

CG5 Automatic Gas Burner

**Installation
Maintenance
Spares**



NU-WAY
HEATING PLANTS LIMITED
A SUBSIDIARY COMPANY OF WOLSELEY-HUGHES LTD.



P.O. Box 1, Vines Lane, Droitwich, Worcestershire, WR9 8NA, Telephone Nos. (09057) 2331 & 2527. Telex. 338551

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SPARE PARTS IDENTIFICATION

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1 INTRODUCTION

This manual covers two types of burner.

1. ON/OFF burner. The operating sequence begins with a pilot gas flame followed by the main flame, then to the 'OFF' position when the appliance has reached its operating temperature/pressure.
2. HIGH/LOW burner. The operating sequence begins with a pilot gas flame followed by low flame expanding to high flame on the demand of the appliance temperature/pressure controlling instruments. Thereafter, the burners will sequence between high flame-low flame and the 'OFF' position on the demand of the appliance temperature/pressure controlling instruments.

Where an instruction or information is applicable to only one of the burner types, then this is identified in the text.

1.1 GENERAL

This manual is structured to enable the user to proceed from the delivery of the burner to its commissioning and use.

The conditions to be fulfilled and the controls and adjustments to be used are dealt with in the sequence that should be followed for the correct assembly, installation and use. Pre-commissioning (Dry Run) and Live Run are described and the location of necessary controls and adjustments to undertake these runs are illustrated and supported by appropriate tabular matter and graphs.

Routine Maintenance, Fault Finding, Spare Parts identification and Wiring Diagrams complete the manual; literature on proprietary components is included.

1.2 SAFETY

Before attempting to assemble, install or commission the CG5 burner, it is essential that the following instructions are carefully read and understood. It is also recommended that such work is carried out only by experienced and qualified gas burner commissioning engineers.

1.3 DESPATCH FOR TRANSIT

To safeguard against damage, the CG5 burner may be despatched in partly assembled form in one of two alternative modes.

Alternative 1 comprises four units (see Fig. 1):-

- (a) Burner Body complete with Control Panel.
- (b) Flame Tube and Hinged Gas Manifold.
- (c) Gas Train with Valves, Multi-Pin Plug and Micro Switch connections.
- (d) Gas Pressure Governor (Regulator).

1.3
Cont'd

Alternative 2 comprises three units (see Fig. 2):-

- (a) Burner Body complete with Control Panel, Flame Tube and Hinged Gas Manifold.
- (b) Gas Train with Valves, Multi-Pin Plug and Micro Switch connections.
- (c) Gas Pressure Governor (Regulator).

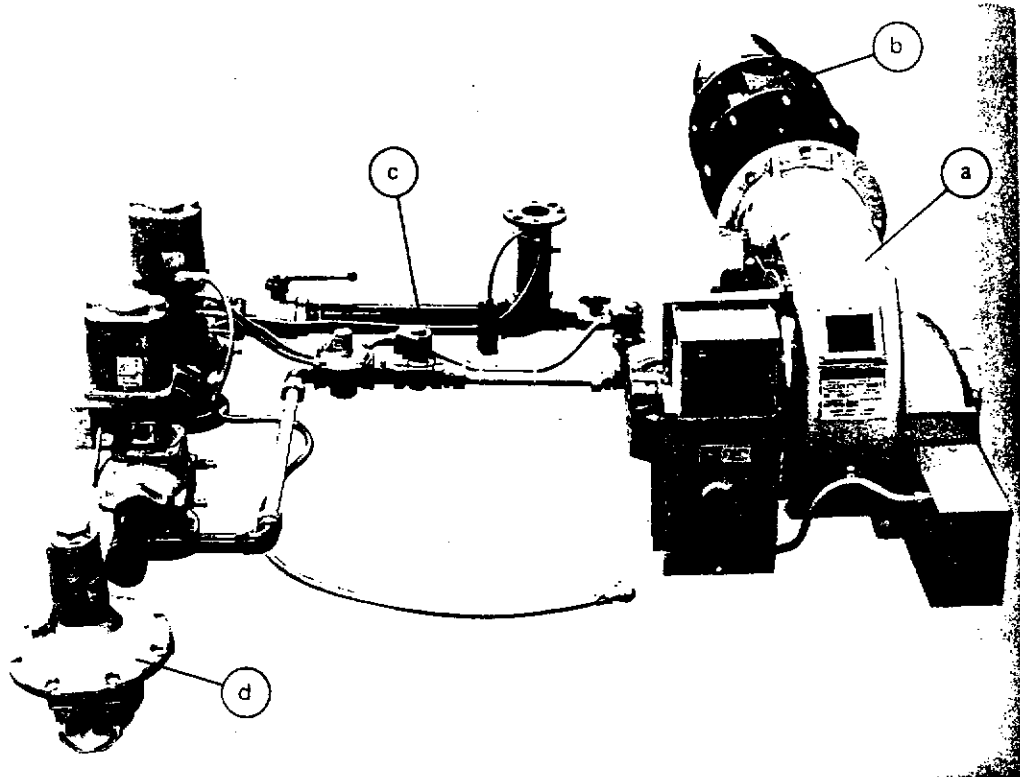


FIG.1 Partly assembled four unit package

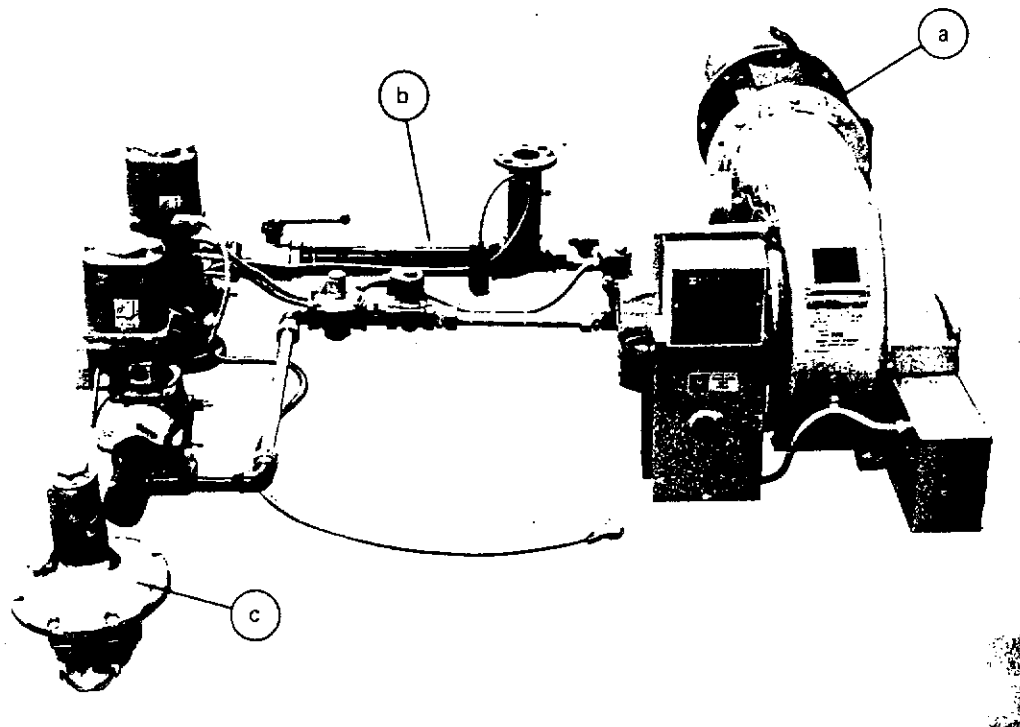


FIG.2 Partly assembled three unit package

2 BURNER

Check and identify that the Serial Number and Specification Number on the burner and gas valve train are compatible.

2.1 ASSEMBLY

Fit the Flame Tube and Hinged Gas Manifold assembly to the burner body with the 8 studs provided ensuring that the gas inlet boss is at the bottom. (See Fig. 3.)

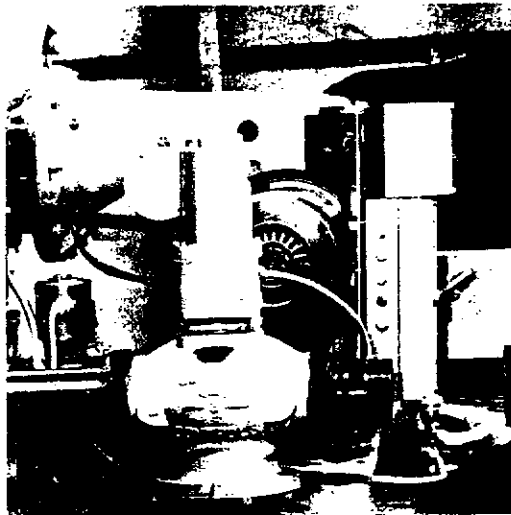


FIG. 3 Assembly of Flame Tube and Hinged Gas Manifold to Burner Body

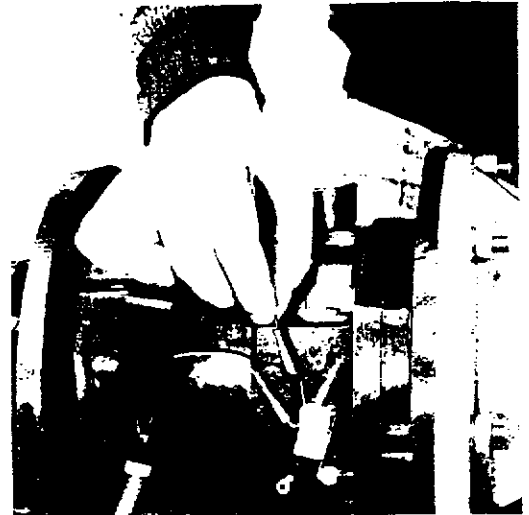


FIG. 4 Microswitch and connections on Hinged Gas Manifold

At this stage it may be convenient to fit the assembly to the appliance ensuring that the mounting flange gasket is fitted between the appliance and burner mounting flange.

Fit the Gas Valve Train to the Hinged Gas Manifold of the burner with the four studs using the sealing gasket provided.

Connect the micro switch terminals on the gas valve train to the micro switch on the Hinged Gas Manifold. Connect the brown lead to the terminal marked 'C' (Common) and the blue lead to the terminal marked N.O. (Normally Open). (See Fig. 4.)

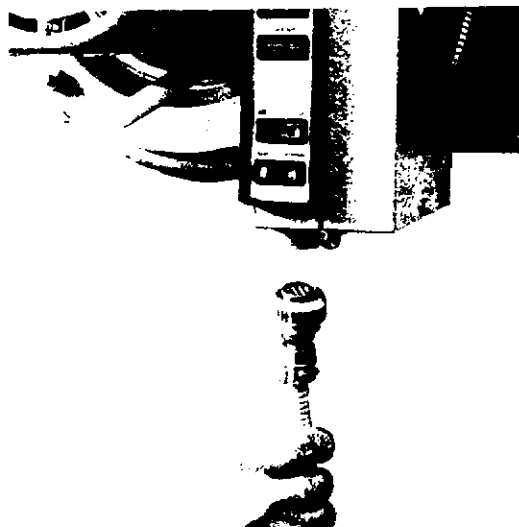


FIG. 5 12-Pin Multi-Pin Plug/Socket connection on Control Panel

Connect the 12-pin Multi-Pin Plug on the Gas Valve Train to the Socket located on the base of the burner Control Panel. (See Fig. 5.)

2.1 Fit the Gas Pressure Governor (Regulator) to the gas valve train.

Cont'd

The burner is now completely assembled and ready for fitting to the appliance.

2.2 FITTING TO APPLIANCE

If the burner is to be fitted to a new packaged unit with over pressure conditions, refer to the Manufacturer's recommendations.

If the burner is to be used with an existing appliance, the chimney, flues, passageways and heat transfer surfaces must be cleaned. Prepare burner mounting plate (see dimensional drawing in Data Sheet). Ensure that the joint between the appliance and the burner is effectively sealed by using the gasket provided.

2.2.1 Flue and Chimney Requirements

The top of the Chimney/Flue should be above all roofs within a radius of 10 metres.

Ensure that the flue pipe from the appliance does not protrude into the chimney beyond the wall thickness.

If more than one appliance is connected to a common flue/chimney, ensure that the cross section of the flue/chimney is adequate for the total volume of flue gases from all the appliances.

2.2.2 Combustion Chamber Conditions

When the burner is fitted to an appliance designed to work under balanced or negative combustion chamber conditions, the over fire draught must not exceed 0.05kPa (0.2inches w.g., 0.5mBar, 5mm w.g.).

Should the over fire draught exceed this figure, then steps should be taken to reduce it to this level.

2.2.3 Plant Room Ventilation

An adequate dust-free supply of fresh air is required for the burner at both high and low level in accordance with the appropriate standards.

3 INSTALLATION

3.1 SERVICES

3.1.1 Gas Supply

The piped gas supply to the burner must be sized, constructed and installed to comply with local conditions and appropriate Codes and Standards. All pipework must be firmly supported.

3.1.2 Electrical Power Supply

Connect the appropriate electricity supply to the burner observing all applicable Codes and Standards. Refer to specific burner wiring diagrams included in the Manual, Burner Instruction Pack (attached to the burner) or the Appliance Manufacturers Hand Book. Connect external auxiliary control circuits by reference to the appropriate wiring diagram.

THE BURNER IS NOW READY FOR COMMISSIONING.

Before proceeding further, check that the appliance is in a proper state to be fired. (For instance, is there water in the boiler?)

Recheck that both Gas and Power supplies to the burner are **TURNED OFF**.

3.2 PRE-COMMISSIONING (Dry Run)

Ensure that the burner Pilot and Main Gas Manual Shut Off Valves are closed.

With Gas supply to the burner **TURNED OFF** pressure test the valve train using air or any other **INERT** gas and check that there are no leaks.

Burner Pilot and Main manual gas valves remain closed.

Set Appliance Control and Limit instruments to "Call for Heat" condition.

Switch on Power to the burner.

Energise the burner with the On/Off switch located on the side of the burner Control Panel. (See Fig. 6).



Fig.6 On/Off Switch on Control Panel

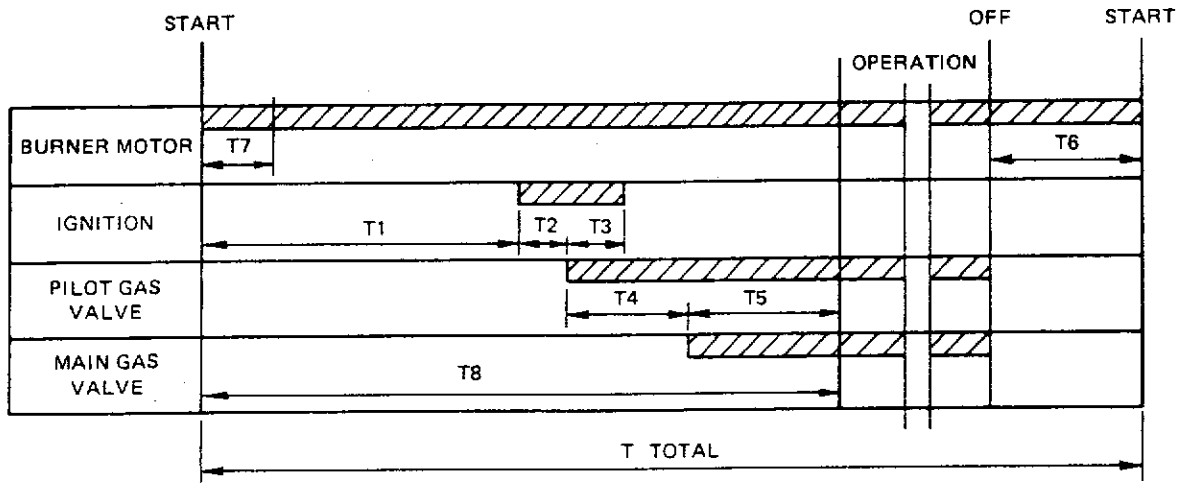
3.2 The burner will now Start
Cont'd

- (a) Immediately if a Gas Leak Detection System is not fitted to the burner.
- (b) Immediately if the burner has been switched off during its normal sequence of operation. Burner will continue to the end of the cycle, stop and restart.
- (c) After approximately 65 seconds if a Pressure Proving Leak Detection system is fitted.
- (d) After approximately 30 seconds if a Vacuum Proving Detection system is fitted.

Check rotation of burner motor which should be *anti-clockwise* viewed from motor end and correct if necessary.

Check that ignition spark is present. For actual time refer to Sequence Diagram. (See Fig. 7).

At this stage if the burner continually purges without ignition spark, the Air Pressure Switch requires adjustment. (See Fault Finding section).



TIME	CONTROL TYPE						DESIGNATION
	TMG 740-1	LFA/B 1.33	LFA/B 1.63	LFL 1.335	LFL 1.635	FW46 A21	
T1	47	36	66	45	75	40	Prepurge.
T2	3	3	3	2.5	2.5	3	Pre-ignition.
T3	5	3	3	5	5	4	Lockout.
T4	10	12	12	15	15	19	Delay pilot-main flame
T5	10	28.5	24	12.5	12.5	22	Delay between main flame low & main flame high (H/L burners only).
T6	10	10.5	10.5	15	15	36	Post-purge.
T7	8	6	3	10	10	5	Air pressure switch inter- lock.
T8	70	79.5	105	75	105	84	Total start time.
T Total	80	90	115.5	90	120	80	Total cycle time of control.

FIG. 7 Sequence Diagram and Table

3.2
cont'd

Check that Pilot Gas Valve/s open.

Ignition spark ceases and Pilot Gas Valve/s close. Burner goes to Lockout.

SAFETY LOCKOUT PROVED

Switch off power supply at burner and mains isolator.

3.3 BURNER AIR CONTROLS AND ADJUSTMENTS

3.3.1 Air Control Damper

Located inside the air inlet to the burner. Its purpose is for the fine and final adjustment of the combustion air. A disc calibrated 0-10 for the visual setting of the Air Control Damper is fitted on the forward end of the burner air inlet casing. (See Fig. 8.)

