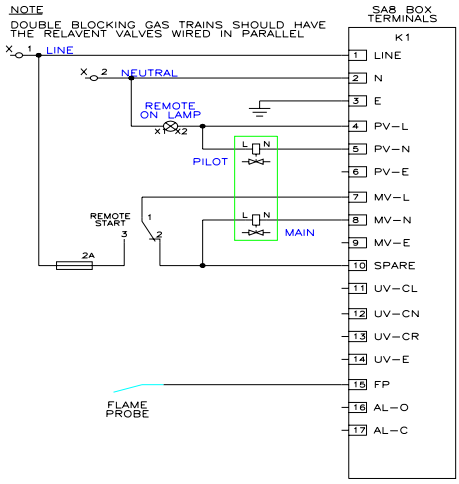
Valve Load capability

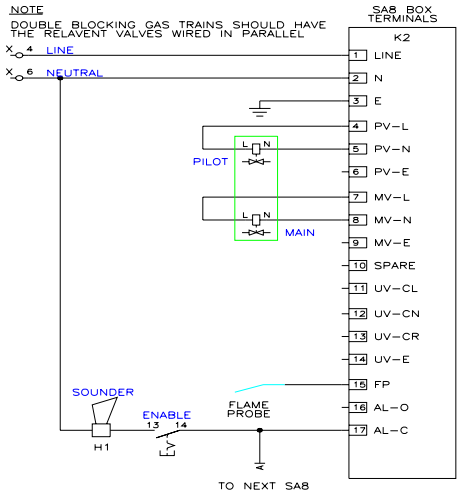
The maximum external load is 2A. An internal fuse is provided to protect the system in the event of an overload. It is vital that this fuse rating is not exceeded as this may result in damage to the internal relay contacts.

Ambient Conditions

Protection	IP54 when correctly fitted
Temperature range	0-60 C
Humidity range	20-90% Rh non condensing
Vibration	0.5G Maximum

Electrical Connections





Example of remote start wiring

Basic system with optional alarm relay fitted

Key

MV	Main Valve
PV	Pilot Valve
FP	Flame Probe
UV	UV Sensor
AL	Alarm

N.B. Double blocking gas trains will have 2 pilot valves piped in series. The valve coils should be wired in parallel.

Setting operating Voltage

SA8 Box

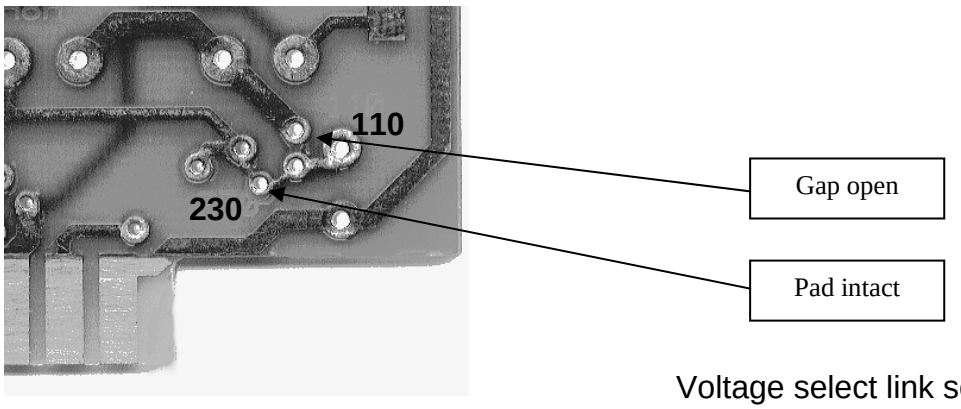
The SA8 box is universal and therefore requires no modification for use on either voltage. The Ignition transformer however is not and the correct one should be fitted for which ever supply voltage required. In the event that the optional alarm relay is fitted, this also needs to be of the correct voltage.

SA8 Card

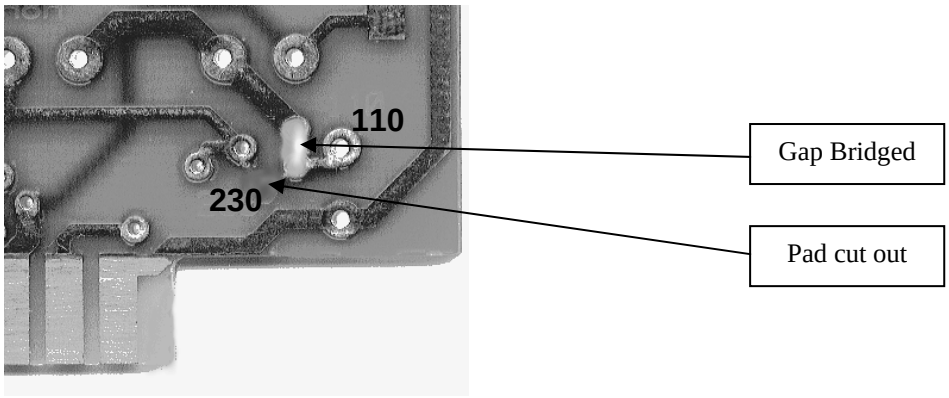
The SA8 control card is suitable for use with 110V and 230V AC supplies. It is important to configure the card for the correct voltage before use. Unless specified otherwise, cards are supplied for use on 230V.

