

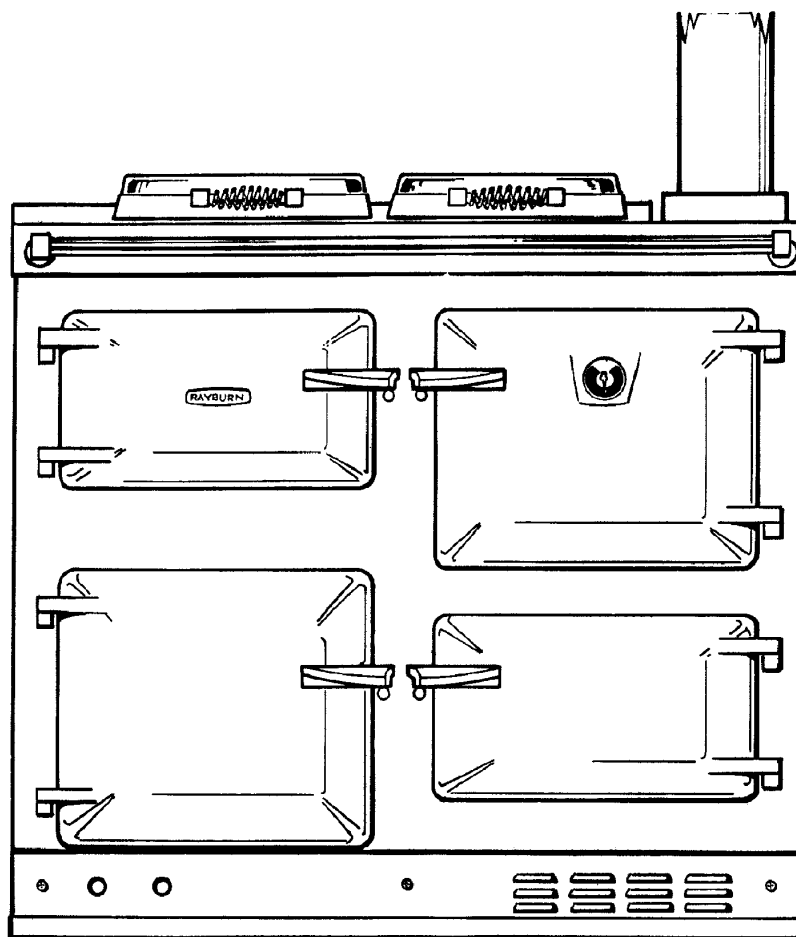


from AGA

Servicing Instructions

Heatranger 440/460/480/499K

For use in GB and IE



DESN 512012 A

REMEMBER, when replacing a part on this appliance, use only spare parts that you can be assured conform to the safety and performance specification that we require. Do not use reconditioned or copy parts that have not been clearly authorised by AGA.

PLEASE READ THESE INSTRUCTIONS BEFORE SERVICING THIS APPLIANCE

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Consumer Protection

As responsible manufacturers we take care to make sure that our products are designed and constructed to meet the required safety standards when properly installed and used.

IMPORTANT NOTICE: PLEASE READ THE ACCOMPANYING WARRANTY

Any alteration that is not approved by AGA could invalidate the approval of the appliance, operation of the warranty and could affect your statutory rights.

Health & Safety

This appliance may contain some of the materials that are indicated. It is the Users/Installers responsibility to ensure that the necessary personal protective clothing is worn when handling where applicable, the pertinent parts that contain any of the listed materials that could be interpreted as being injurious to health and safety, see below for information.

Firebricks, Fuel beds, Artificial Fuels

When handling use disposable gloves.

Fire cement

When handling use disposable gloves.

Glues and Sealants

Exercise caution - if these are still in liquid form use face mask and disposable gloves.

Glass Yarn, Mineral Wool, Insulation Pads, Ceramic Fibre

May be harmful if inhaled. May be irritating to skin, eyes, nose and throat. When handling avoid contact with skin or eyes. Use disposable gloves, face-masks and eye protection. After handling wash hands and other exposed parts. When disposing of the product, reduce dust with water spray, ensure parts are securely wrapped.

Kerosene and Gas Oil Fuels (mineral oils)

1. The effect of mineral oils on the skin vary according to the duration of exposure.
2. The lighter fractions also remove the protective grease normally present on the surface of the skin. This renders the skin dry, liable to crack and more prone to damage cause by cuts and abrasions.
3. 'Oil acne' is recognised by the presence of skin rashes. The arms are most often affected, but may occur where there is contact with oil or oily clothing.
 - Seek medical attention for any rash.
 - Avoid skin contact with mineral oil or clothing containing mineral oil.
4. Inhalation of mineral oil vapours must be avoided. Never fire the burner in the open air as unburnt oil vapours are likely to occur.
5. Use a suitable barrier cream which will give protection against mineral oil, lanolin based hand cream are usually very effective.
6. Never syphon mineral oils by mouth. If accidentally swallowed, call a doctor, do not induce vomiting.