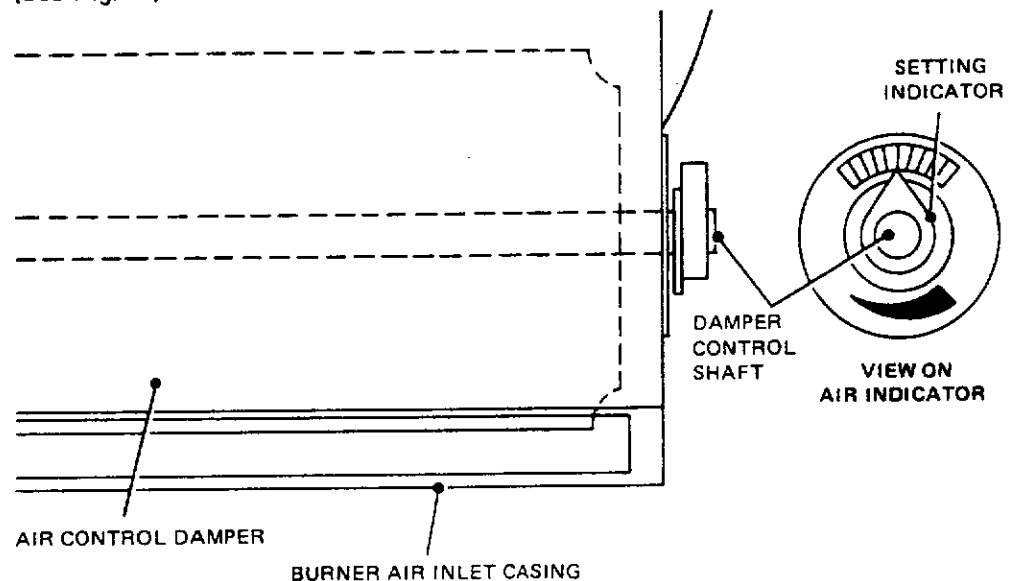


FIG. 8 Air Control Damper and calibrated indicator

On/Off Burner only

Adjustable Stops for locking the Air Control Damper in its final position are located beneath the cover on the rear of the air inlet casing. (See Fig. 9.)

High/Low Burner only

Adjustable stops, micro switch, cam, and servo motor for setting High and Low flame air are located in a housing at the rear of the air inlet casing. (See Fig. 10.)

3.3.2 Air Diffuser

The Air Diffuser is fitted to the front end of the adjustable inner assembly of the burner and located within the flame tube.

The function of the Air Diffuser is to control the volume of combustion air and create a pressure drop over the burner head to ensure good fuel/air mixing.

The setting of the Air Diffuser is determined by the Air Adjusting Mechanism located under the cover on the top of the Hinged Gas Manifold. (See Fig. 11.)

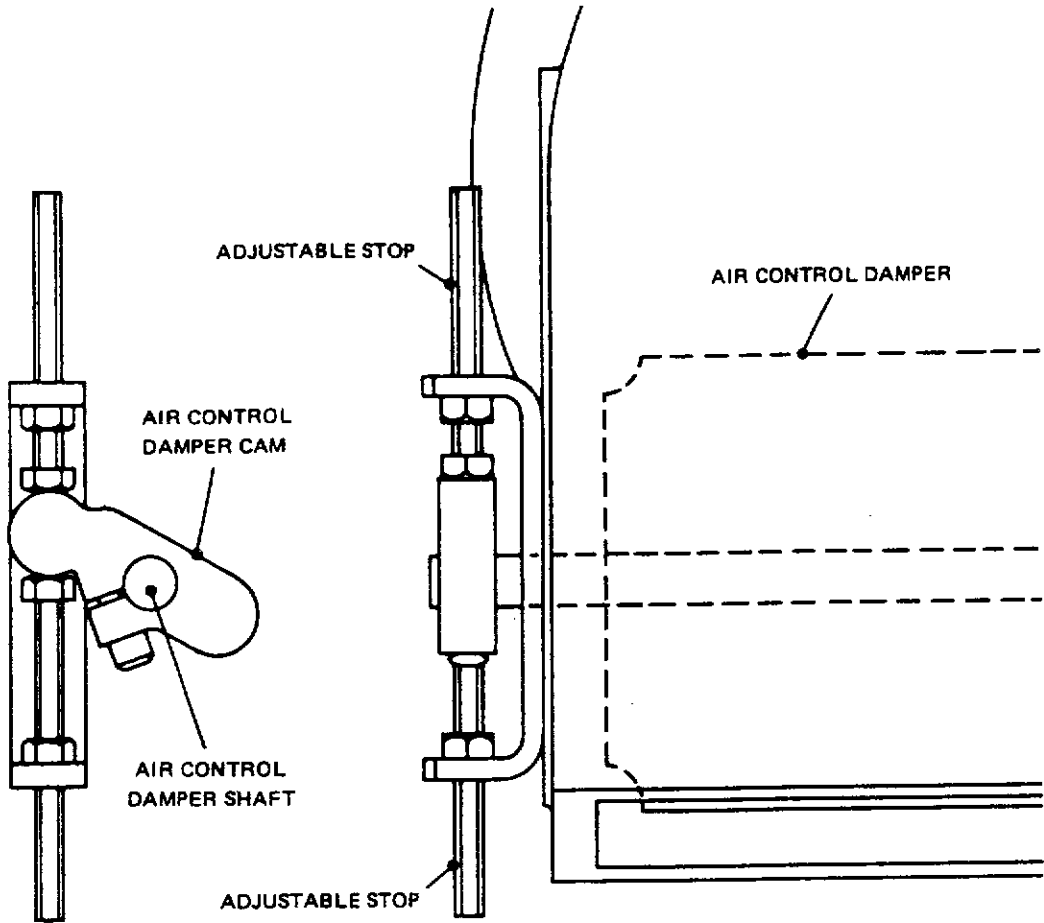


FIG. 9 Air Setting adjustment (On/Off Burner only)

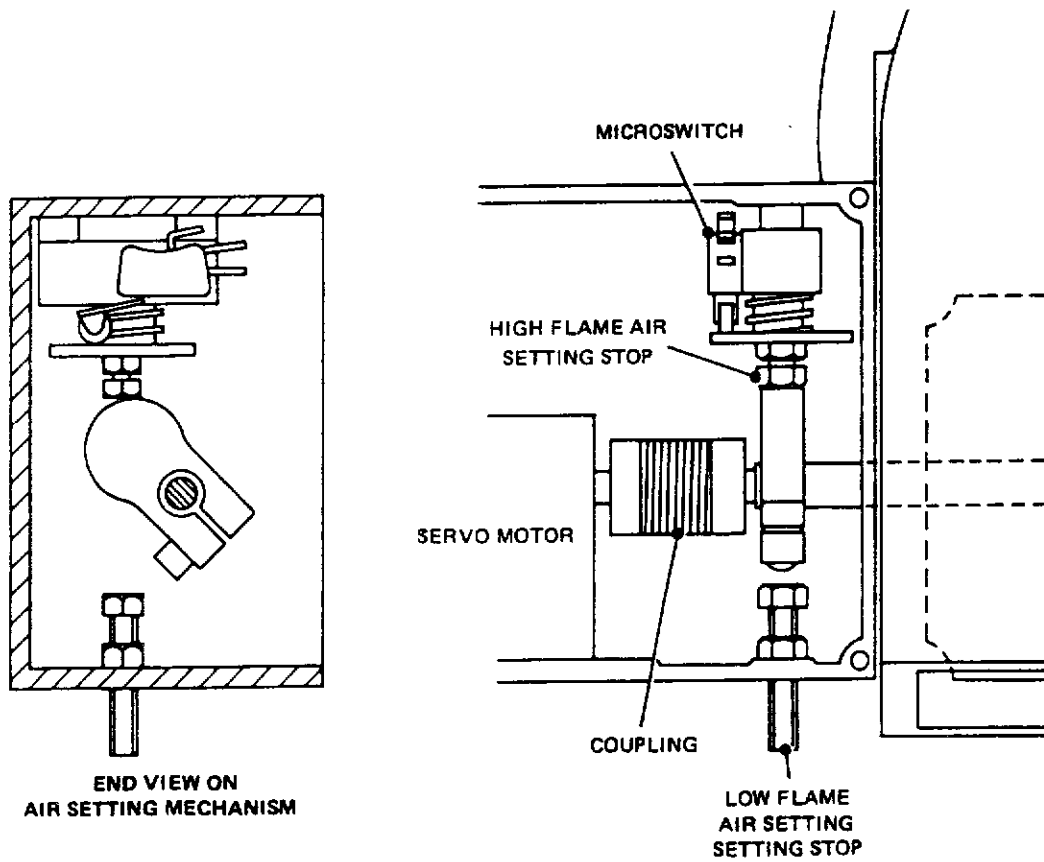


FIG. 10 Air Setting adjustment (High/Low Burner only)

3.4 BURNER GAS CONTROLS AND ADJUSTMENTS

3.4.1 Gas Spreader

The Gas Spreader is fitted to the front of the adjustable inner assembly of the burner and located within the Flame Tube.

The function is to control the volume and distribution of gas within the air stream.

The setting of the Gas Spreader is determined by the gas adjustment mechanism located under the cover on top of the Hinged Gas Manifold. (See Fig. 11.)

Note: To assist in the setting of air and gas adjustment mechanisms both plates are calibrated 0-10.

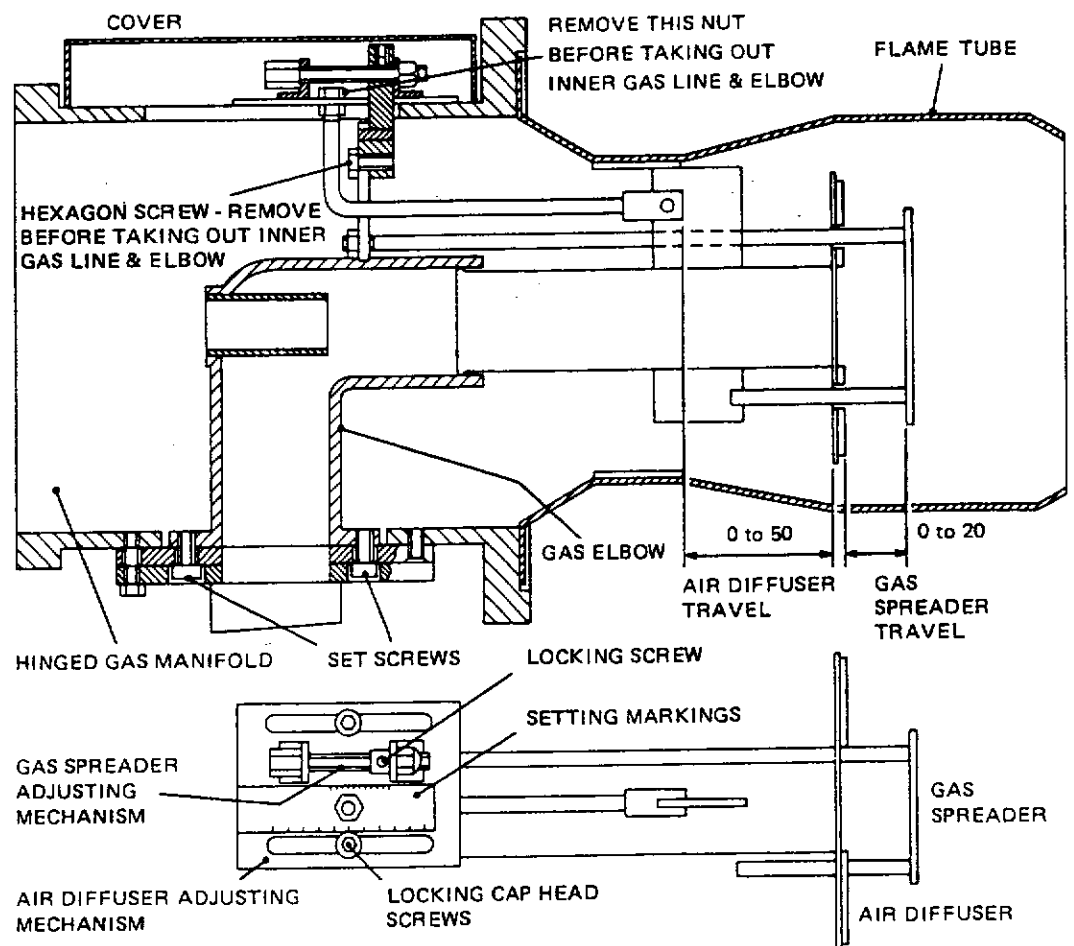


FIG.11 Air and Gas Controls

3.5 LEAK DETECTION SYSTEMS (L.D.S.) – (Optional Extras)

CG5 burners may be fitted with Gas Leak Detection Systems (L.D.S.) which are included and prewired in the Gas Valve Train.

Two types of L.D.S. can be supplied:-

Landis & Gyr L.E.B. Pressure Proving System.

Landis & Gyr L.E.D. Vacuum Proving System.

The system of operation is as follows.

3.5.1 L.E.B. Pressure Proving System

When the appliance "calls for heat", a signal via the burner Sequence Control Box energises the L.E.B. unit which then carries out a series of checks before the burner can start. (See Fig. 12b.)

Valves V1, V2 and V3 are closed.

The L.E.B. sequence first opens Valve V3 in the Pilot Line and after 8 seconds closes again.

Valves V1, V2 and V3 all remain closed for 20 seconds while the minimum side of the Gas Pressure Switch, factory set at 0.5kPa, (2.0 inches w.g., 5.0mBar, 50mm w.g.) now checks for rise in gas pressure between the three valves.

If there is a rise in gas pressure. Valve V1 is leaking and the seat may need cleaning and/or the valve should be renewed.

The L.E.B. unit will Lock Out.

If there is no rise in gas pressure, Valve V1 is leak proof and the L.E.B. unit will continue to sequence to the next stage.

Valve V1 opens for 6 seconds and pressurises the line between Valves V1, V2 and V3.

Valve V1 closes.

Valves V1, V2 and V3 remain closed for 28 seconds, while the maximum side of the Gas Pressure Switch, factory set at 1.75kPa, (7.0 inches w.g., 17.5mBar, 175mm w.g.) now checks for a fall in pressure between the three valves.

If there is a fall in gas pressure, check the gas train for leaks. Valves V2 and V3 may be leaking and the seats may need cleaning and/or the valves should be renewed.

The L.E.B. unit will Lock Out.

If there is no fall in gas pressure, the system is leak proof and the L.E.B. will allow the burner to continue on NORMAL OPERATION.

3.5.2 L.E.D. Vacuum Proving System

When the appliance "calls for heat", a signal via the burner Sequence Control Box energises the L.E.D. unit which then carries out a series of checks before the burner can start. (See Fig. 12c.)

The Normally Open Vent Valve V1 closes.

The vacuum pump within the L.E.D. unit is energised for 22 seconds and creates a vacuum between Valves V1, V2, V3 and V4.

Burner motor runs at this time.

Proving of vacuum for 28 seconds.

If vacuum is not proved, check the gas valve train for leaks. Valves V1, V2, V3 and V4 may be leaking and the seats may need cleaning and/or the valves renewed.

L.E.D. will Lock Out.

If the vacuum is proved, the system is leak proof and the L.E.D. will allow the burner to continue on NORMAL OPERATION.

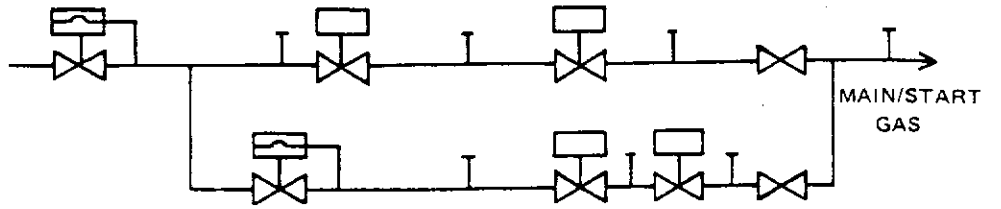


FIG.12a Burner with basic standard gas valve train

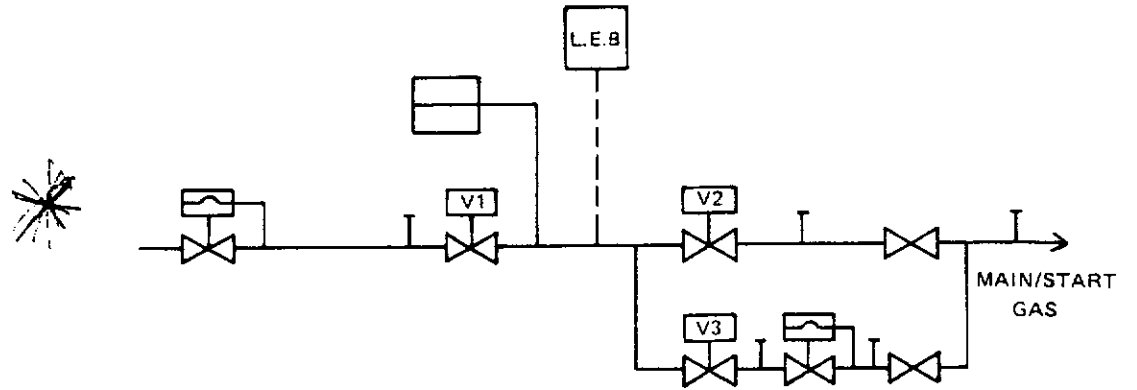


FIG.12b Burner with Pressure Proving System

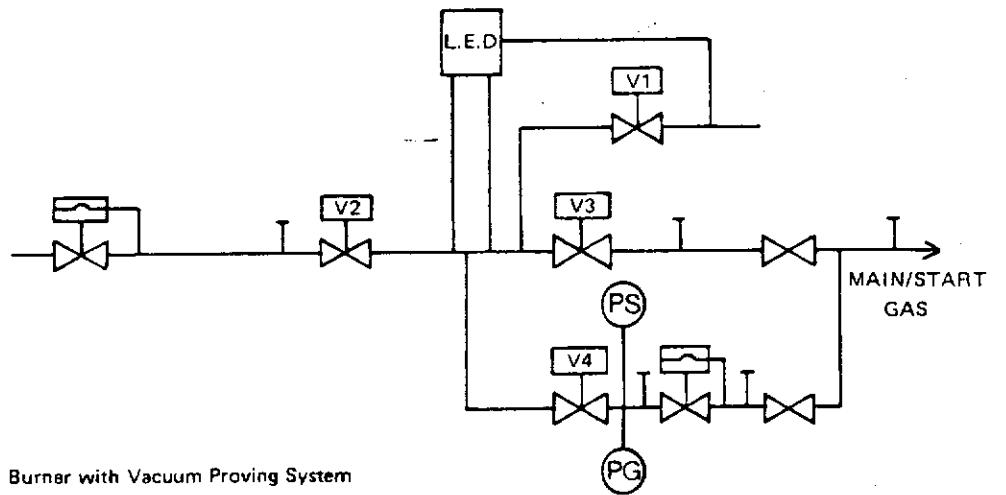
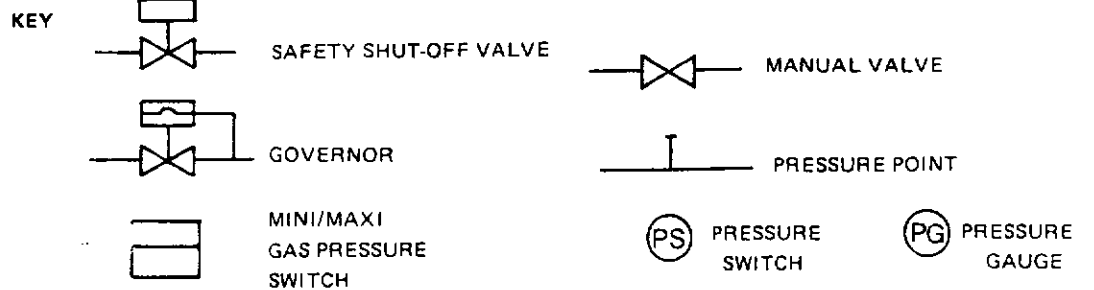


FIG.12c Burner with Vacuum Proving System



4 PRE-FIRING CHECK AND INITIAL SETTING

Check that Gas and Electrical Power Supplies to the burner are TURNED OFF.