To change to 110V operation, the track labelled 230 should be cut. A pad has been provided, that can be removed by using a drill bit of approximately 3mm diameter. If this is held by hand in the pad's hole and turned, it will neatly cut away the pad. Once the 230 link has been removed, solder a wire link across the pads labelled 110.

In the event that a card needs to be converted back, simply remove the 110 link and replace the 230. Pads have been provided at either end of the 230 link to facilitate this.



Voltage select link set at 230V

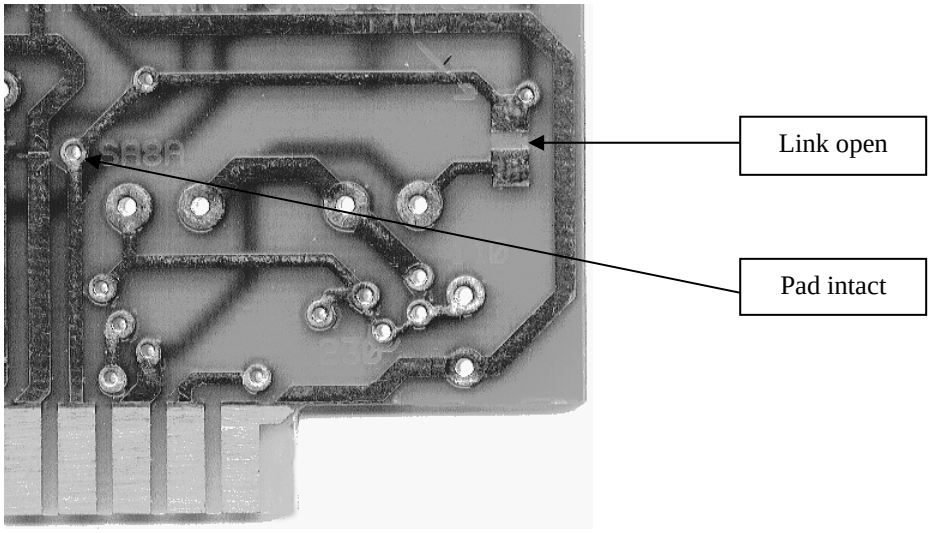


Voltage select link set at 110V

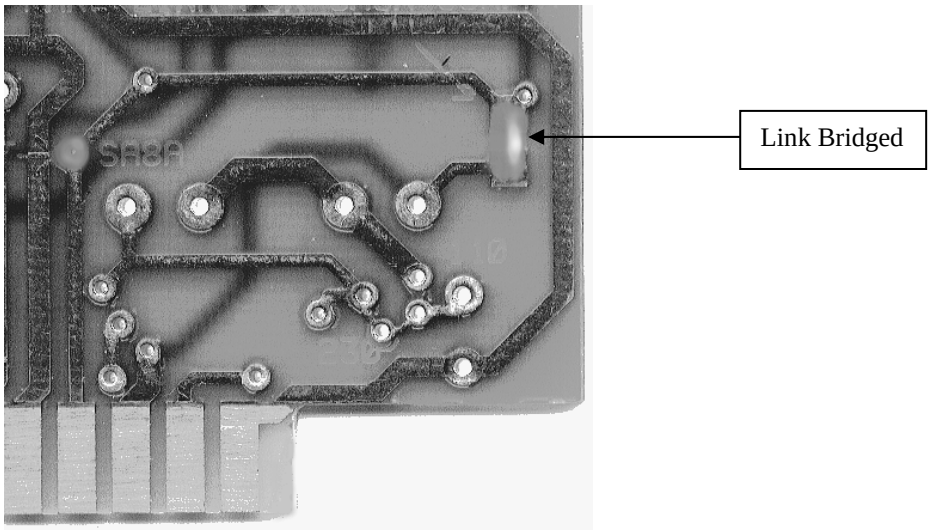
Setting Compatability

As supplied the SA8 control card is configured to reference the flame probe signal to the mains neutral. Provision has been made to reconfigure the card to refernece the signal to the mains earth. This facility should only be used with new SA8 boxes. It is possible to use old style cards in a new style box without modification.

For advice on converting old style boxes to use new style cards, contact Saflame.



Card configured for use in new systems. Earth referenced.



Card as supplied, universal use. Neutral referenced.