NOTE: SMOKE/SMELL EMITTED DURING INITIAL USAGE

Some parts of the cooker have been coated with a light covering of protective oil. During initial operation of the cooker, this may cause smoke/smell to be emitted and is normal and not a fault with the appliance. It is therefore advisable to open doors and or windows to allow for ventilation. Lift the lids to prevent staining the linings.

INTRODUCTION

To ensure the best performance from your Rayburn it should be serviced once a year; preferably at the start of the heating season.

This appliance must be commissioned by a competent engineer, such as OFTEC approved.

Failure to install and maintain the appliance correctly could lead to prosecution.

An additional flueway and combustion chamber clean halfway through the heating season may be necessary in some cases.

The Rayburn cannot be serviced whilst hot, so both oven and boiler thermostats should be turned off on the evening before the service visit.

SERVICE SCHEDULE

Annual Service

During annual service flexible oil line, burner nozzles and burner head seals **MUST BE CHANGED**.

WIRING: Ensure there is no damage or loose connections. This should be carried out by a competent engineer.

BURNER REMOVAL - for cleaning and inspection.

CLEANING - Boiler heat exchanger, flueways, oven and hotplate flueways together with ceramic fibre burner chambers.

BURNER SERVICING.

OIL PUMP SERVICING - Cleaning of fuel line strainer.

RE-COMMISSIONING

REPLACEMENT PARTS

Oven Door Fit - Both doors must be checked and adjusted if necessary to ensure the alignment with the door catch is correct, the keep is secure and the oven is sealed when the door is closed.

Additional Flueway Clean

It may be necessary in some installations to give the boiler flueways a clean out at the end of the heating season.

Burner Removal

PREPARATION

WARNING: BEFORE REMOVING SERVICE ACCESS COVERS OR THE OIL BURNERS ENSURE THAT ALL ELECTRICAL SUPPLIES TO THE APPLIANCE HAVE BEEN ISOLATED.

The burners can be removed without disconnecting the oil supply pipe. However if the filters are being cleaned or a pressure gauge fitted to the pump then the oil supply should be turned OFF and arrangements made to catch any oil which will leak from the oil pump.

BURNER ACCESS

SEE FIG. 1

1. Open up the bottom burner access door. Remove door and put in a safe place.
2. Remove 4 inner panel securing screws and remove panel.
3. Remove the 3 plinth securing screws and remove plinth.

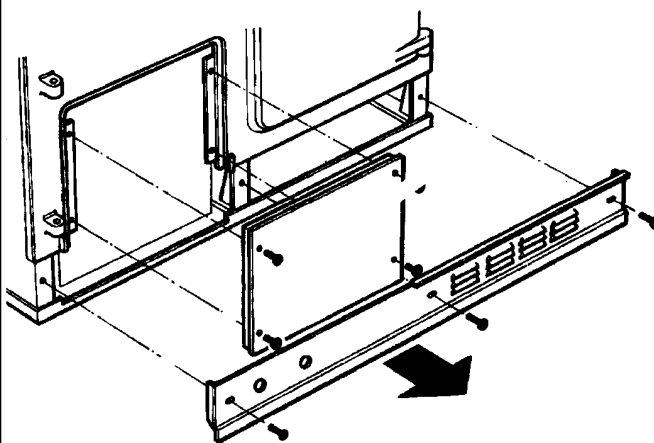


Fig. 1

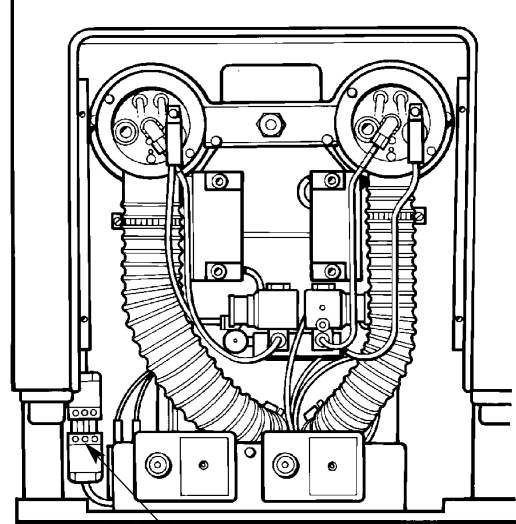
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BURNER REMOVAL

IMPORTANT: DURING BURNER REMOVAL CARE MUST BE TAKEN NOT TO DAMAGE THE CERAMIC FIBRE INSULATION.

SEE FIG. 2, 3 & 4

1. Place a sheet on the floor in front of the cooker to act as a working area.
2. Disconnect the 4-pin plug at the side of the burner.
3. Disconnect air intake.