4.1 AIR CONTROL DAMPER

On/Off Burner only

Remove cover at rear of air inlet casing and manually rotate the cam and the air control damper spindle to the position number shown on Initial Setting Table (see Fig. 13) for burner rating. Lock in position with two stops. (See Fig. 9.)

BURNER RATE		
440 - 733	734 - 938	KW
$378 \times 10^3 - 630 \times 10^3$	$630 \times 10^3 - 806 \times 10^3$	Kcal/hr
$1.5 \times 10^6 - 2.5 \times 10^6$	$2.5 \times 10^6 - 3.2 \times 10^6$	BTU/hr
A 7	8	
B 2	3	
C 4	6	
D 2	4	

FIG.13 Initial Settings table

- A: Air Damper Control Setting- high flame (also main flame on/off burners).
- B: Air Damper Control Setting - low flame.
- C: Air Diffuser Adjusting Mechanism Setting.
- D: Gas Spreader Adjusting Mechanism Setting.

High/Low Burner only

Remove cover from housing at rear of air inlet casing. Manually rotate the cam and the air control damper spindle to the Low Flame position number indicated on the Initial Setting Table for burner rating. Adjust travel stop. (See Figs. 10 and 14.)

Manually rotate the cam and the air control damper spindle to the High Flame position number shown on the Initial Setting Table for burner rating. Adjust travel stop. (See Fig. 10.)

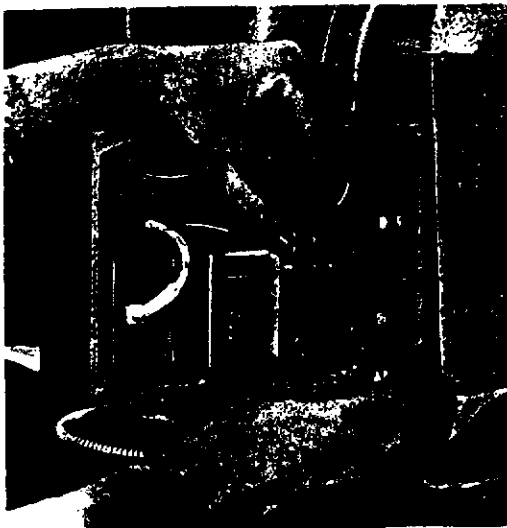


FIG.14 Adjustment of travel stops (High/Low burner only)

4.2 AIR DIFFUSER

On/Off and High/Low Burners

Set the air diffuser adjustment mechanism to the position number indicated on the Initial Setting Table for the burner rating.

Note: The initial settings are for general guidance at this stage. Certain final adjustments may be required later to suit appliance requirements and variable site conditions. (See Fig.17).

5 LIVE RUN

Turn on main gas supply to the burner.

Purge air from burner gas lines through test nipples (ensure Plant Room is adequately ventilated).

5.1 PILOT GAS GOVERNOR (REGULATOR)

Remove metal cap from the top of the Pilot Governor. With a screw driver, turn the plastic adjusting screw fully *clockwise* to give *maximum* gas flow rate.

5.2 MAIN GAS GOVERNOR (REGULATOR)

Remove metal cap from the top of the Main Governor. With a screw driver turn the plastic adjusting screw fully *anti-clockwise* to give *minimum* gas flow rate.

Open Pilot Line Manual Gas Valve ONLY.

Open burner Control Panel and disconnect TEST LINK 'A'. (See Fig.15).
Close burner Control Panel.

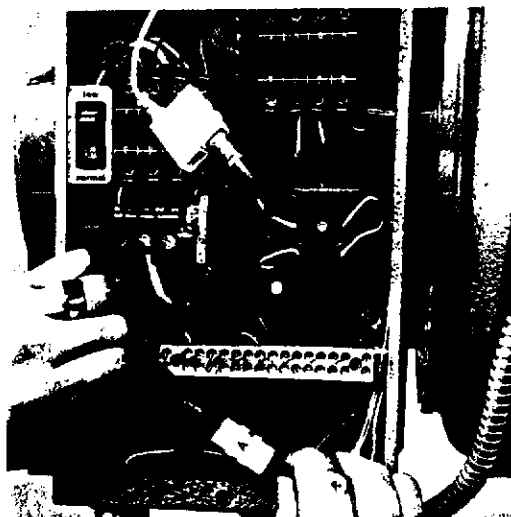


FIG.15 Test Link 'A' Control Panel

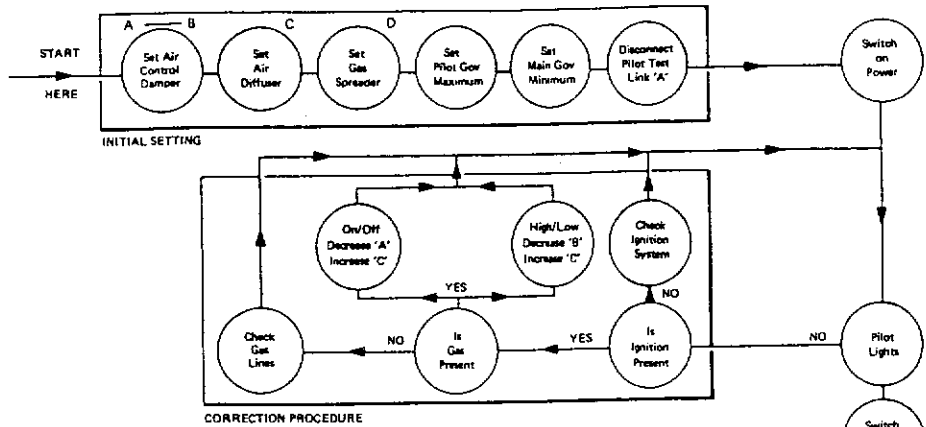


FIG. 16 High/Low switch on control panel

On/Off Burner only

Switch on the burner.

Burner motor will run, ignition spark will be established, Pilot Magnetic Valve/s will open.



INITIAL SETTING

A = AIR DAMPER MAIN FLAME

B = AIR DAMPER LOW FLAME

C = AIR DIFFUSER ADJUSTING MECHANISM

D = GAS SPREADER ADJUSTING MECHANISM

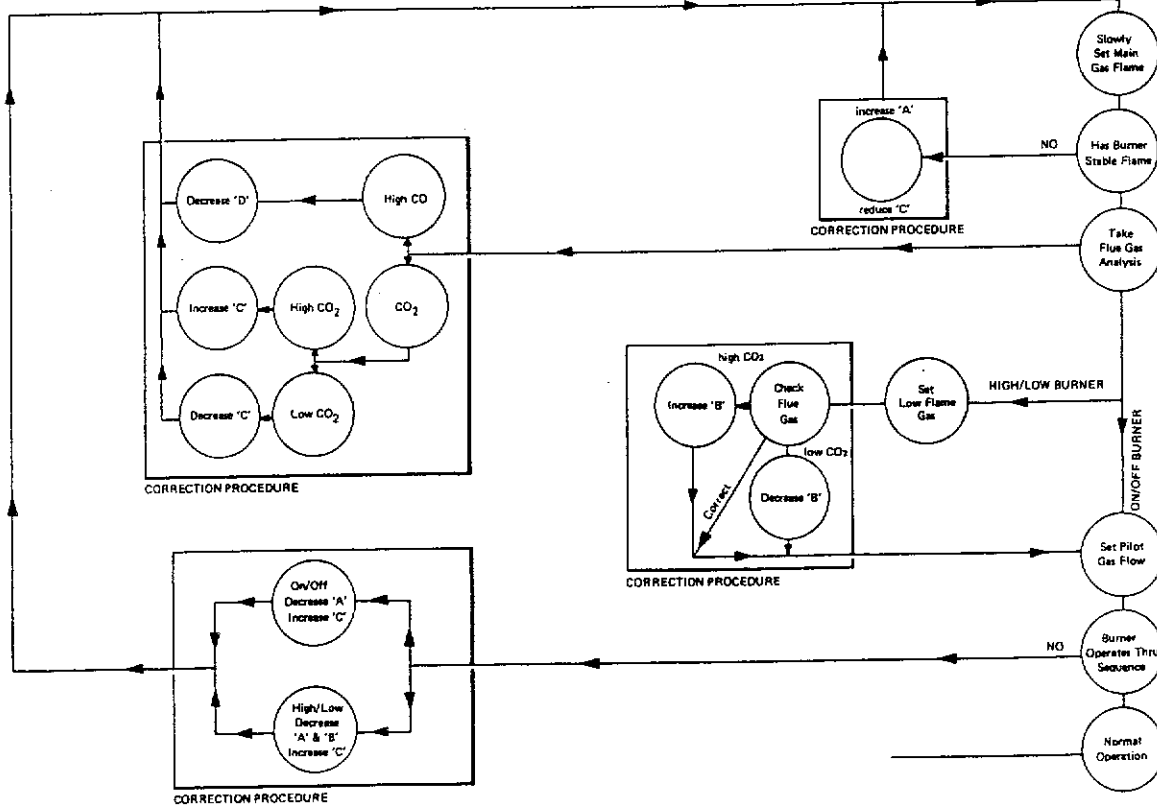


FIG.17 Logic Diagram

5.2
Cont'd

Pilot flame established, flame monitoring Probe or U.V. Cell will take over. Burner will operate continuously on Pilot Flame. For timing refer to Sequence Diagram. (See Fig. 7).

High/Low Burner only

Set High/Low switch on the side of the burner Control Panel to Low Flame position. (See Fig.16).

Turn on the main power supply to the burner.

Switch on power at the burner Control Panel.

Reset Control Box if it is in the Lockout position.

If a Leak Detection System is fitted to the burner, check and re-set if in the Lockout position.

Burner motor will run, ignition spark will be established, Pilot Magnetic Valve/s will open.

Pilot Flame established, flame monitoring Probe or U.V. Cell will take over. Burner will operate continuously on Pilot Flame. For timing refer to Sequence Diagram. (See Fig.7).

On/Off and High/Low Burners

Switch off power supply at burner and mains isolator.

Remove Control Panel cover and re-connect Test Link 'A'.

Close Control Panel.

Open Main Manual Gas Valve on Burner.

Switch on mains power to burner.

Allow On/Off burner to establish Main Flame.

Set High/Low switch on burner panel to High Flame position.

Allow High/Low burner to establish High Flame.

Main Gas Governor (Regulator)

With a screwdriver, turn plastic screw slowly *clockwise* to increase gas volume through the burner to the rate required by the appliance rating. Check gas flow rate at the meter or with other suitable and approved instruments.

Ensure that other appliances served by the same meter are not in use at the time the flow tests are being carried out.

With the gas flow rate for main flame set and the burner running with stable flame, the flue gases can now be checked for CO₂, CO and O₂ with suitable combustion testing instruments. At this stage of the commissioning, the ratio of CO:CO₂ should not exceed 0.02.

5.2
Cont'd

Example:

For a CO₂ of 9.5% then the CO must be less than 0.19% by volume. (1900 part per million) (P.P.M).

IMPORTANT: After each adjustment, gas flow rate and flue gases should be re-checked.

If the combustion is unacceptable, various operational adjustments may be made while the burner is running on main flame.

Refer to Logic Diagram and proceed accordingly. (See Fig.17).

Example:

If burner is unstable on high flame, move Air Diffuser slightly back by adjusting the air diffuser mechanism to a lower calibrated number.

Check gas flow rate. If re-adjustment is necessary, increase or decrease on Main Gas Governor (Regulator).

It may also be necessary to slightly increase air flow through the Air Control Damper.

5.3 LOW FLAME SETTING (High/Low Burner only)

Set the High/Low switch on the burner Control Panel to Low Flame position.

Check gas flow rate. This should be approximately 50% of the high flame or a rate recommended by the appliance manufacturer. The turndown ratio between high and low flame should not exceed 2 to 1.

If the gas flow rate requires adjustment, it can be made on the High/Low Flame Gas Valve.

Switch off power. Remove electrical terminal housing cover. The Low Flame hexagon screw adjustment can be turned *clockwise* to increase flow and *anti-clockwise* to reduce flow. (See Fig.18).

Turn on power. Switch burner to High Flame then back to Low Flame. Re-check Low Flame gas rate. This operation should be repeated several times to ensure that Low Flame gas rate is constant.

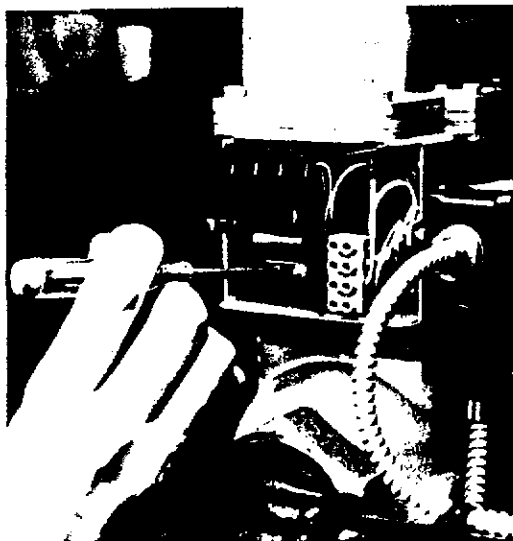


FIG.18 Low Flame Hexagon screw adjustment

5.3 cont'd Re-check flue gas analysis. If further adjustments are necessary, follow instructions shown on the Logic Diagram. Refit electrical terminal housing cover.

5.4 PILOT GAS RATE (On/Off and High/Low Burners)

Turn off power supply at burner and mains isolator.

Remove cover from burner Control Panel.

Disconnect Test Link 'A'.

Replace Control Panel cover.

Turn on power supply to burner. If High/Low burner, switch to Low Flame position.

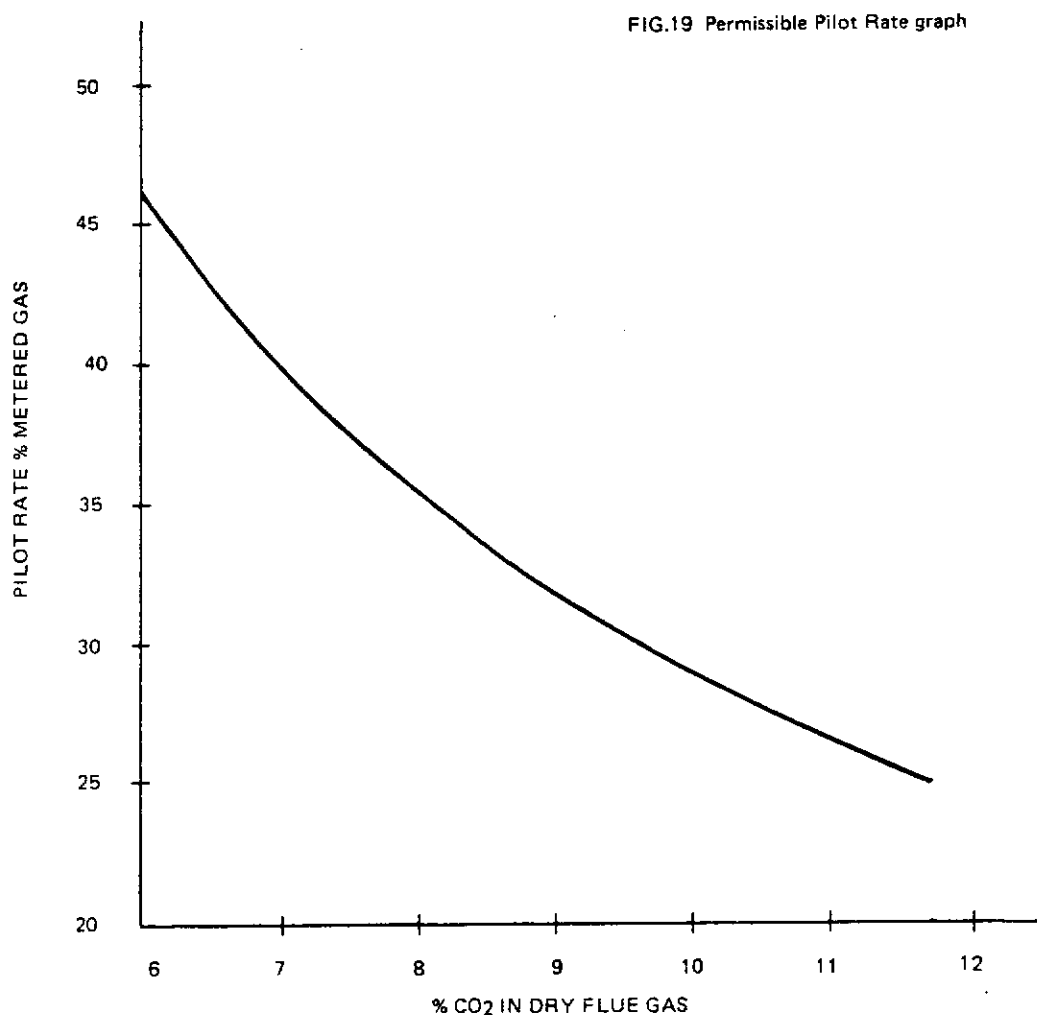
Switch on burner.