Flame Probe

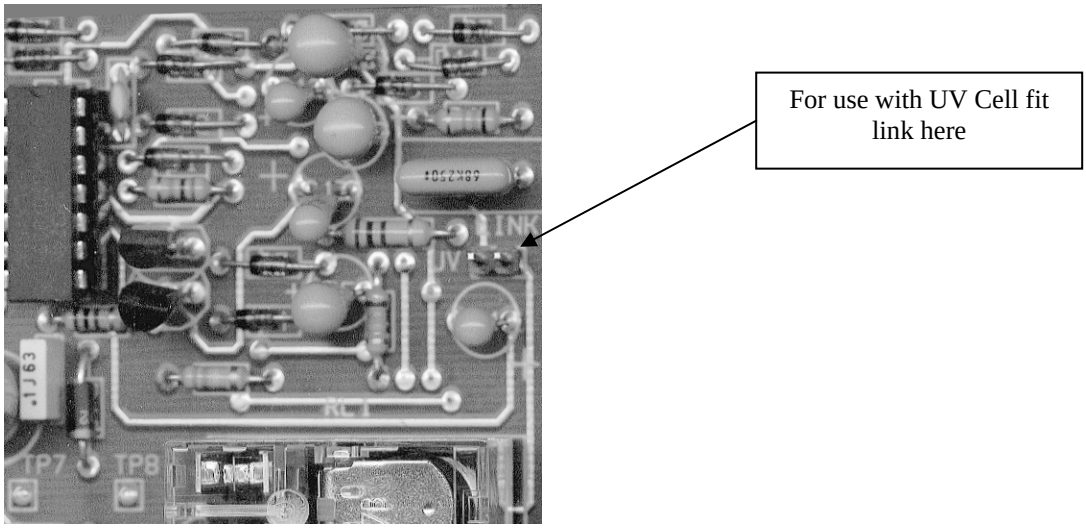
The standard method of flame detection is via a ‘Flame Probe’.
This is an electrically conductive rod placed in contact with the flame. An AC electrical signal is applied to the rod. When a flame is present, part of this signal is able to leak to earth via the flame, whilst the part of the signal of opposite polarity is less able to leak away. This results in the flame seeming to have rectifying properties. It is this rectification of the signal the SA8 system monitors. Due to the fact that very few natural phenomena have this effect, it is easy to distinguish a real flame from say, a short circuit.
For a flame probe to function it is important that the burner body is well earthed. A target ratio of 200 to 1 Earth to flame probe area ideal. Too large a probe or too small an earthed area will both lead to a reduction in signal. For this reason, it may be found that certain types of burner construction are unsuitable for flame probe systems.

UV Cell (Optional)

An alternative method of flame detection is supported by the SA8 system. This utilises a photoelectric sensor sensitive only to the UV range of the spectrum. This form of light is effectively absorbed by the Earth’s atmosphere and is therefore absent from sunlight. Most forms of electric lighting also emit very small amounts of UV light, whilst a flame produces a significant amount. This means it is possible to monitor a flame whilst ignoring most ambient light, without recourse to complex baffles or filters.

The UV sensor should be positioned so it has a clear view of the flame under all ignition and running conditions. It should be borne in mind that the ignition spark also produces large quantities of UV and should not be positioned in such a way that allows the UV sensor to view it.

For use with a UV sensor it is necessary to fit a link to the control card as shown. Card must be configured for neutral reference.



Spark Probe

The spark probe position is largely dictated by the physical arrangement of the burner. It obviously needs to be placed so that the spark is formed in a combustible fuel/air mixture to enable ignition. The spark also requires an earthed object to arc to, normally the metal nozzle of the burner. The recommended spark gap is approximately 3mm. In the event of a UV sensor being used for flame detection, it is important that the sensor is positioned such that it cannot see the spark.

Alarm Relay

A socket is provided for an alarm relay. The recommended type is an OMRON G2R2-SN, voltage to suit (110/230V AC). On a multi burner system, if all the SA8 N/C alarm terminals are wired in parallel, and then to a sounder or beacon. In the event of any burner not being lit, the sounder will operate. If it is desirable to run with some burners not on, switching off the relevant SA8 will also disconnect its alarm output.

Remote Start

It is possible to connect a remote start switch to an SA8. A Momentary 1pole Changeover switch with contacts rated at atleast 2A is required. In the event of modular switches being used, separate N/O and N/C contacts being configured as a changeover switch is NOT RECOMMENDED as it is possible to defeat a safety interlock by removing the N/C contact block. Most manufacturers make a combined N/O N/C module. An example is a Klockner Moeller EC11. Other solutions include using a relay controlled by a single pole N/O switch. Under NO CIRCUMSTANCES must a latching switch be used.

Section 3
Operation

Starting

- Check that both Power and Flame fail lamps are alight.
- Press and hold Start switch.
- Flame Fail lamp goes out after approx. 5 Seconds, Ignition starts.
- After approx. 5 Seconds the Ignition light goes out, release start switch.
- If Flame Fail lamp is not alight, burner is running.