DISCONNECT 4-PIN PLUG

Fig. 2

DESN 511999

SEE FIG. 3

4. Undo the burner locking nut and remove head retaining bar.
5. Undo burner mounting nut.

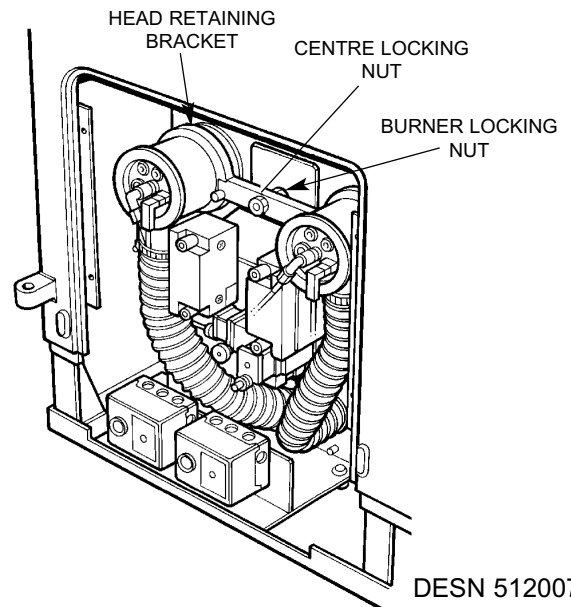


Fig. 3

DESN 512007

SEE FIG. 4

6. Withdraw the burner unit.
7. To remove the burner unit completely, it may be necessary to disconnect the air intake hose from the burner unit.

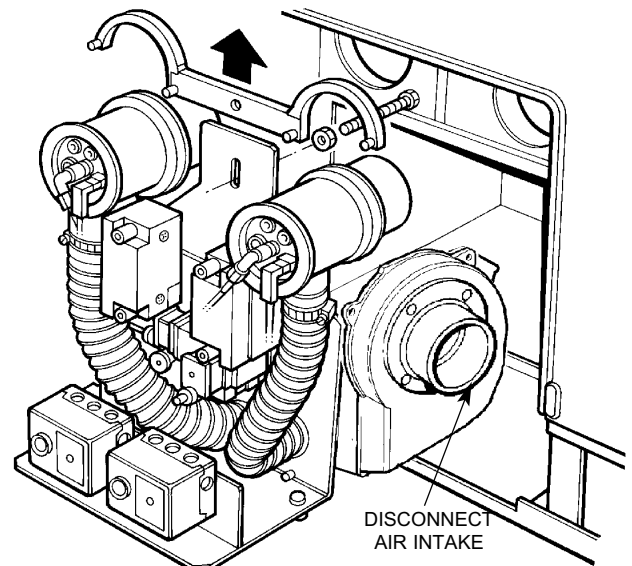


Fig. 4

DESN 512006

Cleaning

HEAT EXCHANGER CLEANING

IMPORTANT: DURING CLEANING CARE MUST BE TAKEN NOT TO DAMAGE THE CERAMIC FIBRE INSULATION.

SEE FIG. 5

1. Lift insulation covers and remove hotplate using lifting hooks provided.

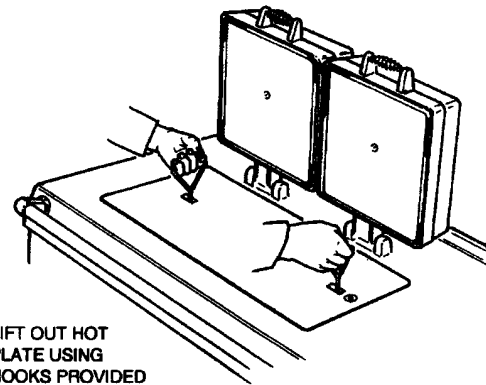


Fig. 5

DESN 510523

SEE FIG. 6

2. Remove the 4 flue cleaning access door securing bolts and remove door.
3. Using the rods provided remove the boiler flueway baffles from between boiler cross waterways.

The baffles are assembled in alternate directions, to allow gases to flow front to back through the assembly.

Each heat exchanger has two rows of baffles

Ensure that the baffles are having the top and bottom plates of the same width and marked **TOP** are fitted last. One at top of each flueway.

Total number of baffles fitted are:-

440 = 6	(2 x 3)
460 = 6	(2 x 3)
480 = 8	(2 x 4)
499 = 10	(2 x 5)