Pilot gas rate can now be adjusted by turning plastic screw in the Governor *anti-clockwise*.

Gas flow should be measured to a maximum of 25% Stoichiometric gas rate for the proved air flow at the time of ignition.

5.5 BURNER PILOT RATE (On/Off Burner only)

Applying the CO₂ figure obtained from the flue gas analysis of Main Flame to Fig. 19 will establish permissible pilot rate.



5.5 Example:

Cont'd

9% CO₂ requires a metered pilot gas rate of 32% of Main Flame gas rate.

5.6 BURNER PILOT RATE (High/Low Burner only)

Applying the CO₂ figure obtained from flue gas analysis of Low Flame to Fig. 19 will establish permissible pilot rate.

Example:

10% CO₂ requires a metered pilot gas rate of 29% of Low Flame gas rate.

Turn off power supply at burner and mains isolator.

Remove Control Panel cover and reconnect Test Link 'A'.

Close Control Panel.

5.7 AIR PRESSURE SWITCH SETTING

Remove cover of Air Pressure Switch. (See Fig. 20).

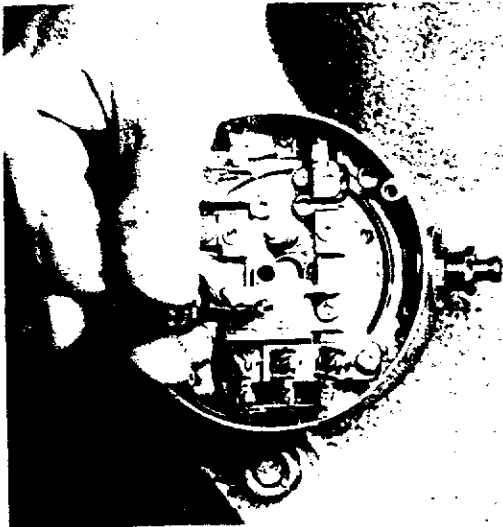


FIG.20 Air Pressure switch showing adjustment



Important

The setting of Air Pressure Switches on Burners supplied after May 1979 must be carried out using an insulated screwdriver through the hole in the cover of the unit as shown.

Turn on power supply to the burner.

Hold High/Low burner in Low Flame position, allow On/Off burner to cycle to Main Flame.

On/Off and High/Low Burners

Slowly turn adjusting screw with a screwdriver *anti-clockwise* towards "+" sign until burner motor is de-energised.

At this point turn adjusting screw **TWO FULL TURNS** *clockwise*.

Burner motor will restart.

Control sequence will continue without ignition or gas to post purge condition and stop.

5.7
cont'd

Switch off burner and replace air pressure switch cover.

Set burner High/Low switch to High Flame.

If an L.E.B. Pressure Proving System is fitted, the maxi side of the Gas Pressure Switch should now be set 20% below the burner Main Gas Governed pressure as follows.

Switch OFF power at the burner.

Remove cover of gas pressure switch. (See Fig. 21.)

Turn dial to a figure 20% below main gas governed pressure on the down stream side of the Main Gas Governor (Regulator).



FIG.21 Maxi/Mini Gas Pressure Switch.

Example:

If governed pressure is 1.5kPa, (6.0 inches w.g., 15mBar, 150mm w.g.), gas pressure switch should be set to 1.2kPa, (4.8 inches w.g., 12mBar, 120mm w.g.)

Replace cover of gas pressure switch.

Check that all covers to components have been replaced and locking devices are properly secured, in particular, the locking screw located on the top of the gas adjuster mechanism (See Fig.11).

Check that appliance control instruments are set to safe limits.

Switch on power at the burner.

COMMISSIONING IS NOW COMPLETE.

Switch on power supply.

Burner will now operate until switched off:-

- (a) by controlling instruments of the appliance.
- (b) manually.
- (c) by power failure.

Upon restoration of power, burner will restart automatically and follow sequence through post purge, stop and re-start.

6 ROUTINE SAFETY CHECKS

TO BE CARRIED OUT ONLY BY QUALIFIED AND EXPERIENCED PERSONNEL

Check that the Plant Room is well ventilated at all times.

Frequently inspect Air Inlet of the burner and ensure there are no obstructions to air flow.

Check Flame Detection System.

6.1 FLAME PROBE (Flame Rectification Rod)

Turn off power at the burner. Open burner Hinged Gas Manifold Assembly by removing the two securing nuts. (See Fig. 22.) Remove connecting lead from Probe. Close burner hinge and secure. Switch on power at the burner.

Check that the burner Locks Out at the end of the Ignition Cycle. (See Fig. 7.)

Switch off power. Open burner Hinged Gas Manifold and reconnect Probe lead. Close hinge and secure. Switch on power. Reset Lock Out.

6.2 U.V. (Ultra Violet) Cell

Turn off power at the burner. Remove U.V. Cell from burner and cover quartz glass envelope to exclude any light. Do not touch with fingers. (See Fig. 23.)

Switch on power. Check burner locks out at end of Ignition Cycle. (See Fig. 7.)

Switch off power at the burner. Replace U.V. Cell.

Switch on power at the burner. Reset Lock Out.

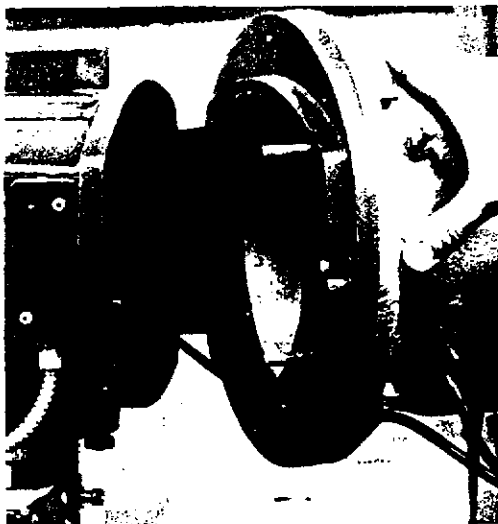


FIG.22 Hinged Gas Manifold Assembly shown in open position

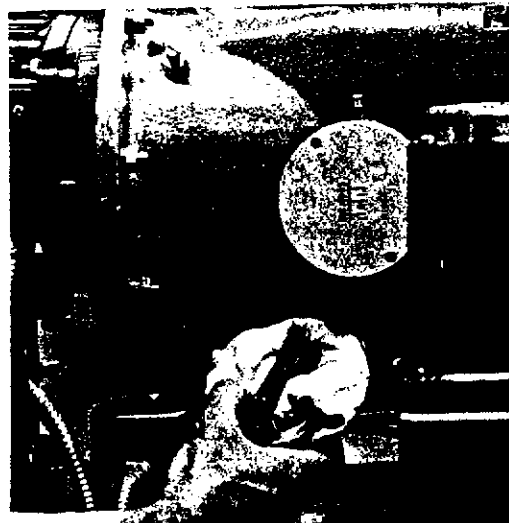


FIG.23 Removal of U.V. Cell from burner

6.3 THERMISTOR (High/Low burner only)

Check for component failure as indicated below.

6.3.1 CG5 Burners supplied before February 1979

Switch off power supply at the burner and main isolator.

Remove Control Panel cover.

Link the terminals listed below for the appropriate Control Box fitted to the burner.

Satronic TMG 740	b and 6 of Relay R1.
Landis & Gyr LFA or LFB	b and 2 of Relay R1.
Elesta FW 46	b and 2 of Relay R1.

Replace Control Panel cover.

Switch on power supply.

Burner will follow Sequence Timing to High Flame and Lock Out within 7 seconds.

Switch off power supply — Open burner Control Panel.

Disconnect link prepared to instruction above.

Close burner Control Panel.

Switch on power supply.

IMPORTANT: If burner does not lock out after 7 seconds, switch off burner immediately.

Thermistor is faulty and must be renewed.

6.3.2 CG5 Burners supplied after February 1979

Switch off power at the burner and mains isolator.

Open burner Control Panel.



FIG. 24 Test Link 'B', Control Panel.

6.3.2 Disconnect the white wire, marked 1, from test Link 'B' and re-connect it to test Link 'B' at 2. This will complete circuit with Red wire marked 2.
Cont'd

Close burner Control Panel.

Switch on power supply.

Burner will follow Sequence Timing to High Flame and Lockout after 7 seconds.

Switch off power supply — Open burner Control Panel. Disconnect White wire from 2 on test Link and return it to its original position marked 1.

Close burner Control Panel.

Switch on power supply.

IMPORTANT: If burner does not lock out after 7 seconds switch off at burner immediately.

Thermistor is faulty and must be renewed.

7 **ROUTINE MAINTENANCE**

SWITCH OFF POWER SUPPLY TO THE BURNER.

7.1 **COMBUSTION AIR FAN**

Clean blades regularly with stiff brush. Access through burner top cover secured by four screws. (See Fig. 25.)

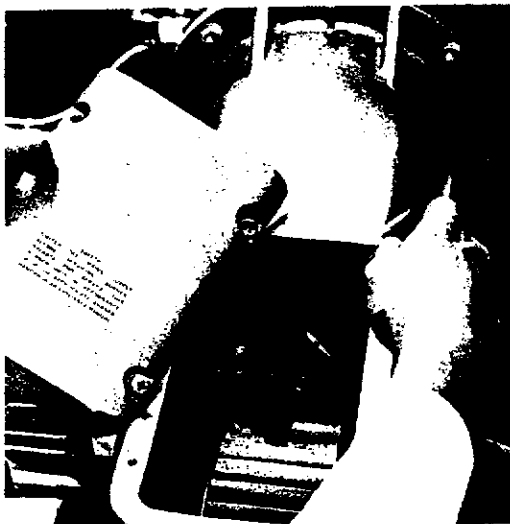


FIG.25 Cleaning Combustion Air Fan

7.2 **INNER ASSEMBLY**

To remove the burner Inner Assembly, first open the Hinged Gas Manifold by removing the two securing nuts. (See Fig. 22.)

Disconnect Ignition Electrode H.T. Lead and Probe Lead if Probe is fitted.

- (a) Referring to Figure 11, remove hexagon screw of gas spreader adjustment mechanism.

7.2
cont'd

- (b) Remove hexagon nut on the air diffuser mechanism located under the cover on top of the Hinged Gas Manifold.
- (c) Remove set screws securing the Inner Assembly Gas Pipe to the Hinged Gas Manifold.

Remove Inner Assembly. (See Fig. 26.)

Clean Air Diffuser and Gas Spreader with a stiff brush. (See Fig.27).

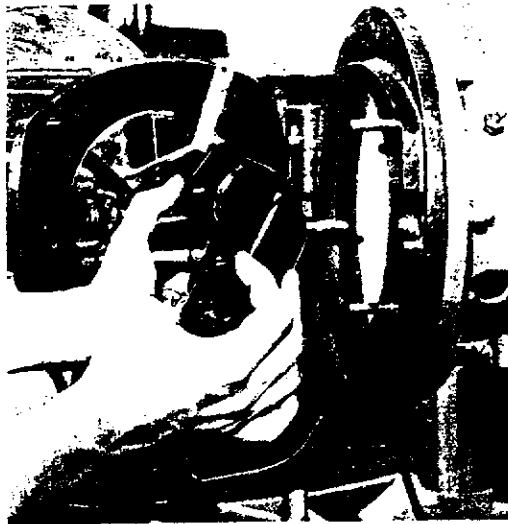


FIG.26 Removal of Inner Assembly



FIG.27 Cleaning of Air Diffuser and Gas Spreader

Clean Ignition Electrodes and Probe (if fitted) and check that they are not cracked or worn. (See Fig.28). Renew if necessary.

Check settings of Ignition Electrode and Probe (if fitted). Reset, if necessary, to dimensions shown on Fig. 29.

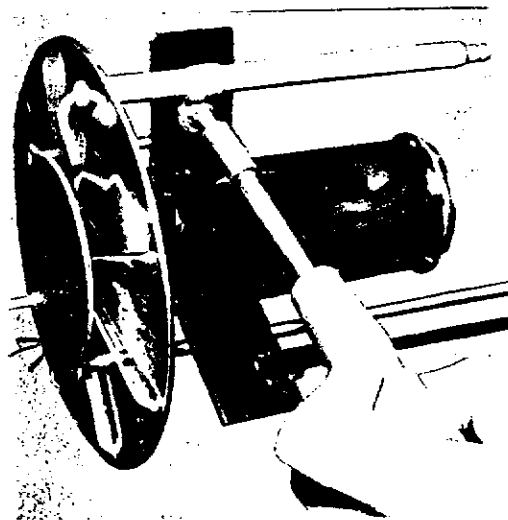


FIG.28 Ignition Electrode and Probe

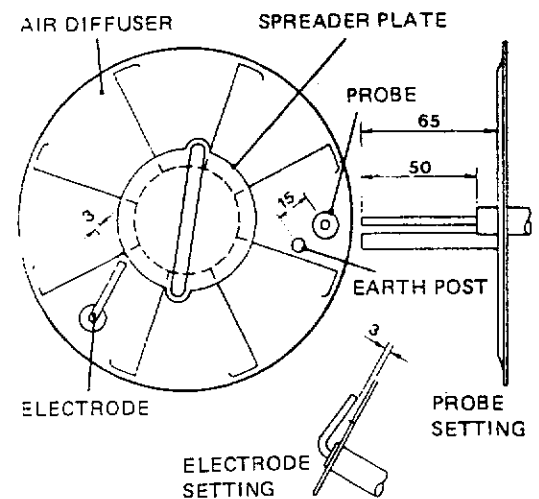


FIG. 29 Electrode and Probe setting

Clean U.V. Cell (if fitted) with a dry clean cloth. Do not touch the quartz glass envelope of the cell with fingers. Replace U.V. Cell making sure it faces direction of flame.

Replace all covers and secure all fittings.

SWITCH ON BURNER.

8 FAULT FINDING

8.1 BURNER MOTOR FAILS TO START

Check power is available and burner is correctly wired. Check fuses and motor overloads in burner Control Panel.

Check that Hinged Gas Manifold micro-switch is closed.

Check that all control instruments are "calling for heat".

Check control box is not locked out. (Signal lamp may be faulty.)

Check that air pressure switch is in the "start position". The following procedure will assist in this check.

Switch off mains supply, but leave burner On/Off switch at 'On'. Remove plug-in assembly of Control Box. Check continuity between the following terminals with a suitable instrument.

Satronic TMG 740	Terminal 17 and 16.
Landis & Gyr LFA & LFB	Terminal 8 and Terminal 5 in the burner Control Panel.
Elesta FW 46	Terminal 19 and Terminal 5 in the burner Control Panel.

If the air pressure switch is not in the "Start" position, turn setting screw under the component cover *clockwise* to "O" on the scale. (See Fig. 20.) Re-check continuity as above. If continuity is not broken, the air pressure switch is faulty and must be renewed.

8.2 FAN AND CONTROL BOX RUN CONTINUOUSLY & BURNER FAILS TO START

Air Pressure Switch stuck in "Start" position.

Turn air pressure switch setting screw slowly towards maximum setting until burner continues through the normal sequencing programme.

Failure of the burner to continue through the normal sequencing programme on reaching maximum setting may be caused by:-

- (a) Excessive draught condition through burner and appliance
- (b) Faulty air pressure switch
- (c) Wrong direction of rotation of burner motor.

8.3 FAN STARTS & BURNER GOES TO LOCK-OUT

No Ignition — Check electrode setting.
Cracked electrode porcelain.
HT Leads disconnected.
Faulty Transformer.

No Gas — Interrupted gas supply.
Low gas pressure.
Main Gas Governor wrongly installed.
Pilot and Main Flame gas valve fails to open (check Coils, Actuators, Wiring and Leak Detection System if fitted).
Manual shut-off valves closed.

8.4 STARTING FLAME FAILURE

If the flame is not properly established, the safety circuit of the sequence controller will cause Lockout in one second.

The cause may be insufficient signal to the flame monitoring device which can be either Ultra Violet Cell or Flame Probe.

U.V. Cell	—	Glass envelope dirty	—	clean the glass.
		Cell wrongly positioned	—	should face towards flame.
		Faulty unit	—	renew
		Faulty wiring	—	crossed polarity.
Probe (F.R.R.)	—	Wrongly positioned.		
		Bad earth continuity.		
		Faulty wiring.		

IMPORTANT: Check that Sequence Controller is suitable for use with the flame monitoring device (U.V. or Probe) fitted to the burner.

The Manufacturers Data Sheets describing the sequence controls used with the Nu-Way CG5 burner can be found at the back of this manual.

8.5 BURNER RUNS AND FAILS TO GO TO MAIN FLAME

Insufficient Gas. (Volume or Pressure).

Main Gas Valve/s fail to open. (Faulty Actuators). Check Wiring.