Re Starting

- Follow procedure for normal start as above.
- If ignition fails again, it is permissible to retry upto 3 times
- If burner still fails to light, see Fault finding section.

Flame Failure

- In the event of the burner flame failing, the Flame Fail lamp will light.
- Check for obvious causes of the failure.
- Follow Re Starting procedure

Shutting Down

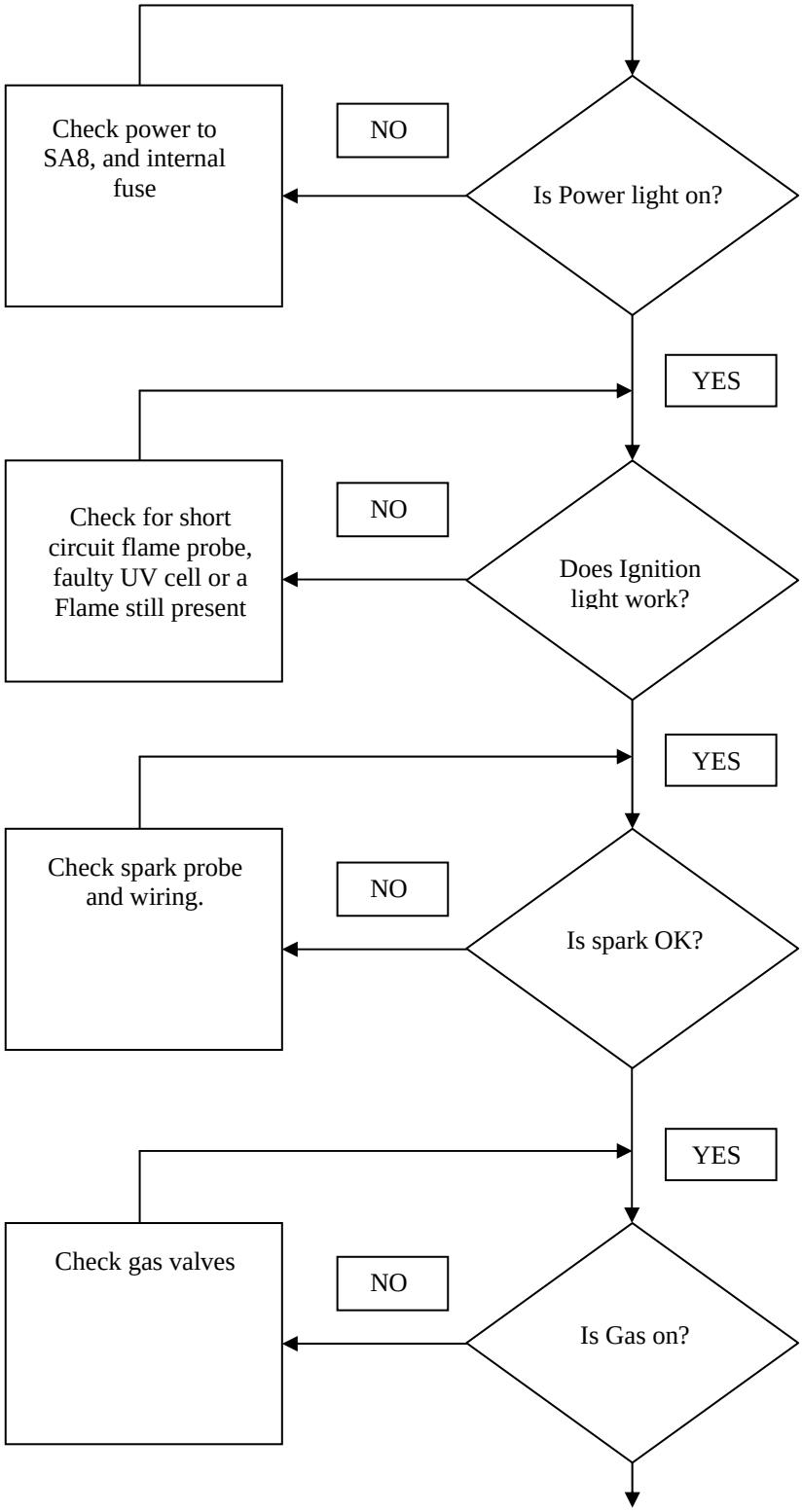
- Switch off Power switch.
- Check that flame has extinguished.
- If ANY DOUBT, isolate gas supply.