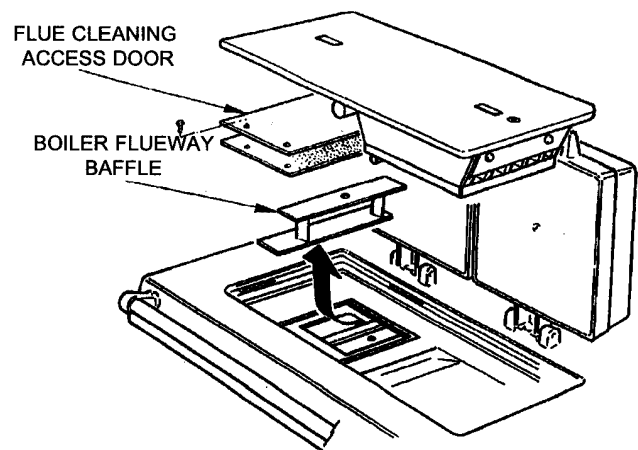
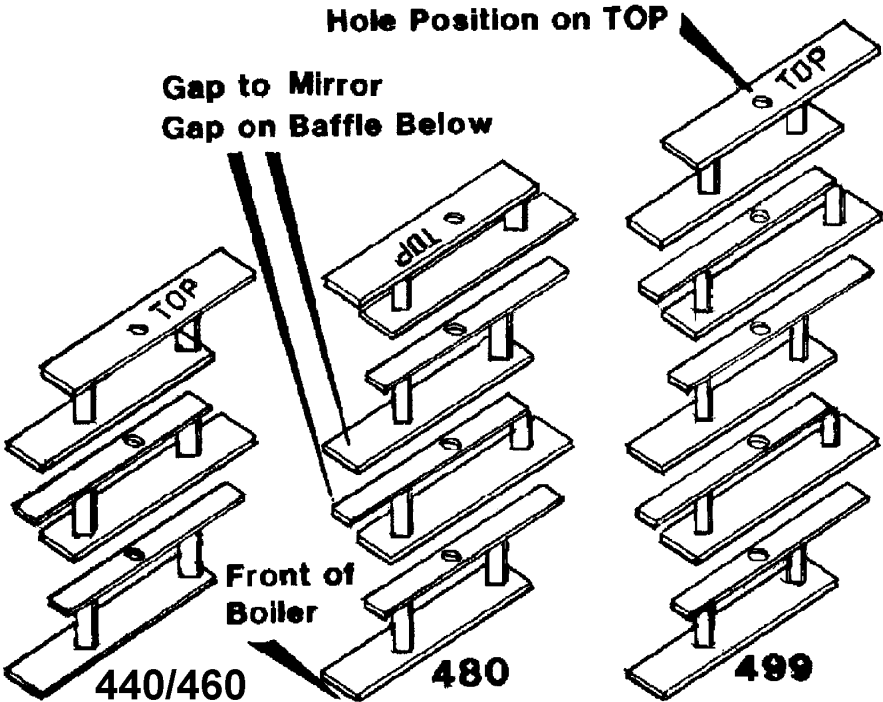


Fig. 6

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**ALL BAFFLES MUST BE STACKED
AS DIAGRAMS BELOW**

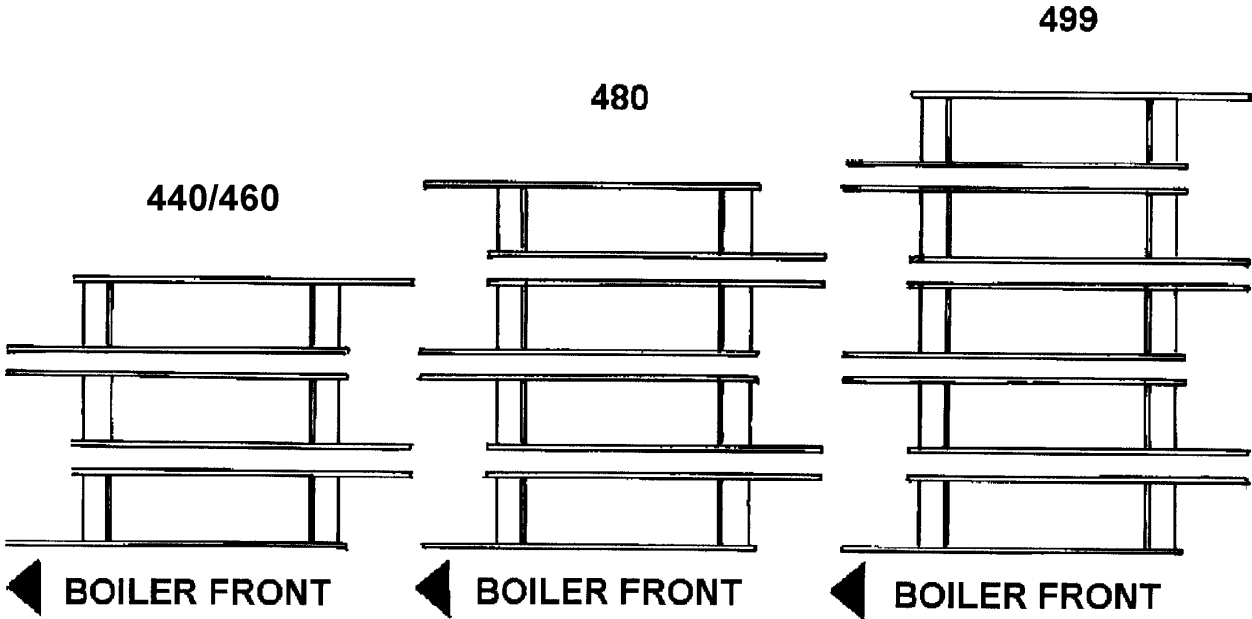


Fig. 6A

Cleaning

SEE FIG. 7

4. Lift top plate enamelled cover panel (behind LH insulating cover) remove insulation pad and sealing plate.
5. Clean the boiler outlet flueway by inserting the flexible brush through the top plate aperture, directing it towards the flue outlet. Scrape the deposits towards the heat exchanger.
6. Thoroughly clean boiler heat exchanger flueway.
7. Carefully vacuum any debris that has fallen down into the burner chamber.
8. Clean and replace boiler flueway baffles in reverse order. Locate boiler flue access door, secure.
9. Replace sealing plate, insulation pad and cover panel.