8.6 BURNER RUNS TO HIGH FLAME & LOCKS OUT WITHIN 7 SECONDS (High/Low Burner only)

Failure of Air Control Damper Servo Motor	—	Renew
Broken coupling connection between Damper and Servo Motor	—	Renew coupling.
Air Control Damper Cam slipping	—	Tighten on to shaft. (See Fig. 8.)
Micro switch fails to change over	—	Renew

9. SPARE PARTS IDENTIFICATION

Separate illustrated lists, containing an Item Number, Description and Code Number, are included in this Section for both On/Off and High/Low burner components. The variations on a component are included and care must be taken when making any reference to a component to use the correct Description and Code Number.

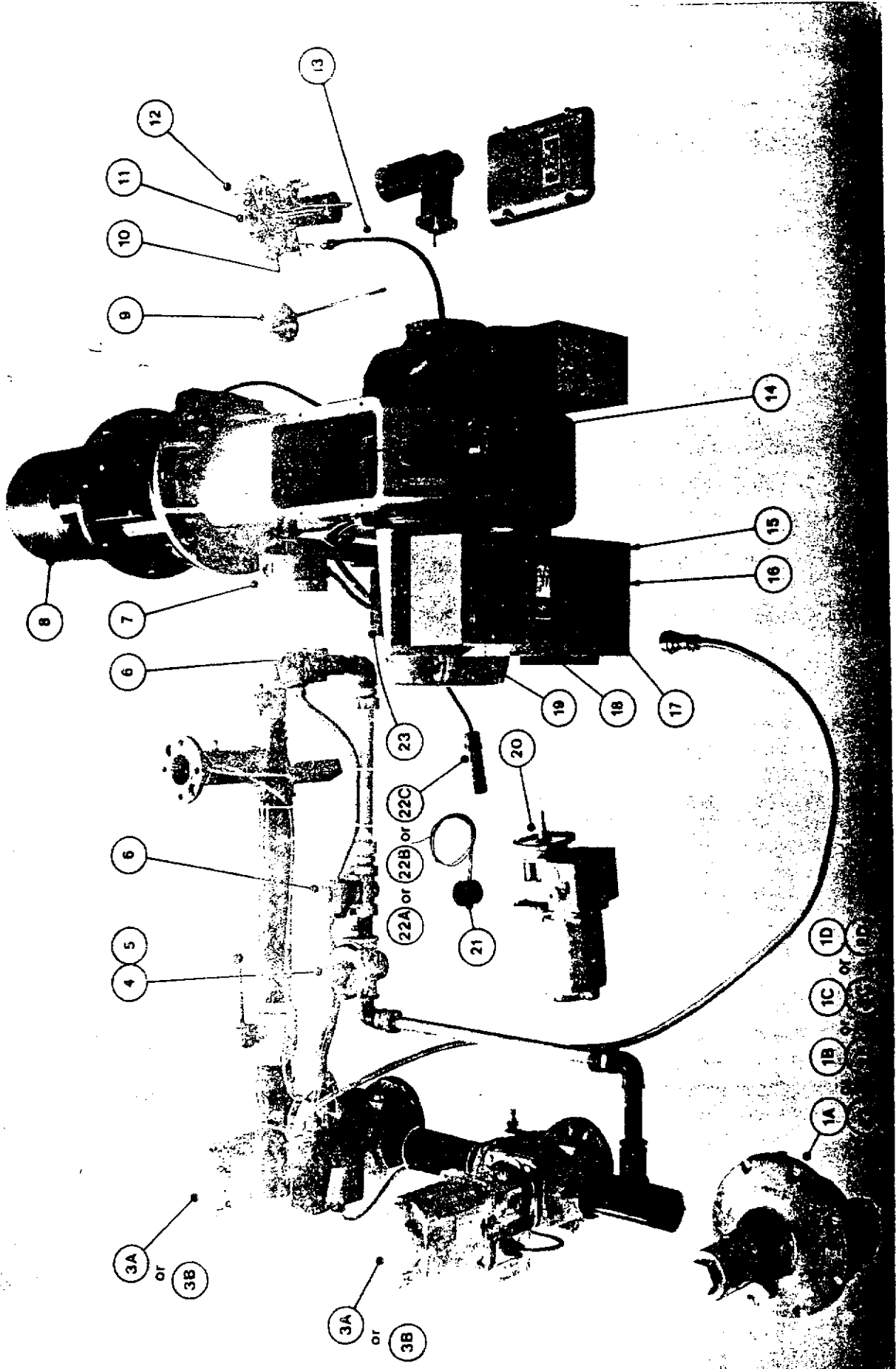


FIG. 30 On/Off Burner

9.1 PARTS LIST, On/Off burner

ITEM	DESCRIPTION	CODE NO.
1A	Main Governor, 2" BSP, Jeavons J48	EO6-027L
2A	Diaphragm Set to Suit Item 1A	
1B	Main Governor, 2" BSP, Donkin 226	EO6-022P
2B	Diaphragm Set to Suit Item 1B	
1C	Main Governor, 3" BSP, Jeavons J48	EO6-020Z
2C	Diaphragm Set to Suit Item 1C	
1D	Main Governor, 3" BSP, Donkin 226	EO6-034K
2D	Diaphragm Set to Suit Item 1D	
3A	Hydramotor Valve, SH211 NVS 50, 2" BSP	EO8-003F
3B	Hydramotor Valve, SH211 NVS 80, 3" BSP	EO8-010H
4	Pilot Governor, 1" BSP Donkin 226	EO6-025J
5	Diaphragm Set to Suit Item 4	
6	Pilot Solenoid Valve, 1" BSP, Alcon	EO1-007U
7	Air Pressure Switch, DSP - 01V	C50-045L
8	Draught Tube (Complete)	N30-006T
9	Gas Spreader Assembly	N30-005S
10	Electrode	GO6-003D
11	Diffuser	P30-005A
12	Probe (If Fitted)	
13	H.T. Cable	
14	Fan Impeller	D10-003Y
15	Contactoer, K6 A62	C56-017S
16	Overload, U16 1.8 - 2.7 amps	C55-001A
17	Fuse, 3 amp Bulgin F129	BO2-050N
18	Control Box Elesta FW46 A21	C21-055V
	Control Box L & G LFA 1.33	C21-026Q
	Control Box L & G LFB 1.33	C21-037K
	Control Box L & G LFL	
	Control Box Satronic TMG 740	C21-067Z
	Control Box L & G LFA 1.63	C21-026Q & C21-058G
	Control Box L & G LFB 1.63	C21-037K & C21-058G
19	Motor, 1.5 HP, 415 Volt	A10-001Z
20	Actuator, SH211, 2" and 3" BSP	EO8-017U
21	Solenoid Coil, Alcon, 1" BSP	
22A	U.V. Cell L & G QRA2	C31-010W
22B	U.V. Cell Elesta FW 141D	C31-022N
22C	U.V. Cell Satronic UVZ 721	C31-024Q
23	Transformer P74231G	CO2-023T

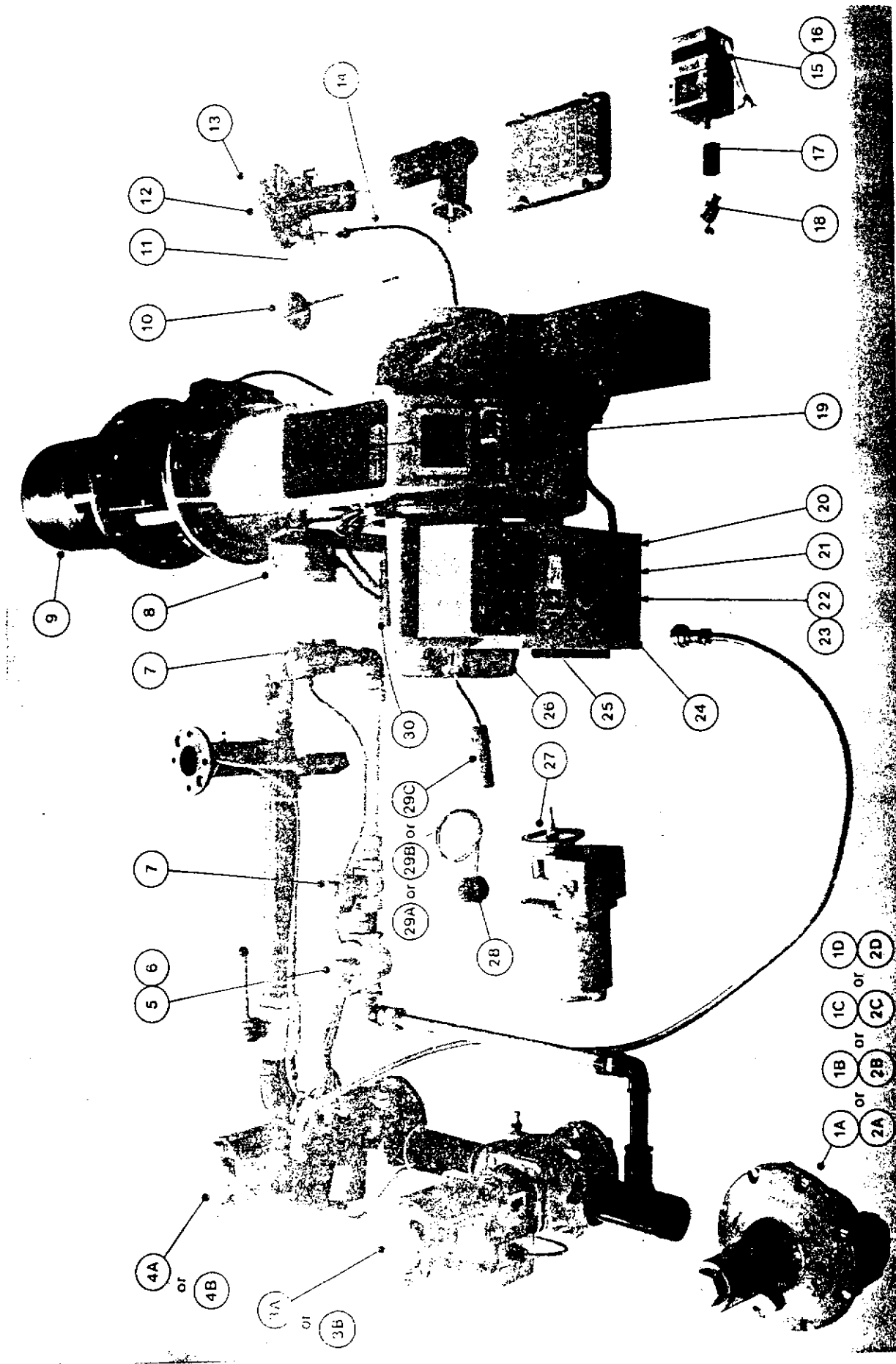


FIG. 31 High Low Burner

9.2

PARTS LIST, High/Low burner

ITEM	DESCRIPTION	CODE NO.
1A	Main Governor, 2" BSP, Jeavons J48	EO6-027L
2A	Diaphragm Set to Suit Item 1A	
1B	Main Governor, 2" BSP, Donkin 226	EO6-022P
2B	Diaphragm Set to Suit Item 1B	
1C	Main Governor, 3" BSP, Jeavons J48	EO6-020Z
2C	Diaphragm Set to Suit Item 1C	
1D	Main Governor, 3" BSP, Donkin 226	EO6-034K
2D	Diaphragm Set to Suit Item 1D	
3A	Hydramotor Valve, SH211 NVS 50, 2" BSP	EO8-003F
3B	Hydramotor Valve, SH211 NVS 80, 3" BSP	EO8-010H
4A	Hydramotor Valve, SH231 NVS 50, 2" BSP	EO8-005H
4B	Hydramotor Valve, SH231 NVS 80, 3" BSP	EO8-007B
5	Pilot Governor, 3/4" BSP Donkin 226	EO6-021N
6	Diaphragm Set To Suit Item 5	
7	Pilot Solenoid Valve, 3/4" BSP ASCO	EO1-070E
8	Air Pressure Switch DSP - O1V	C50-045L
9	Draught Tube (Complete).	N30-006T
10	Gas Spreader Assembly.	N30-005S
11	Electrode	GO6-003D
12	Diffuser	P30-005A
13	Probe (If Fitted).	
14	HT Cable	
15	Torque Motor G4-K70	A30-006S
16	Capacitor For Item 15	B05-002E
17	Damper Coupling	G03-034Y
18	Damper Micro Switch	B01-034Z
19	Fan Impeller	D10-003Y
20	Contacto K6 - A62	C56-017S
21	Overload U16 1.8 - 2.7 amps.	C55-001A
22	Relay D22	C51-033V
23	Relay K6 - A44	C51-031T
24	Fuse 3 amp. Bulgin F 129	B02-050N
25	Control Box Elesta FW46 - A21	C21-055V
	Control Box L & G LFA 1.33	C21-026Q
	Control Box L & G LFB 1.33	C21-037K
	Control Box L & G LFL	
	Control Box Satronic TMG 740	C21-067Z
	Control Box L & G LFA 1.63	C21 - 026Q & C21-058G
	Control Box L & G LFB 1.63	C21 - 037K & C21-058G
26	Motor 1.5 HP 415 Volt	A10-001Z
27	Actuator SH231 2" and 3" BSP	EO8-018D

9.2 cont'd PARTS LIST, High/Low burner

ITEM	DESCRIPTION	CODE NO.
28	Solenoid Coil Alcon 3/4" BSP	
29A	U.V. Cell L & G QRA 2	C31-010W
29B	U.V. Cell Elesta FW 141D	C31-022N
29C	U.V. Cell Satronic UVZ 721	C31-024Q
30	Transformer P74231G	CO2-023T