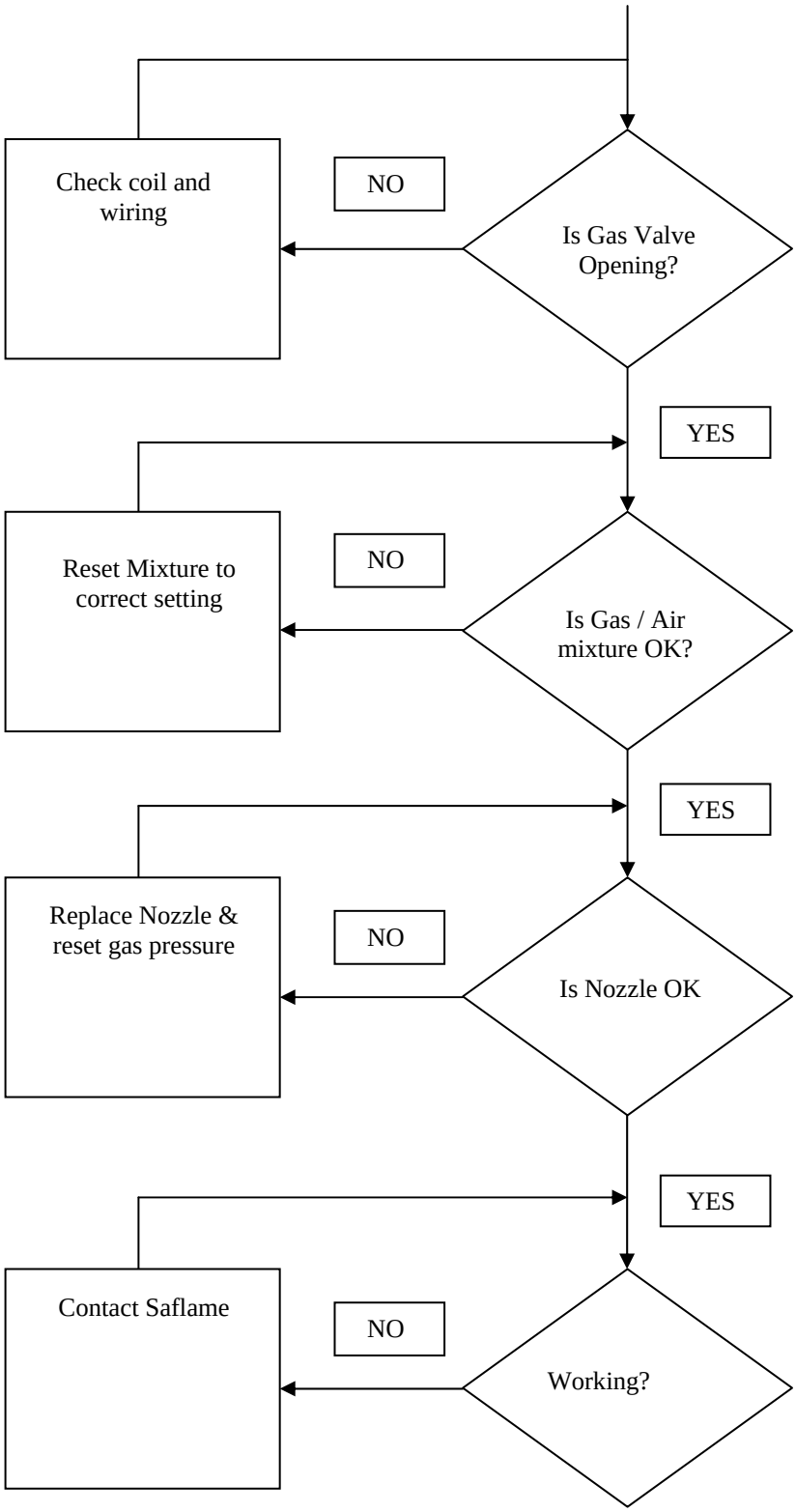
Disable Alarm

- Switch off Power switch.