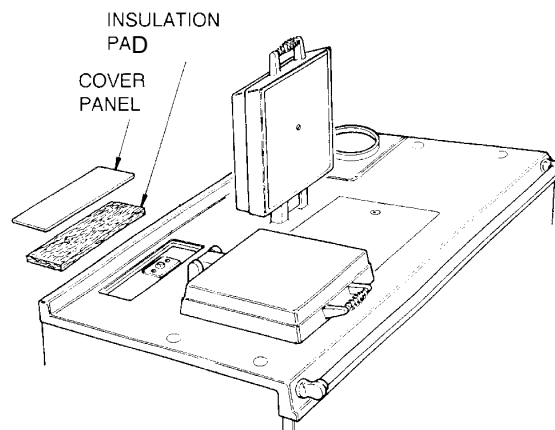


Fig. 7

DESN 511596

OVEN & HOTPLATE FLUEWAY CLEANING

SEE FIG. 8

1. Remove the top oven door and place in a safe position.
2. Remove side and base access doors use hex. driver.
3. Thoroughly clean top, side and base flueways through access apertures with brush.
4. Remove all debris with vacuum cleaner.
5. Replace side and base access doors. Secure in position using hex. driver.
6. Brush and clean in between hotplate ribs on underside.
7. Examine soft rope seal located around hotplate aperture in top plate and two rope seals on hotspot. Replace if frayed or damaged.
8. Replace hotplate ensuring the underside ribs lie over the oven, and that it seals to the top plate.

ACCESS
DOOR
(4 SCREWS)

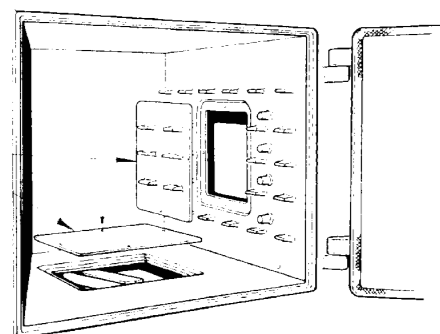


Fig. 8

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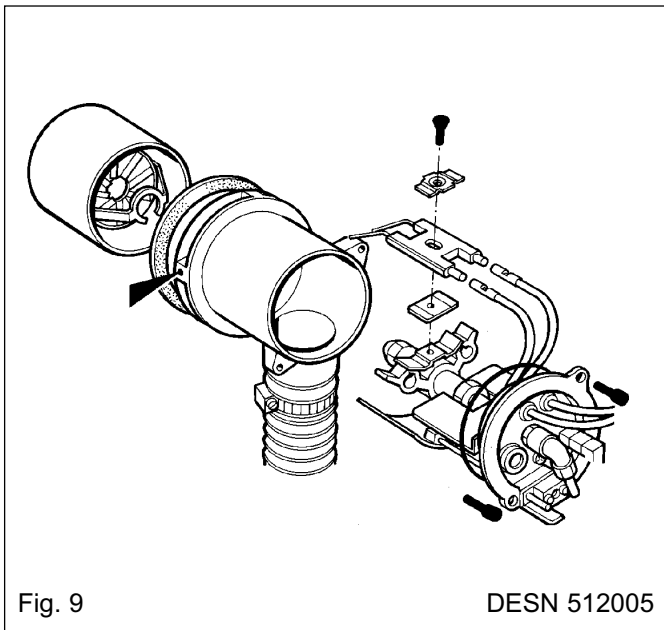
INTRODUCTION

SEE FIG 9, 10A, 10B & 10C

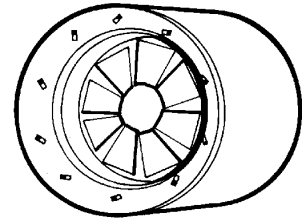
It is recommended that each side of the burner is serviced individually so as not to get the components from the two burners mixed up.

The correct combination of burner blast tubes are shown.

To remove blast tube, slacken two grub screws, pull forward.