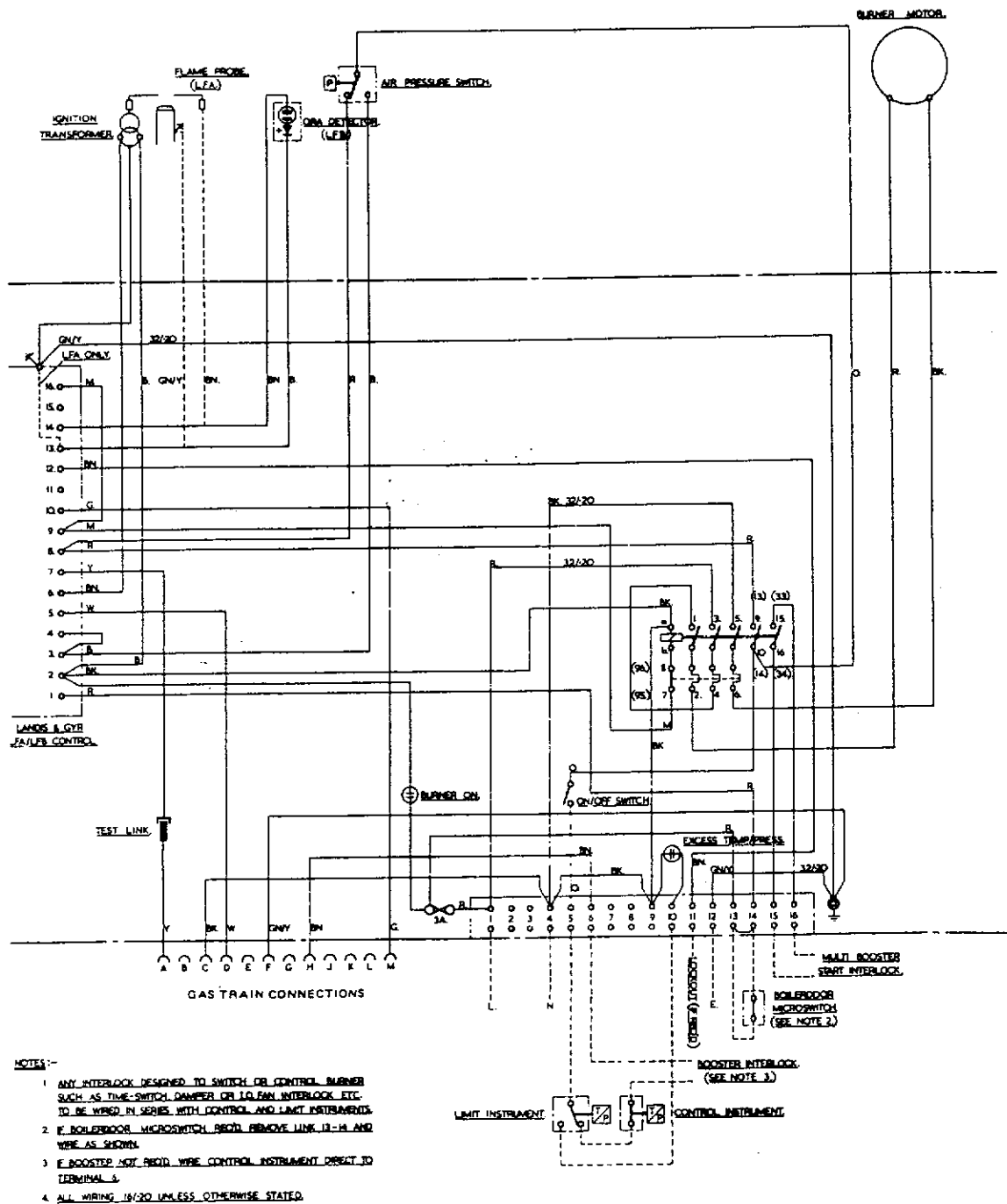


FIG. 32 CG5 On/Off (1Ph) on Landis & Gyr LFA/LFB 1.33 or 1.63 Control

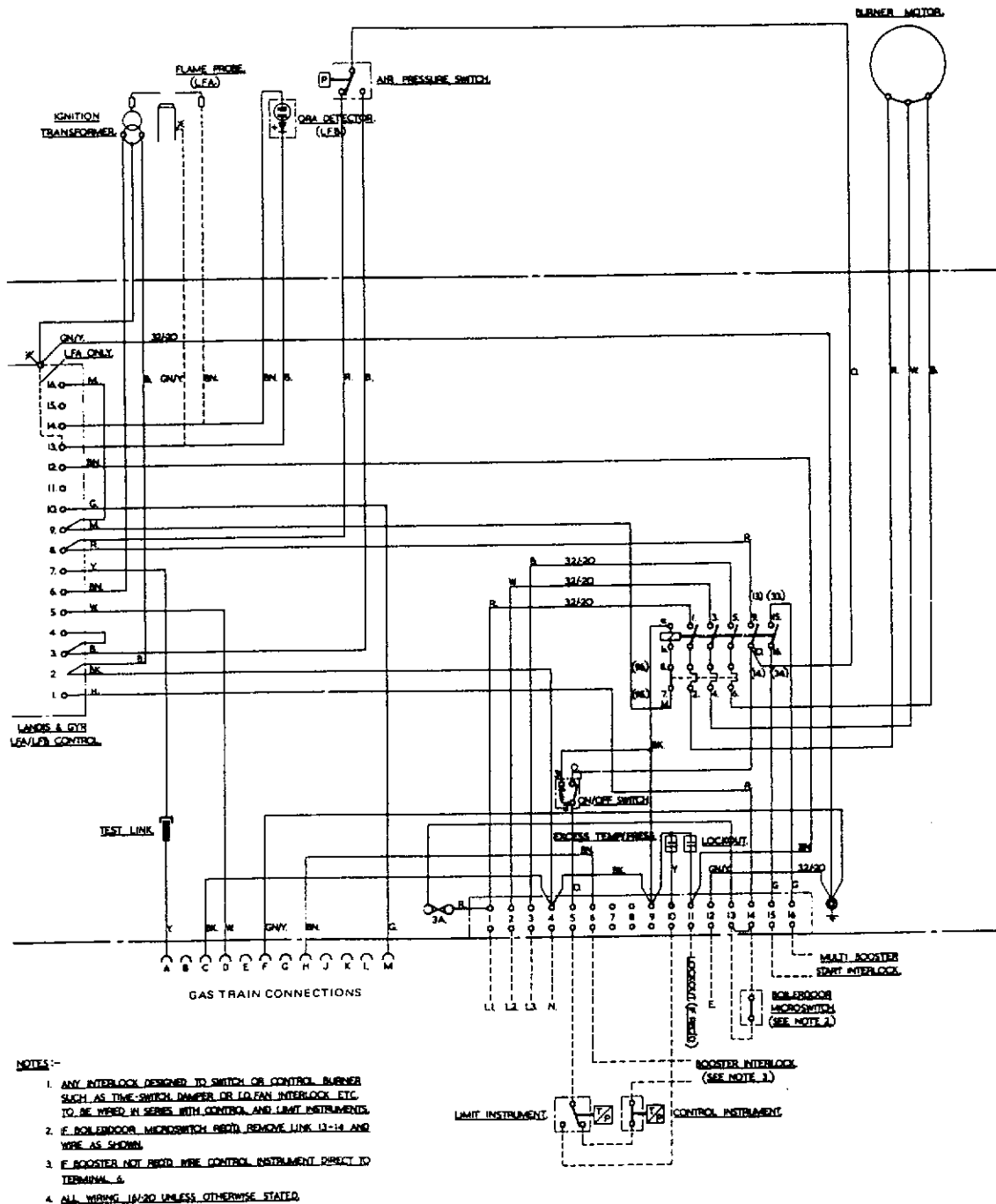


FIG. 33 CG5 On/Off (3Ph) on Landis & Gyr LFA/LFB 1.33 or 1.63 Control

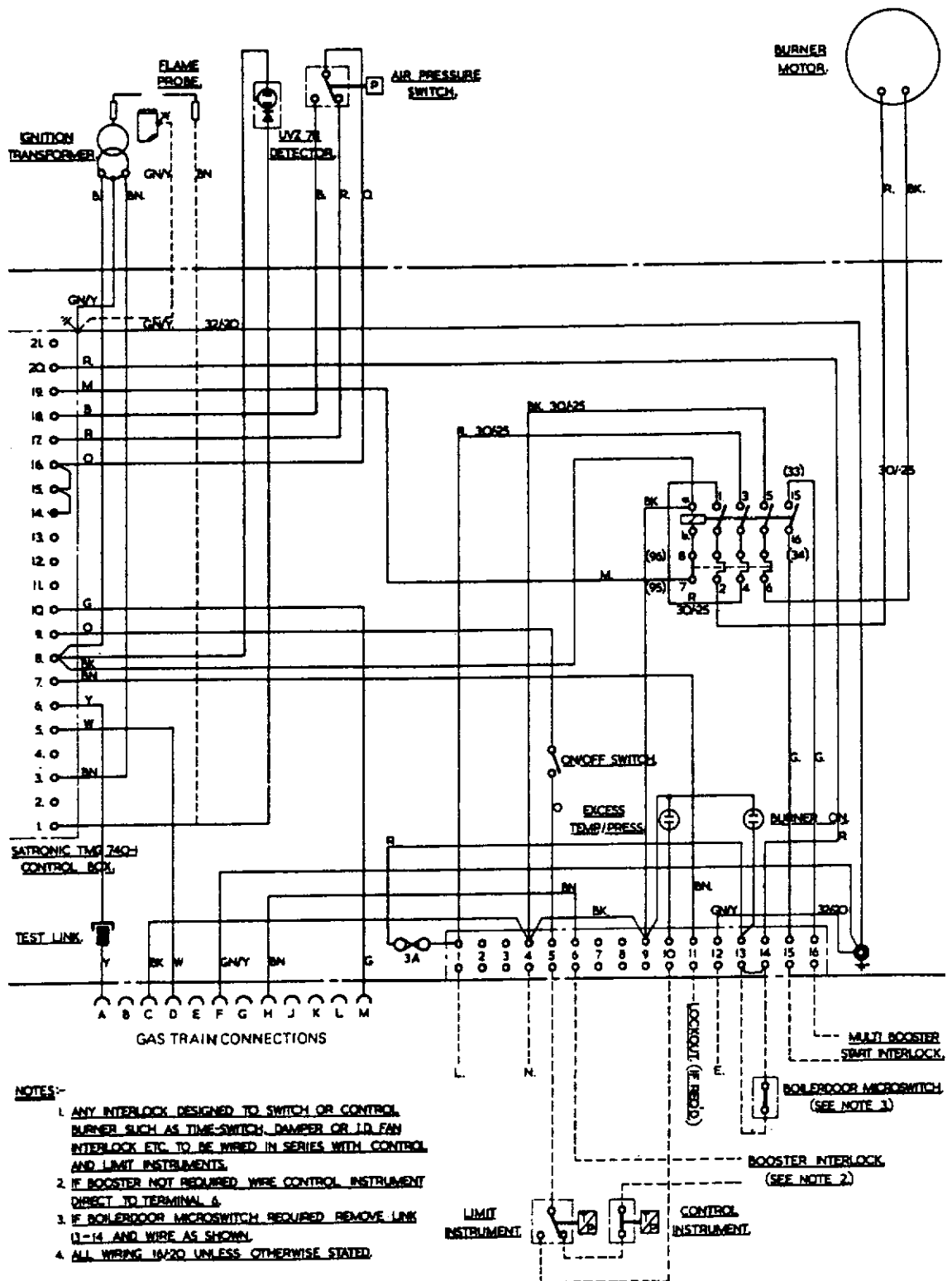


FIG. 34 CG5 On/Off (1Ph) on Satronic TMG 740-1 Control

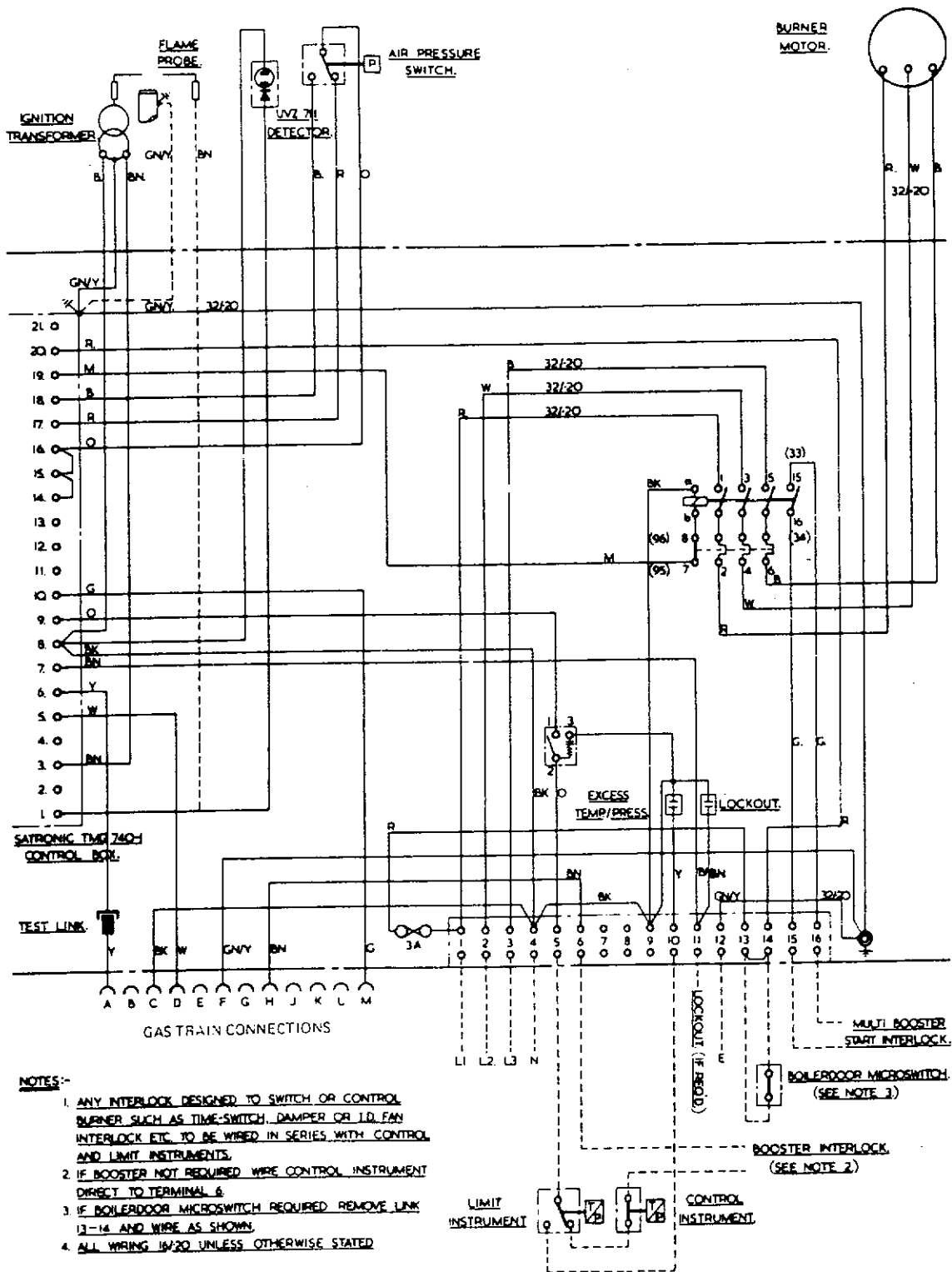


FIG. 35 CG5 On/Off (3Ph) on Satronic TMG 740-1 Control

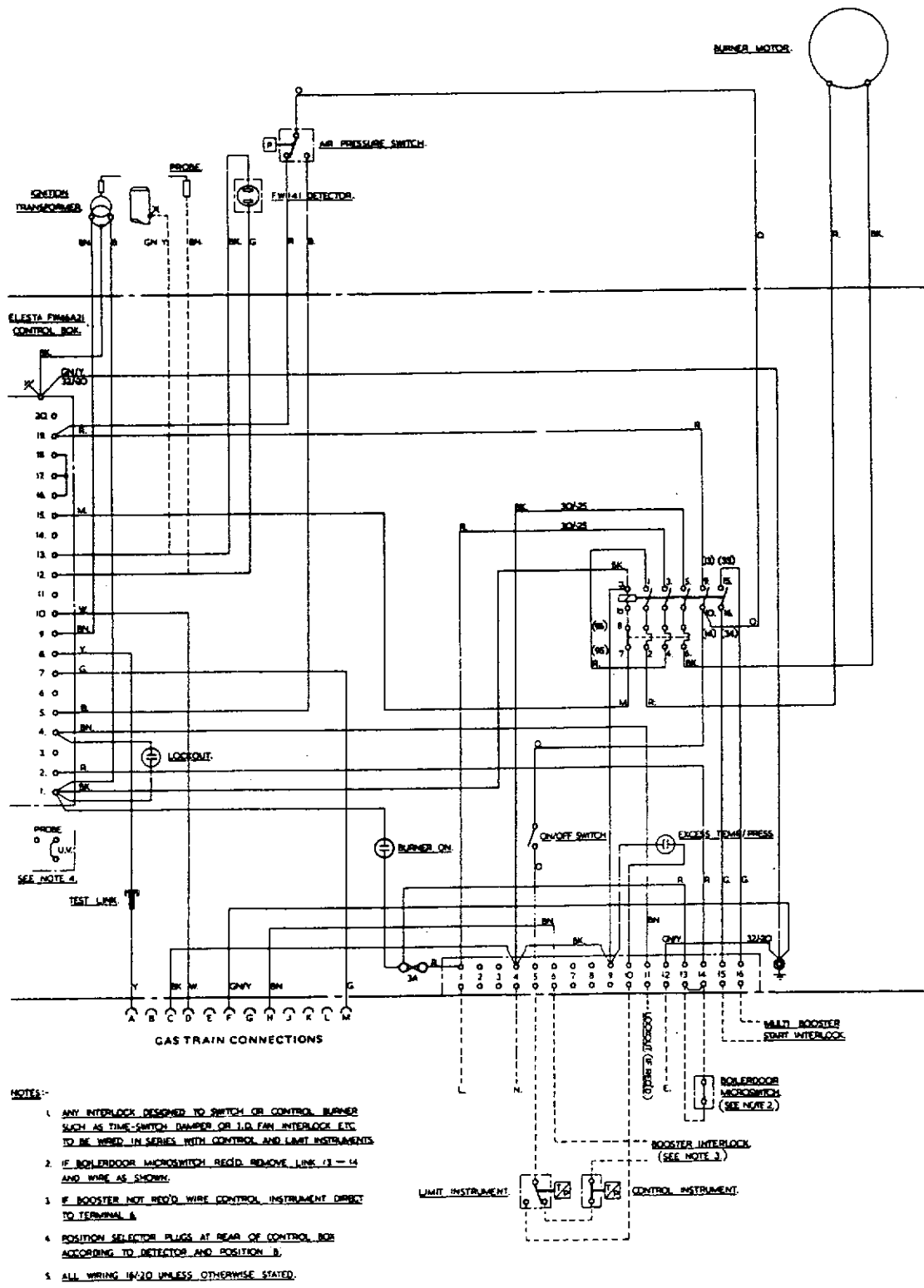
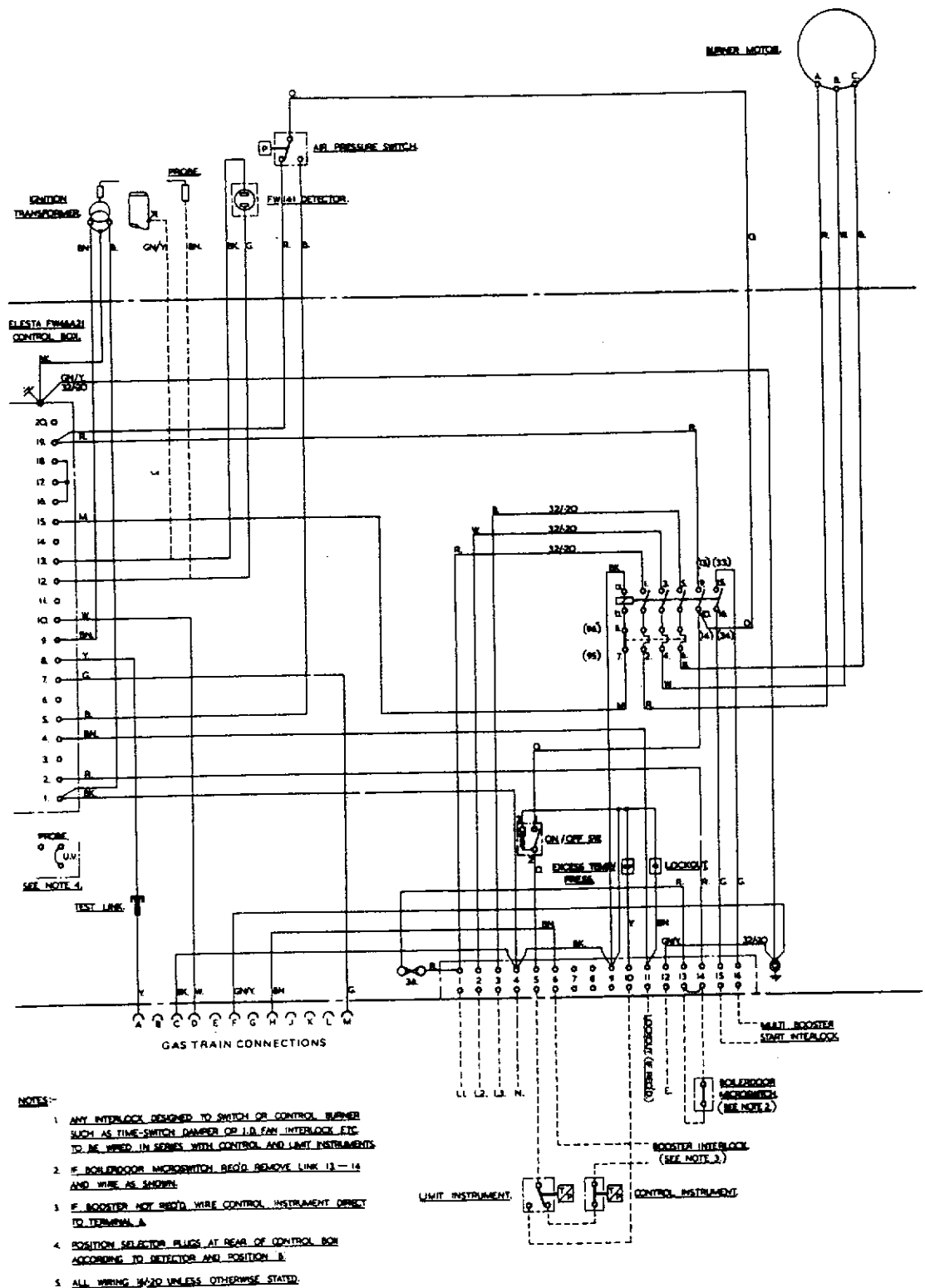