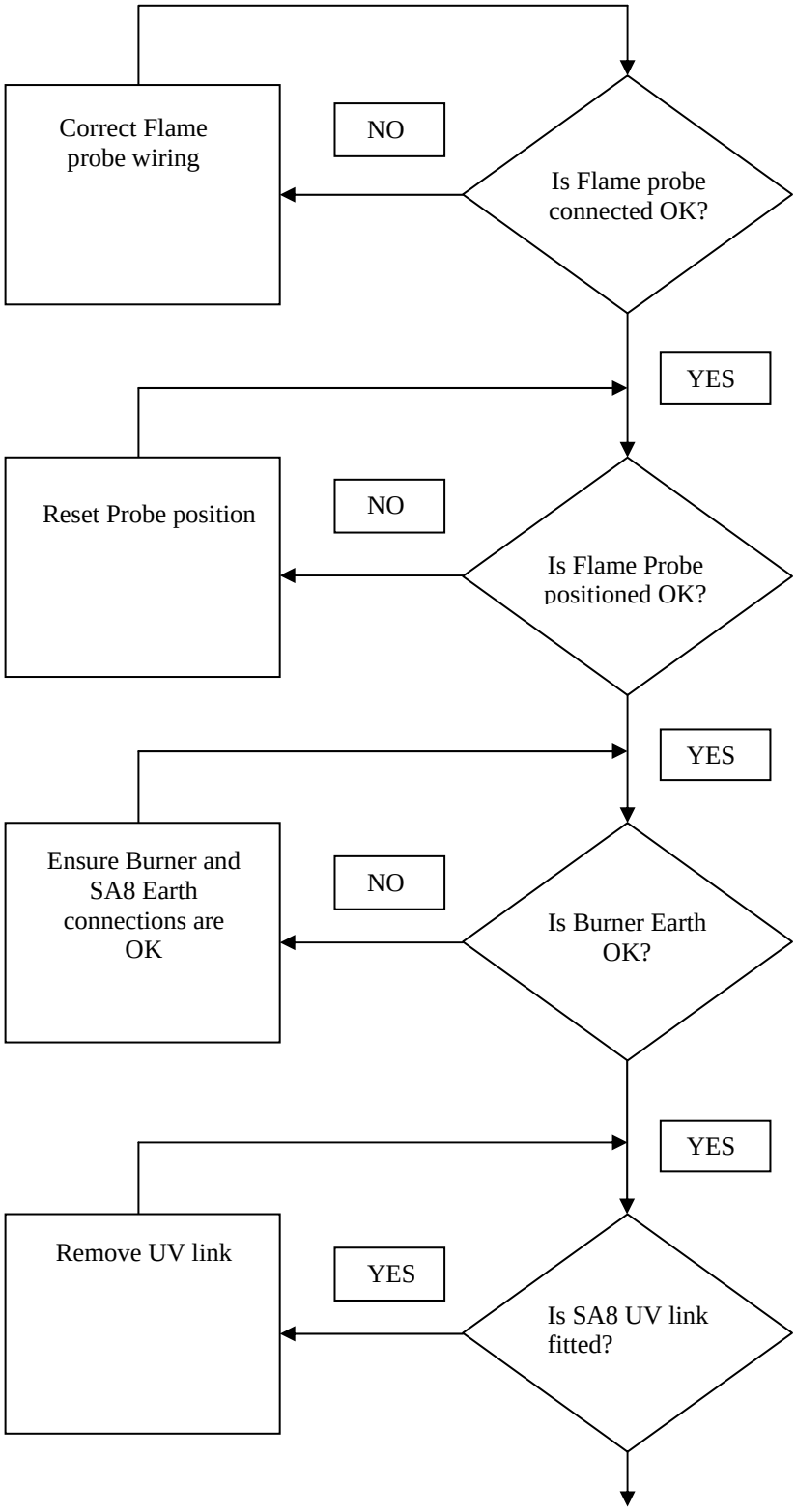
Section 4
Fault Finding (Flame Probe)