BOILER 8 VANES



COOKER 10 VANES

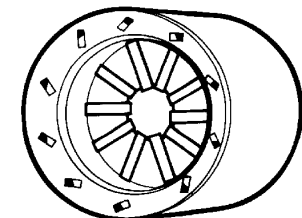


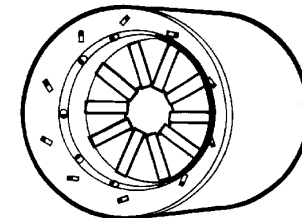
Fig. 10A

440/460K

BOILER 10 VANES

3mm HOLES

SMALL SLOTS



COOKER 10 VANES

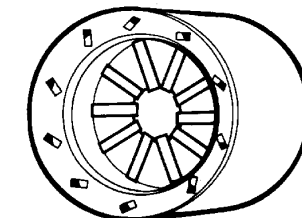


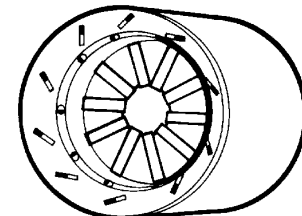
Fig. 10B

480K

BOILER 10 VANES

5mm HOLES

LARGE SLOTS



COOKER 10 VANES

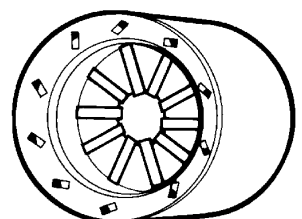


Fig. 10C

499K

Burner Servicing

BURNER NOZZLE REMOVAL

SEE FIG. 11

1. Disconnect ignition leads.
2. Remove two socket head screws.
3. Remove head assembly complete.
4. Remove ignitor assembly, by removing countersunk screw and clamp.
5. Unscrew nozzle from its holder with a correctly fitting tubular spanner to avoid damage to hexagon.

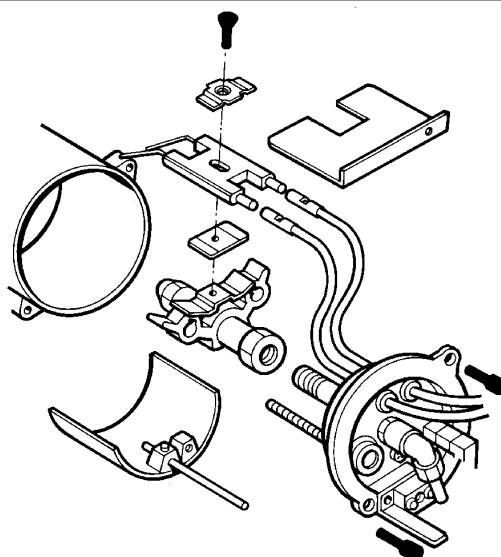


Fig. 11

DESN 512004

BURNER NOZZLE REPLACEMENT

SEE FIG. 12

1. Replace nozzle by new one of the same make and specification.

MODEL	COOKER		BOILER	
	NOZZLE TYPE	BOM CODE	NOZZLE TYPE	BOM CODE
440K	0.35 @ 80° S	RO4M 998940	0.35 @ 60° H	RO4M 998939
460K	0.40 @ 80° EH	RO4M 998391	0.55 @ 80° EH	RO4M 998392
480K	0.40 @ 80° EH	RO4M 998391	0.65 @ 80° EH	RO4M 998394
499K	0.40 @ 80° EH	RO4M 998391	0.85 @ 80° EH	RO4M 998395

2. Ensure that mating faces are clean.
3. Hold nozzle holder with correct spanner when tightening nozzle.
4. Typically finger tight plus 1/4 turn with spanner is sufficient.
DO NOT OVERTIGHTEN.
5. Ensure electrode gaps are correct.

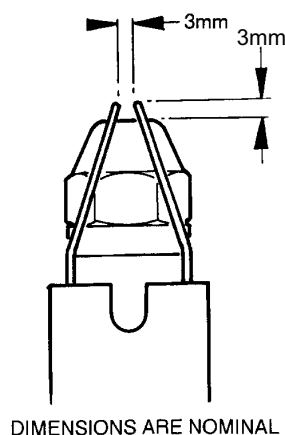


Fig. 12

DESN 510538

PHOTO ELECTRIC CELL (PEC) CLEANING

SEE FIG. 13

Withdraw Photo Electric Cell from the burner head. Clean PEC sensing end with a soft cloth taking care not to scratch the light sensitive body. Re-insert PEC taking care to insert the correct way round.

Should the cell show signs of distortion or cracking, replacement will be necessary. See PEC replacement, page 19.

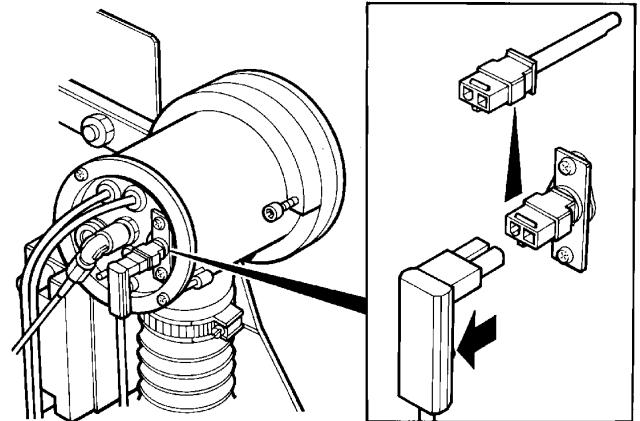


Fig. 13

DESN 512003

FAN CLEANING

SEE FIG. 14 & 14A

440/460K ONLY

1. Clean between the blades of the fan impellor with a small brush and remove any residue.

The fan motor flange has 4 fixings to the fan case.