FIG. 36 CG5 On/Off (1Ph) on Eiesta FW46 A21 Control



- NOTES:-**
1. ANY INTERLOCK DESIGNED TO SWITCH OR CONTROL BURNER SUCH AS TIME-SWITCH DAMPER OR I.D. FAN INTERLOCK ETC. TO BE WIRED IN SERIES WITH CONTROL AND LIMIT INSTRUMENTS
 2. IF ROCKETOR MICROSWITCH REQ'D REMOVE LINK 13 - 14 AND WIRE AS SHOWN
 3. IF BOOSTER NOT REQ'D WIRE CONTROL INSTRUMENT DIRECT TO TERMINAL A
 4. POSITION SELECTOR PLUGS AT REAR OF CONTROL BOX ACCORDING TO DETECTOR AND POSITION B
 5. ALL WIRING 16/20 UNLESS OTHERWISE STATED

FIG. 37 CG5 On/Off (3Ph) on Elesta FW46 A21 Control

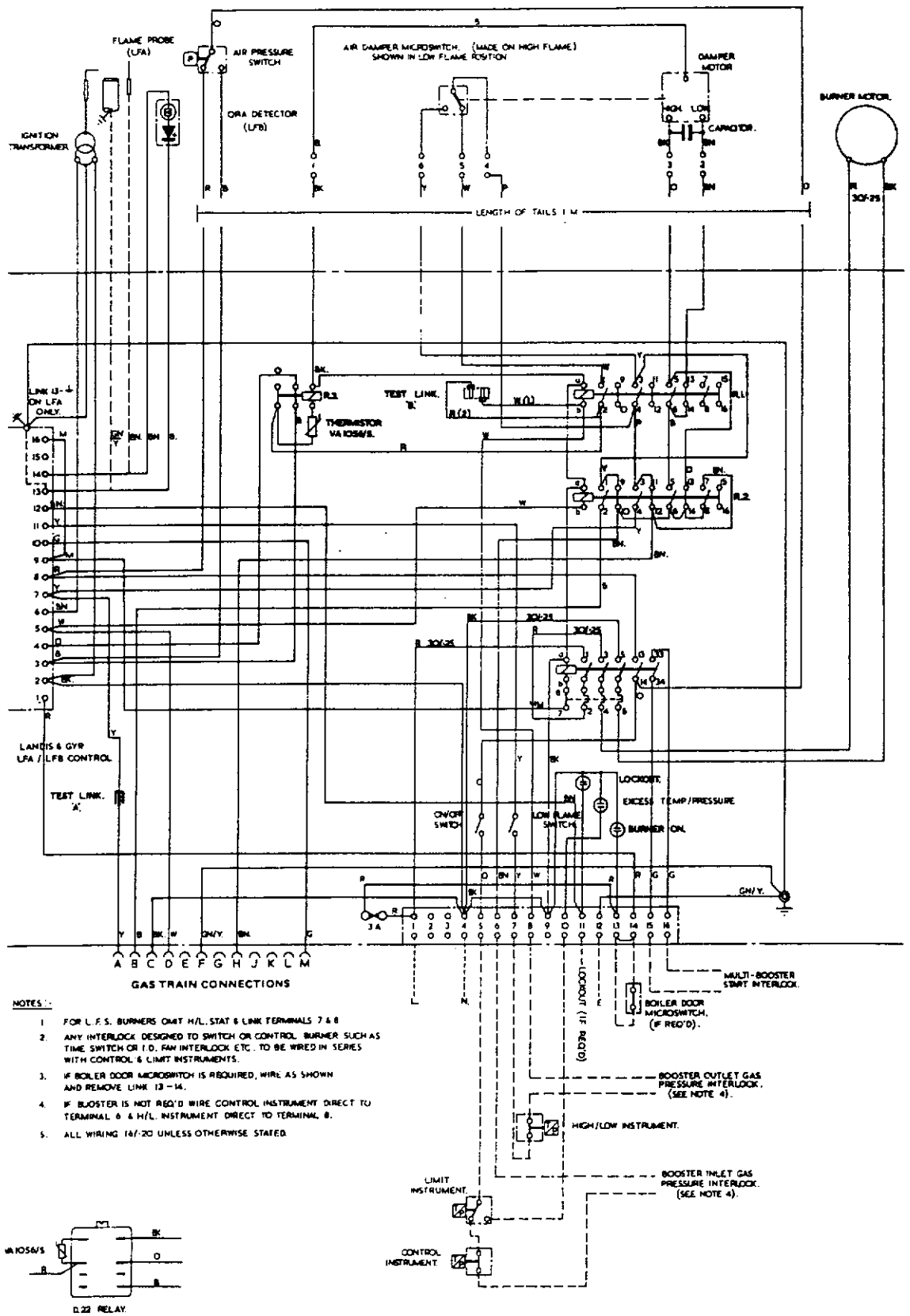


FIG. 38 CG5 H/L & LFS (1Ph) on Landis & Gyr LFA/LFB 1.33 or 1.63 Control

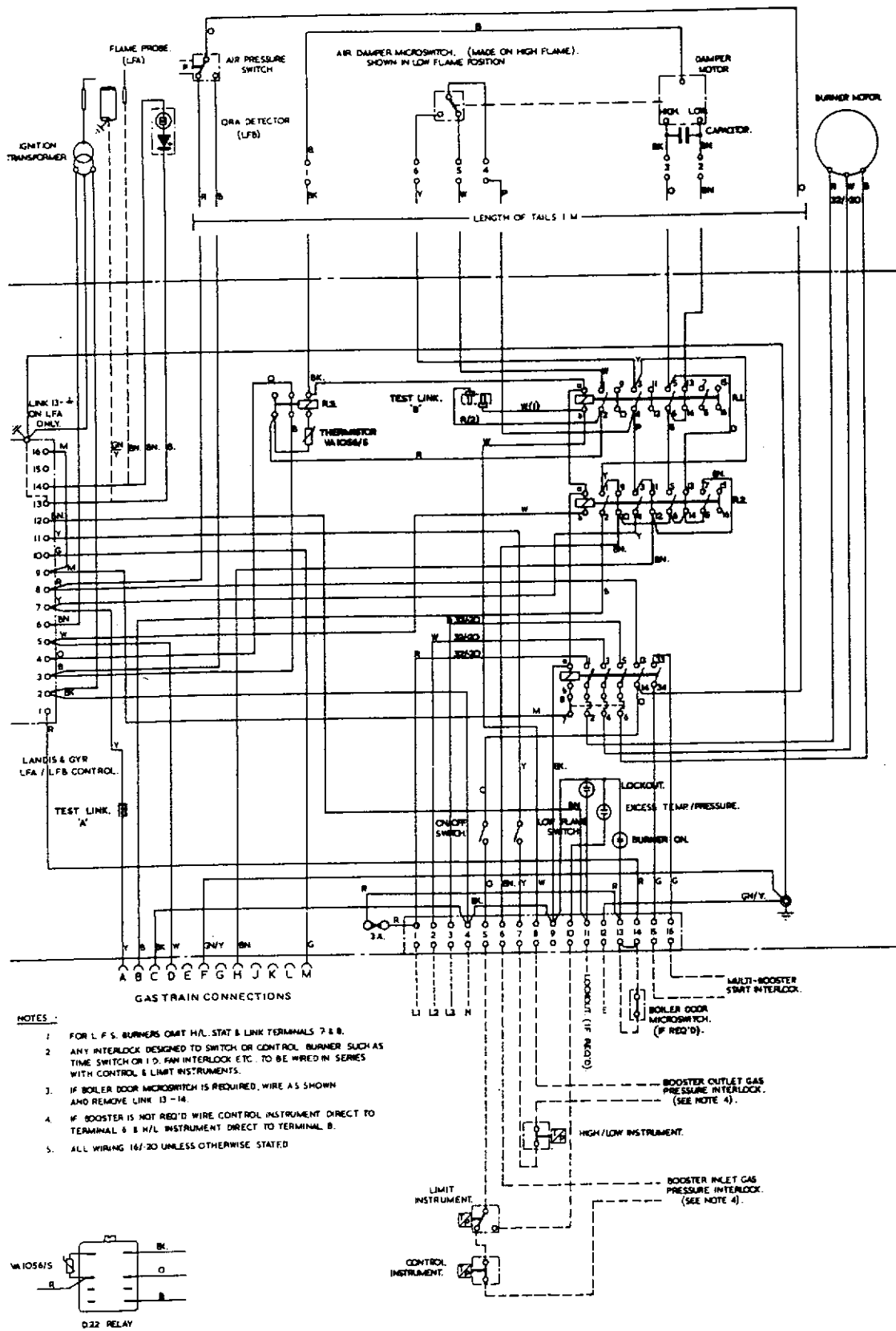