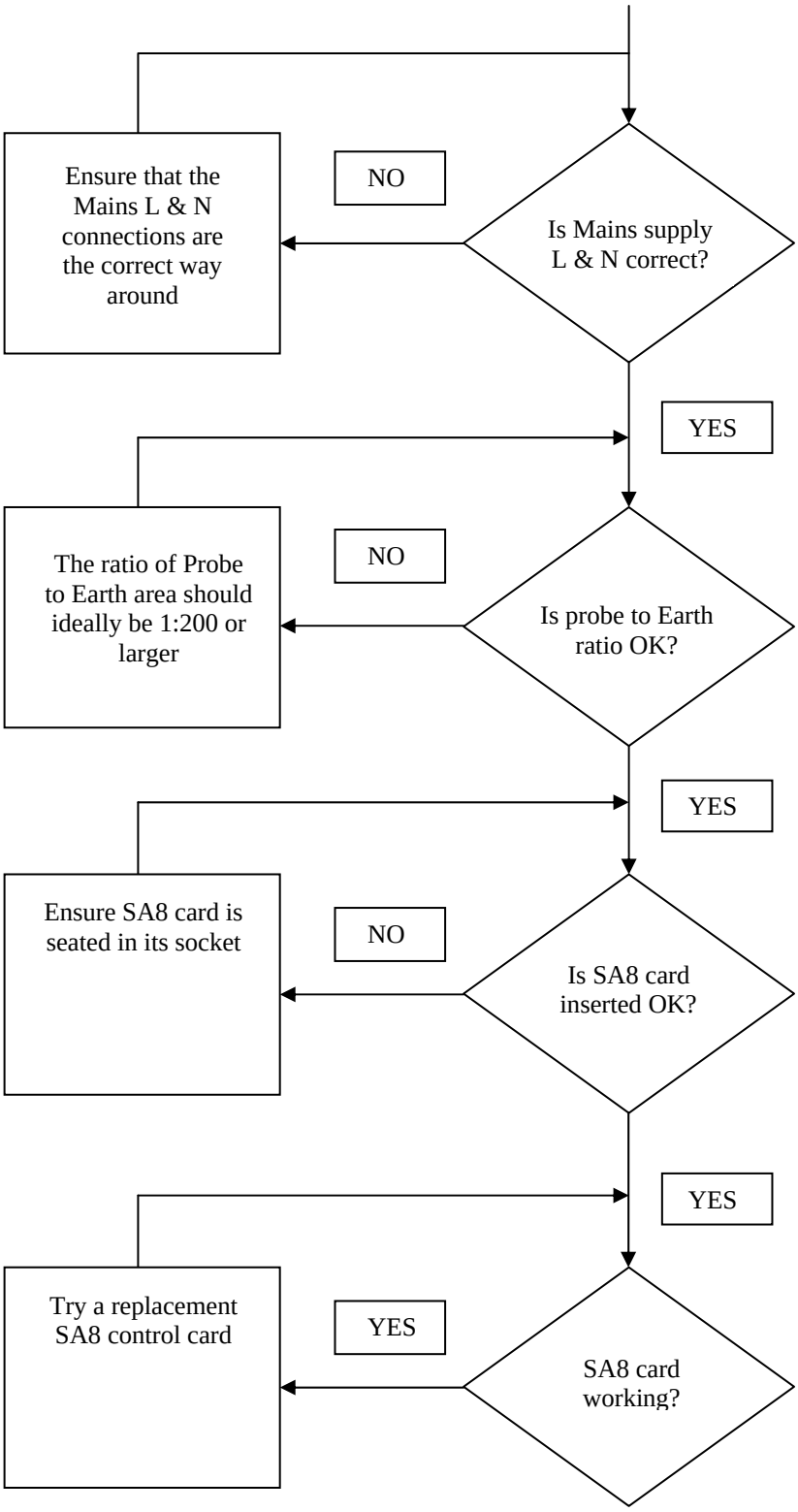
Burner will not light (No flame appears during ignition sequence)