480/499K ONLY

1. Remove 4 fixing screws and pull off fan can inlet.
2. Clean between the blades of the fan impellor with a small brush and remove any residue.

440K & 460K

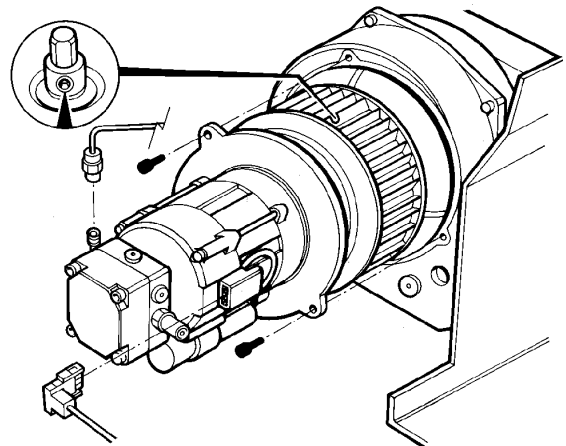


Fig. 14

DESN 511996

RE-ASSEMBLE BURNER

Re-assemble the burner in reverse order.

NOTE: Burner head gaskets should be renewed at each service.

480K & 499K

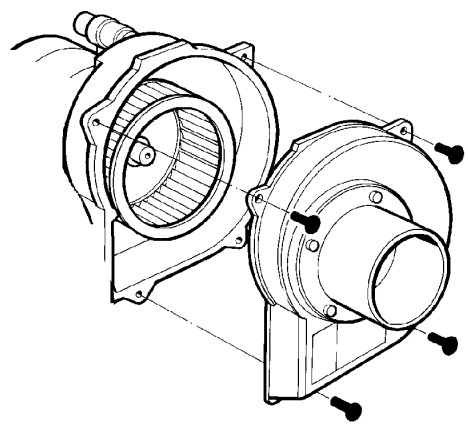


Fig. 14A

DESN 515883

Oil Pump Servicing

INTRODUCTION

To carry out any servicing on the oil pump. Turn off the oil line isolating valve near to the appliance.

OIL PUMP STRAINER CLEANING

SEE FIG. 15

1. Remove 4 socket head screws.
2. Remove filter.
3. Wash with clean petrol or paraffin.
4. Re-assemble in reverse order.

OIL LINE FILTER CLEANING

1. Turn OFF the line isolating valve fitted prior to the oil line filter.
2. Follow manufacturer's instructions to remove filter element from the housing, taking care to collect Kerosene residue from the filter housing.
3. Wash filter thoroughly in clean petrol or paraffin.
4. Re-assemble in reverse order.

NOTE: Flexible fuel hose (s) must be replaced at each service.

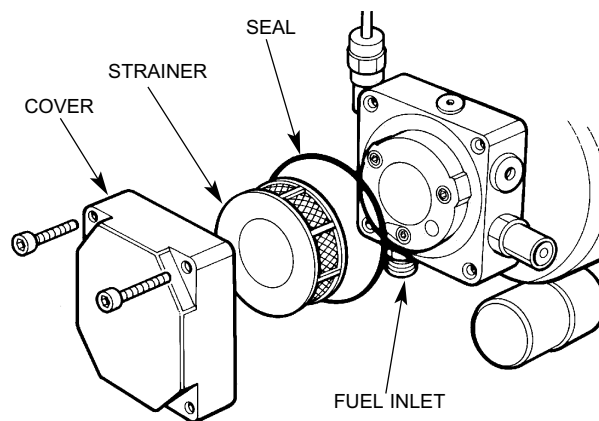


Fig. 15

DESN 512002

BLEED AIR FROM OIL SUPPLY

SEE FIG. 17A

Disconnect the flexible oil pipe line at the pump inlet, open the stop valve slowly and run off some of the oil into a receptacle to establish an air free supply to the pump. Remake the connection oil tight and leave valve open.

FIT PRESSURE GAUGE

SEE FIG. 16

Remove the bleed screw from the manifold and fit an oil pressure gauge with R 1/8 connection to check the pump output pressure.

SWITCH ON ELECTRICITY

Set the boiler burner time clock to continuous and turn the boiler thermostat to maximum. The boiler burner should run on pre-purge for 7 - 15 seconds. With the ignition spark energised. The oil solenoid valve should open allowing the burner to fire.

Until all the air from the oil pump is flushed out there may be some flame instability resulting in the burner locking out. This will be shown by the burner stopping and the illumination of the signal light in the reset button of the control box (see Fig. 17). **IN THIS EVENT, WAIT AT LEAST ONE MINUTE**, then press the re-set button to restart.