FIG. 39 CG5 H/L & LFS (3Ph) on Landis & Gyr LFA/LFB 1.33 or 1.63 Control

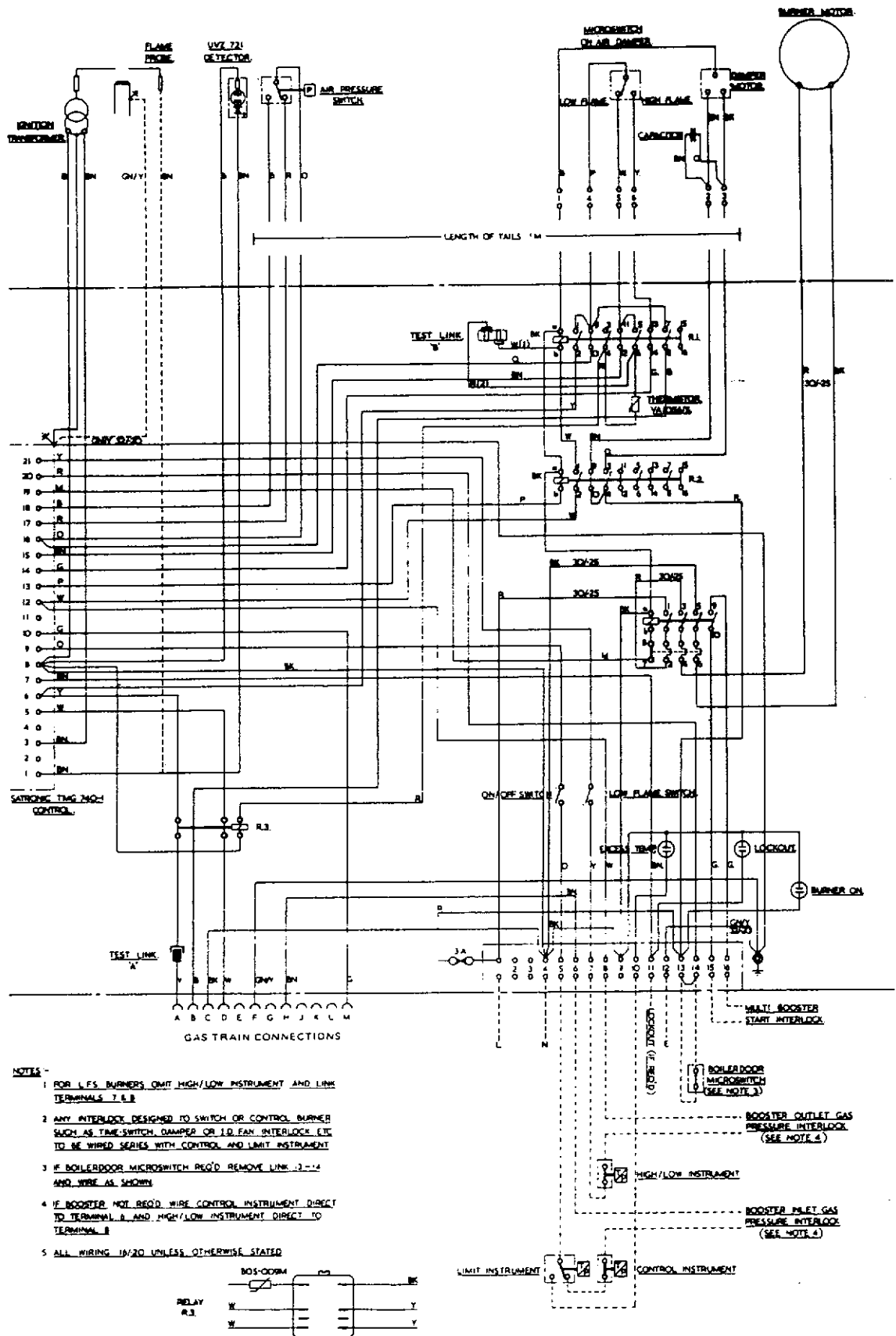


FIG. 40 CG5 H/L & LFS (1Ph) on Satronic TMG 740-1 Control

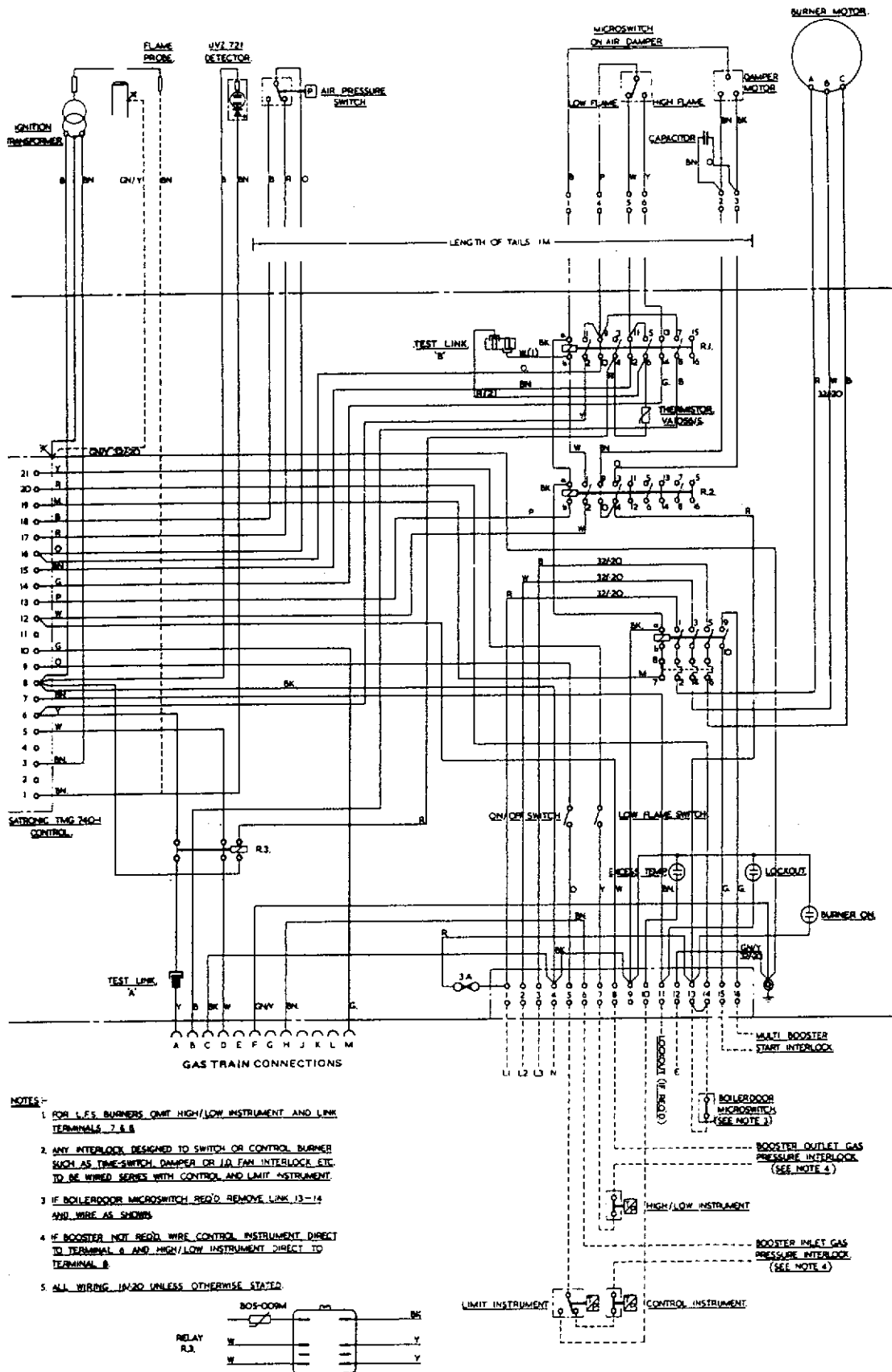


FIG. 41 CG5 H/L & LFS (3Ph) on Satronic TMG 740-1 Control

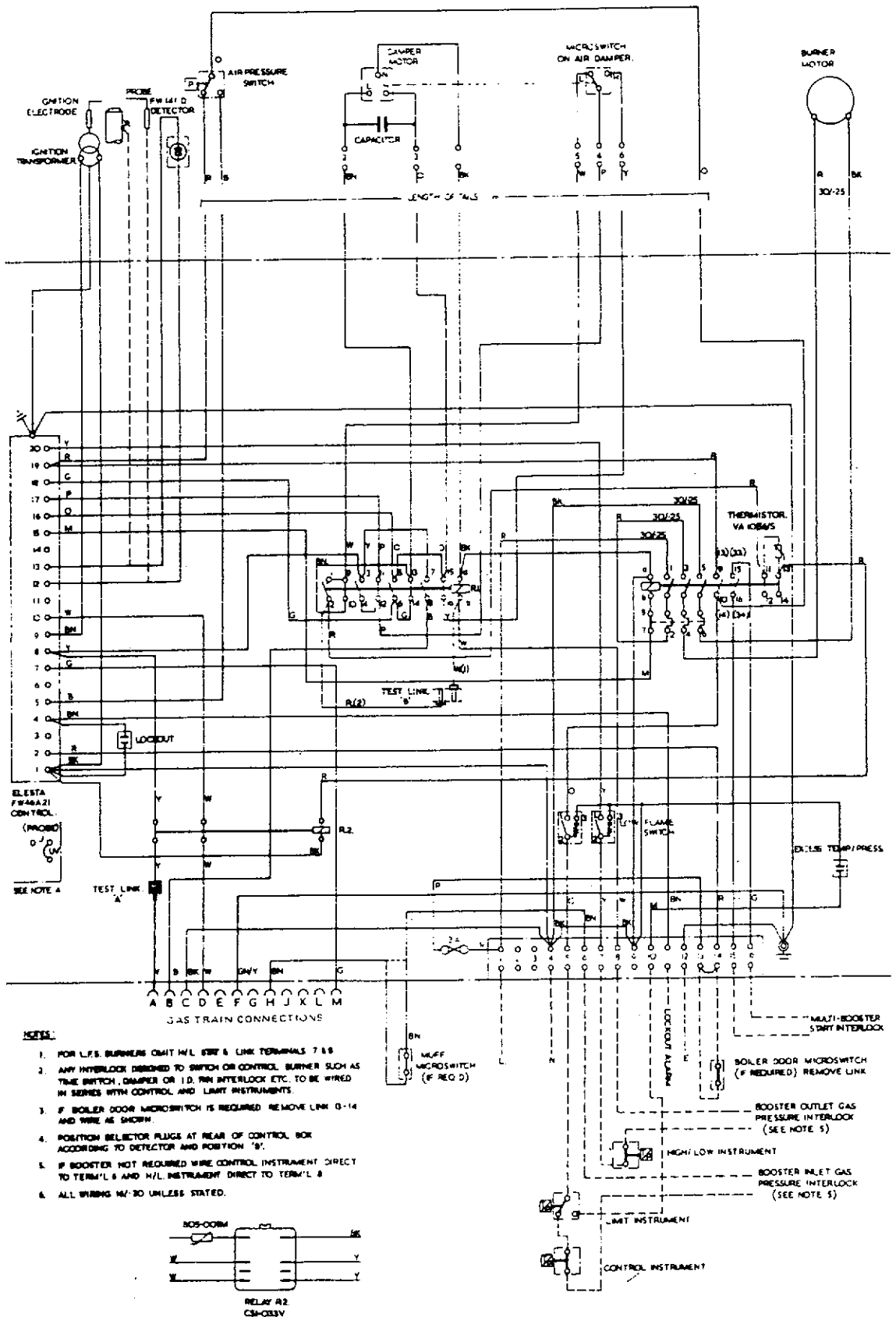


FIG. 42 CG5 H/L & LFS (1Ph) on Elesta FW46 A21 Control

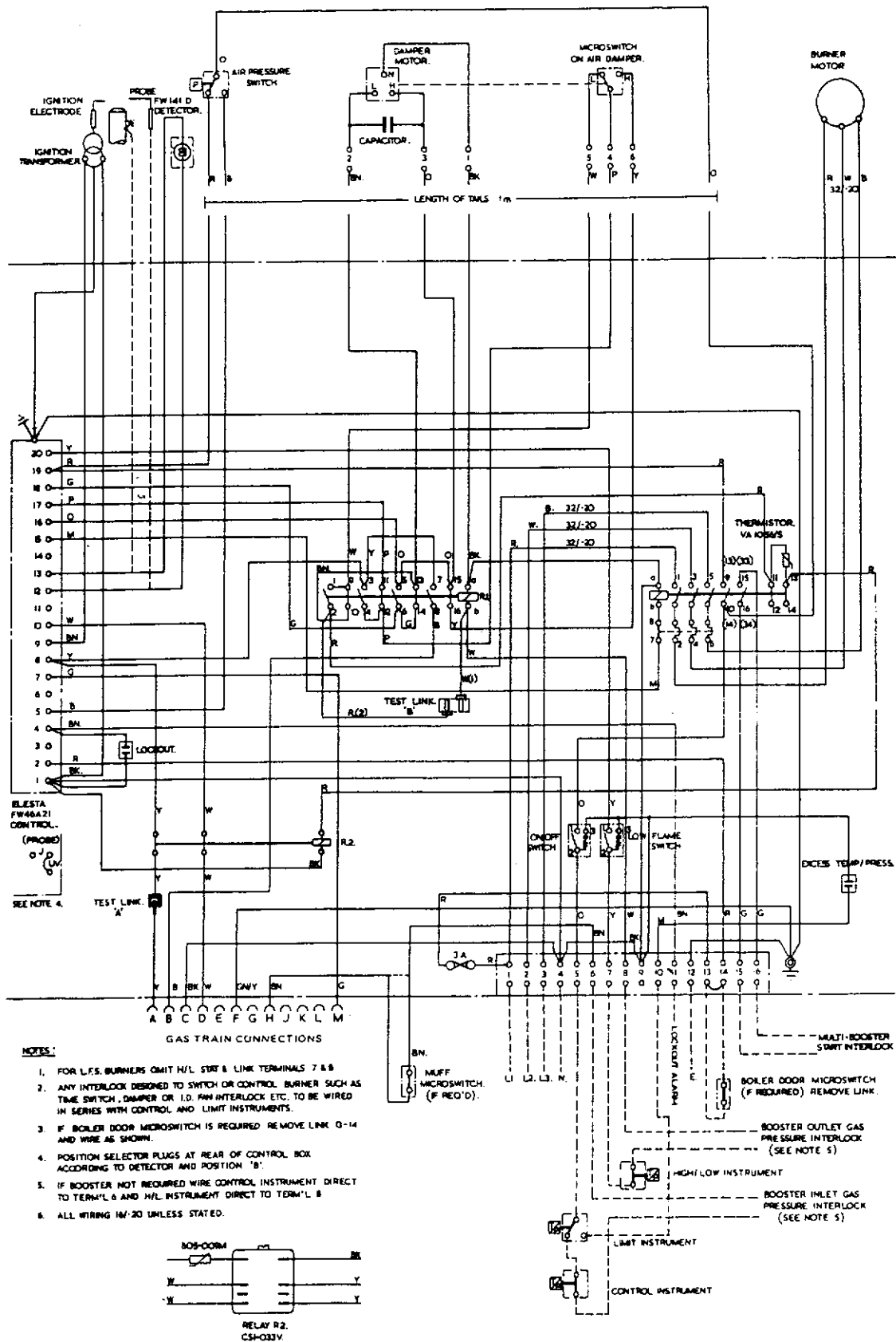


FIG. 43 CG5 H/L & LFS (3Ph) on Elesta FW46 A21 Control

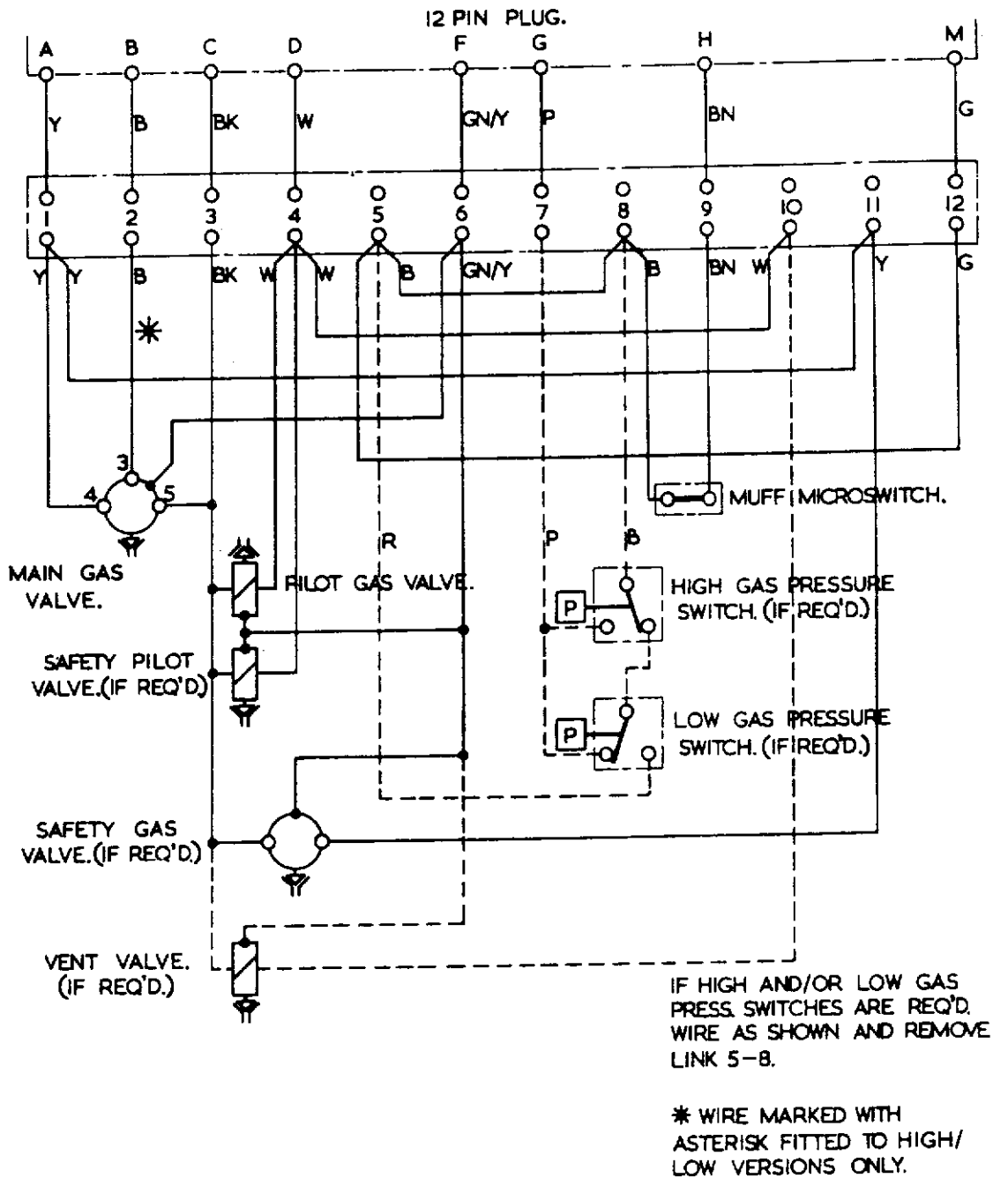


FIG. 44 Standard Gas Valve Train

4 VALVE SYSTEM.

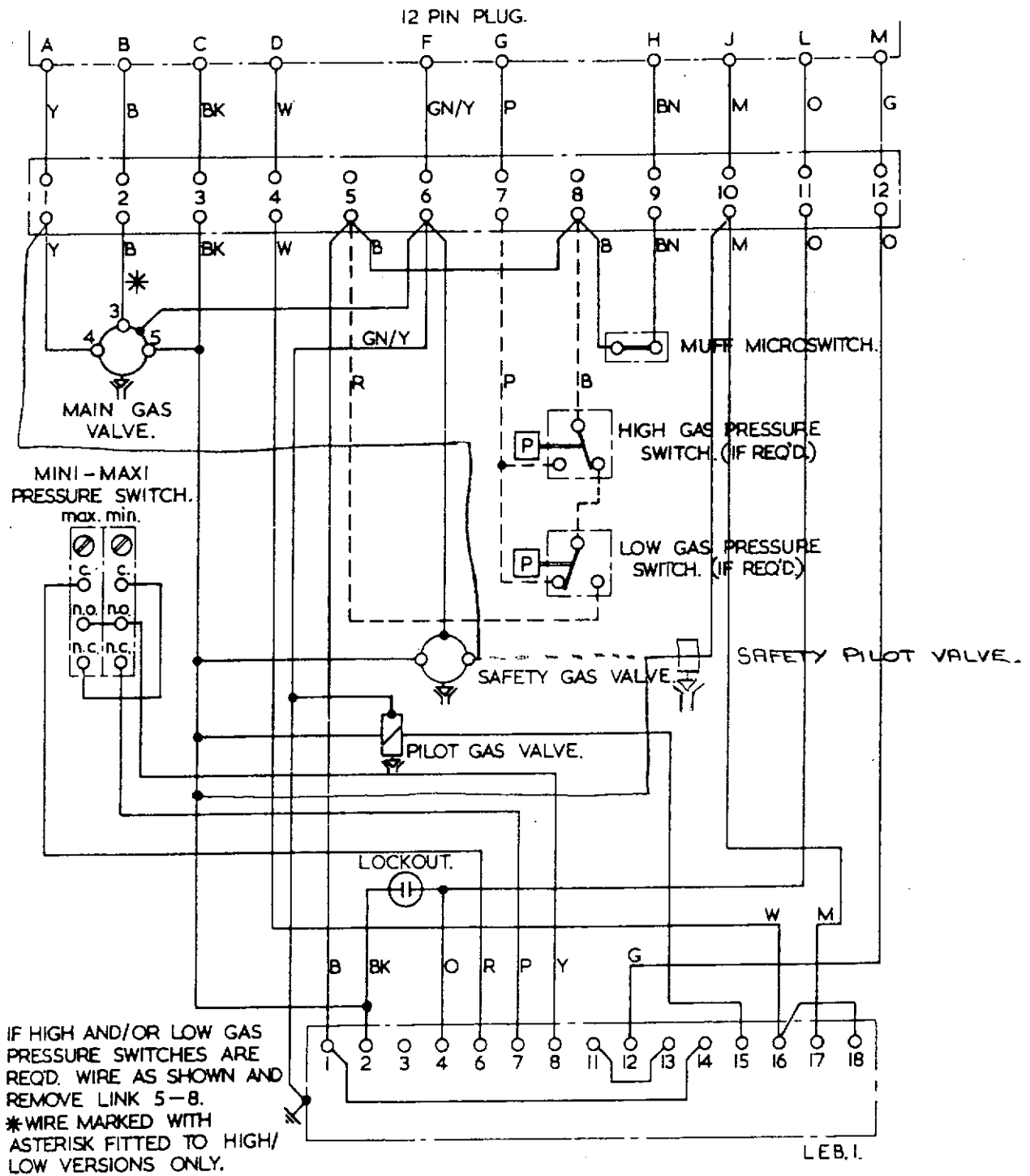


FIG. 45 Gas Valve Train with LEB 1

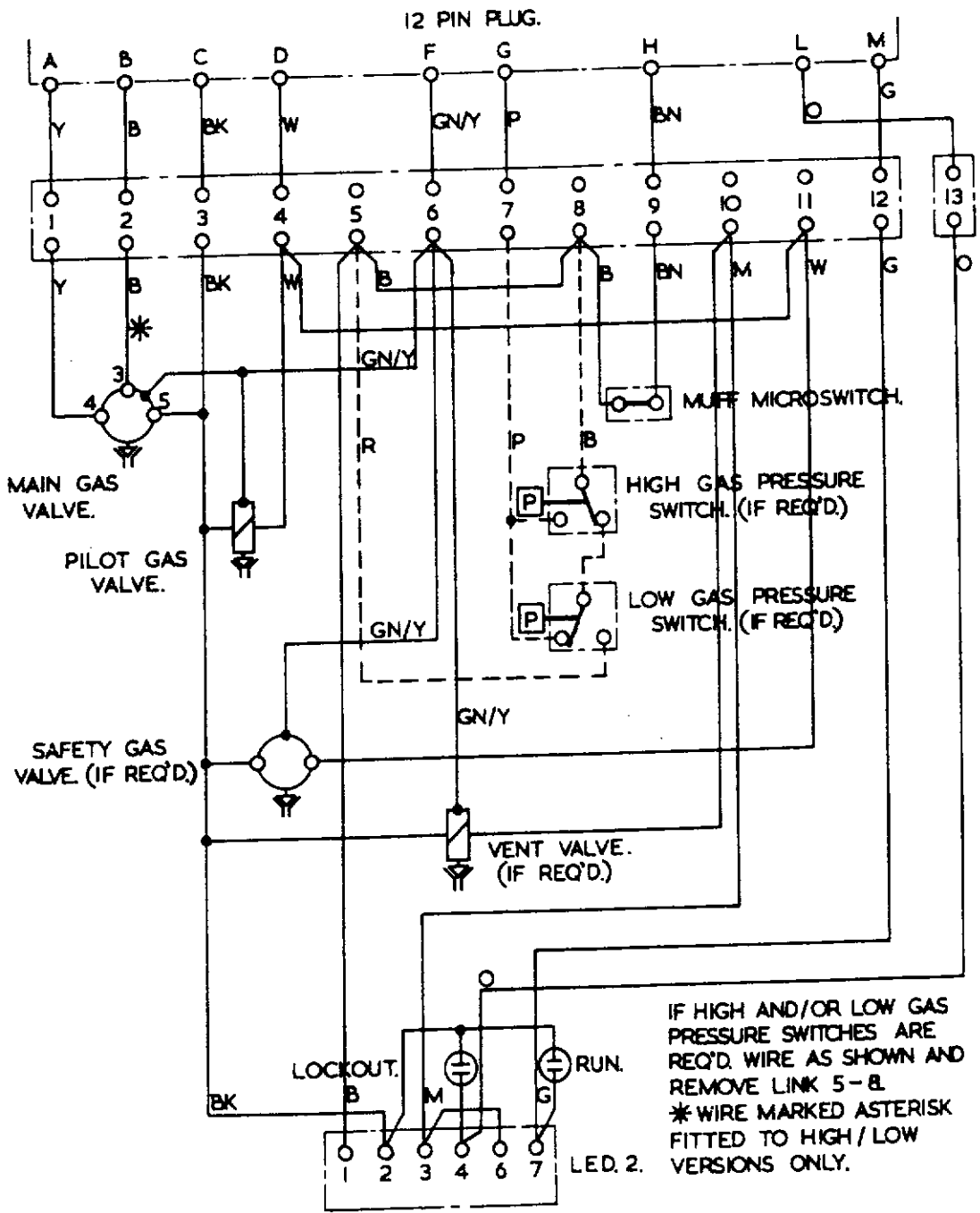


FIG. 46 Gas Valve Train with LED 2