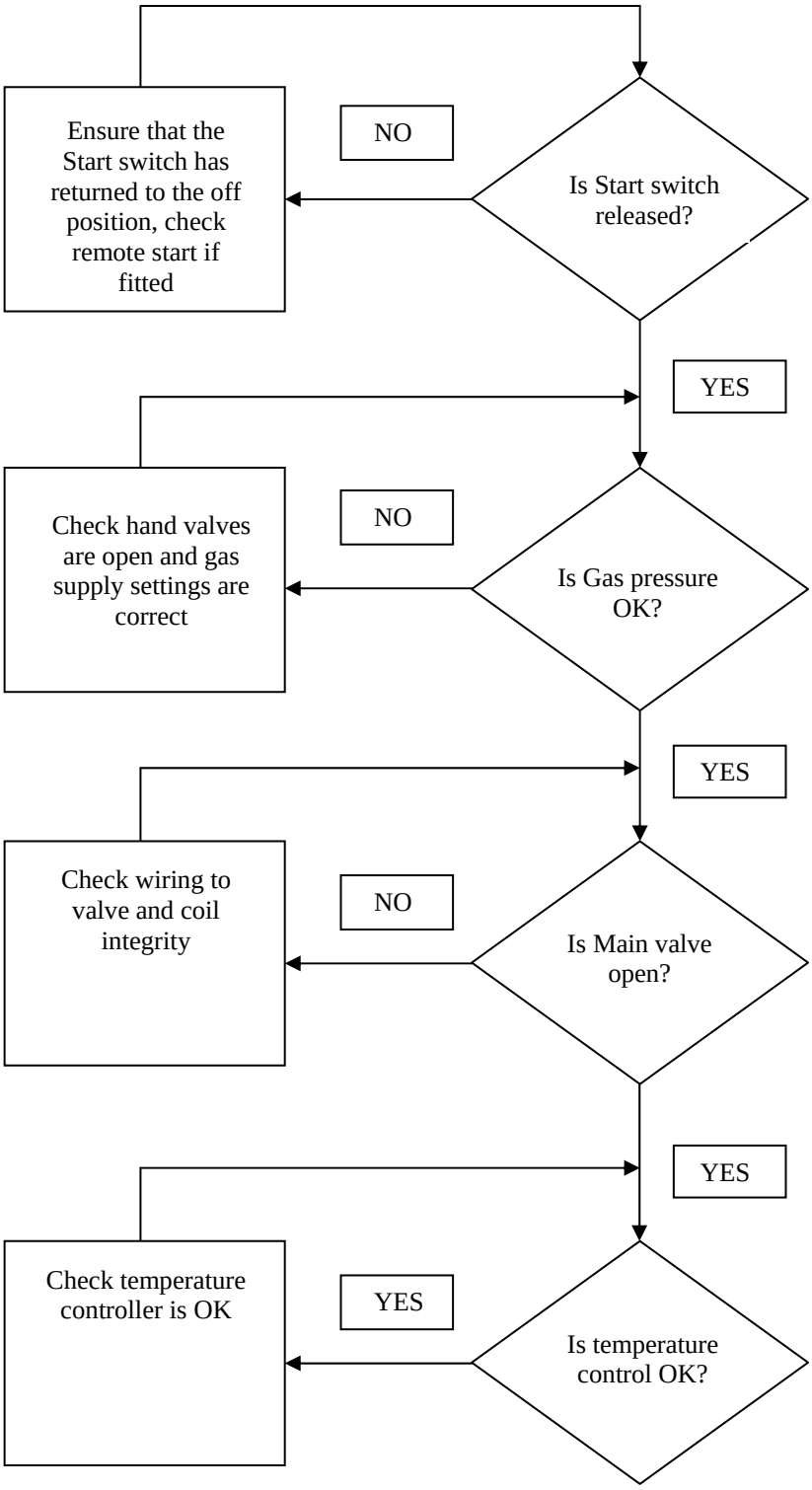

Check coil and wiring
NO
Is Gas Valve Opening?
YES
Reset Mixture to correct setting
NO
Is Gas / Air mixture OK?
YES
Replace Nozzle & reset gas pressure
NO
Is Nozzle OK
YES
Contact Saflame
NO
Working?

Burner will not stay alight (Flame appears during ignition)




Is Mains supply L & N correct?
NO
Ensure that the Mains L & N connections are the correct way around
YES
Is probe to Earth ratio OK?
NO
The ratio of Probe to Earth area should ideally be 1:200 or larger
YES
Is SA8 card inserted OK?
NO
Ensure SA8 card is seated in its socket
YES
SA8 card working?
YES
Try a replacement SA8 control card

Burner will not generate full power



Section 5
Safety & Maintenance

Safety Recommendations

Only suitably qualified personnel should work on and operate this equipment.

Any known faults, however trivial, must be rectified before the equipment is put into use.

The suitability for use with any particular burner, combustion system or plant rests entirely with the client. Whilst Saflame Controls are happy to offer advice we cannot be held responsible in any way.

Routine Safety Checks

It is recommended that the system should be shutdown and restarted at least once in every 24 hours.

Periodically a flame failure should be simulated by shutting off the gas supply. Check that the system shuts down correctly.

Gas valves should be checked for leaks on a regular basis.

The gas piping and electrical wiring should be checked for wear and damage on a regular basis. Any found must be repaired before using the equipment.

The external Proof of air and Purge control systems must be regularly tested.

Routine Maintenance

Remove any dust accumulation from external and internal surfaces.

Keep the Ignition and Flame probe wiring and connections clean and secure.

Ensure that the enclosure is securely shut.

Replace any damage switch dust seals or lamp lenses (Spares available from Saflame)

Section 6
Warranty & Repair

Warranty Conditions

In addition to your statutory rights, Saflame Controls guarantees this product for a period of 1 year from delivery, to be free from manufacturing defects and faulty materials, with the exception of items designated as consumables. The sole remedy under the terms of this guarantee is to return the faulty goods, suitable packed and carriage paid. Saflame Controls, at its discretion will either repair, replace the goods, or offer a refund of the original amount paid. No other liability is accepted, nor any other guarantee expressed or implied.

Repair instructions

Any items failing outside of the warranty time or conditions may be returned for repair. If requested at the time of return, Saflame Controls will be happy to provide an estimate of the costs involved, before commencing any work. In the event of the customer declining the offer of repair, Saflame Controls will dispose of the returned items at no cost to the customer. In the event that the customer requires the return of the goods, the customer can arrange for collection, incurring no charge, or at their discretion, request return shipment. The cost of the return carriage being charged at our standard rate.

Certain products are eligible for our ‘Service Exchange’ scheme. For details contact our ‘Spares and Service’ department.

Spares

Most of the sub assemblies of the SA8 system are available as spares, enabling the customer to effect their own repairs. Saflame Controls is happy to offer advice but cannot be held responsible for any repair performed by the customer.

Availability

SA8 Control card	*
Ignition Transformer (State Voltage)	
Options Board (optional fitment)	*
Main Back board	
Door Board	
Power Switch	
Start Switch	
Lamp Lens	
Front Label	
Alarm Relay (State Voltage)	
Fuse	

Items marked * are eligible for service exchange.

For items not listed contact Saflame Controls.

Section 7
Declaration of Conformity

Safety

The SA8 system complies with the European Low Voltage Directive 73/23/EEC. Assessed to BSEN60335-1:1995

Electromagnetic compatibility

The SA8 system conforms with the general requirements of the European EMC directive 89/336/EEC, amended by 93/68/EEC, by the application of a Technical Construction File. For use in an industrial environment as defined by EN50081-2 and EN50082-2.