VENT OIL PUMP

SEE FIG. 16

Whilst the burner is running, vent air from the pump by slackening the pressure gauge port sufficient to allow air to bleed out. When bubble free oil seeps out re-tighten.

ADJUST OIL PRESSURE

SEE FIG. 17

With the burner running check the oil pressure on the pressure gauge.

If the pressure gauge is not indicating the correct reading then adjust the pressure by turning the pressure regulator clockwise to increase or anti-clockwise to decrease the pressure until the pressure gauge reads 10 bar (145lbf/in²).

NOTE: 440K ONLY

Increase/decrease pressure until pressure gauge reads 8 bar (120lbf/in²).

NOTE: 499K ONLY

During initial start up, the pressure will indicate approximately 100 psi for 30 seconds then up to 10 bar (145lbf/in). Any adjustments must be made after this sequence has been completed.

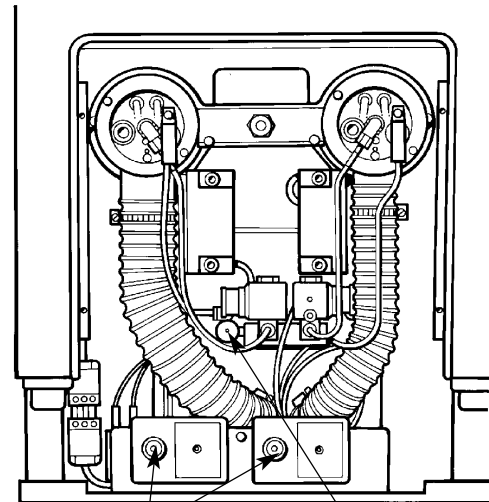


Fig. 16

RESET
BUTTONS

PRESSURE PORT/
BLEED SCREW

DESN 511999

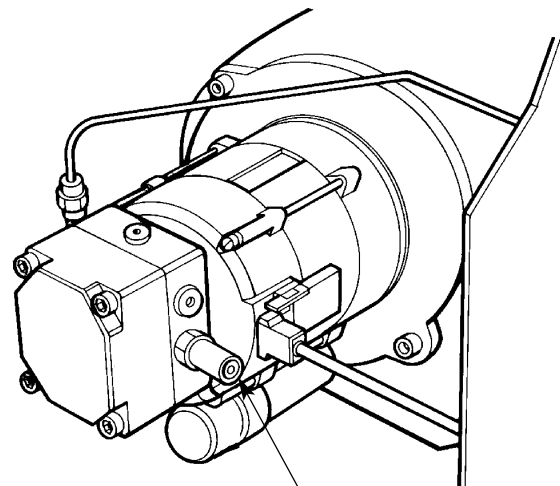


Fig. 17

OIL
PRESSURE
ADJUSTMENT

DESN 511997

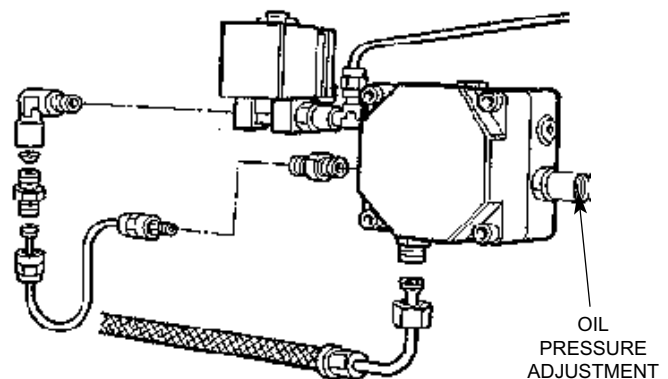


Fig. 17A

DESN 512046

Re-commissioning

SET COMBUSTION AIR

SEE FIG. 18 & 18A

After 15 minutes of the boiler burner running.

Remove the enamelled top cover panel and the insulation pad.

Remove the plugging screw and insert the sensing end of a portable indicator to check the CO² (Carbon Dioxide) level. Adjust the boiler burner air intake until a reading of 11.0/11.5% is recorded on the indicator.

CHECK SMOKE

SEE FIG. 18A

Remove the CO² sampling tube and using the same hole for flue sampling insert the sensing end of a Baccarach Smoke Pump and check that the smoke in the boiler flue ways does not exceed No. 2 on the scale.

Replace the plugging screw, insulation pad and cover panel.

Switch off the boiler burner.

COOKER BURNER - SEE FIG. 18A

Switch on cooker burner.

After 15 minutes of the cooker burner running.

Repeat the above procedures for the cooker burner. To sample the flue gases from the cooker burner lift up the R.H. insulating cover and remove the countersunk headed screw in the hotplate. The cooker burner should be set to 11.0/11.5% maximum Smoke No. 2.

Replace the countersunk headed screw on completion ensuring that it will not interfere with any pots and pans placed on the hotplate.

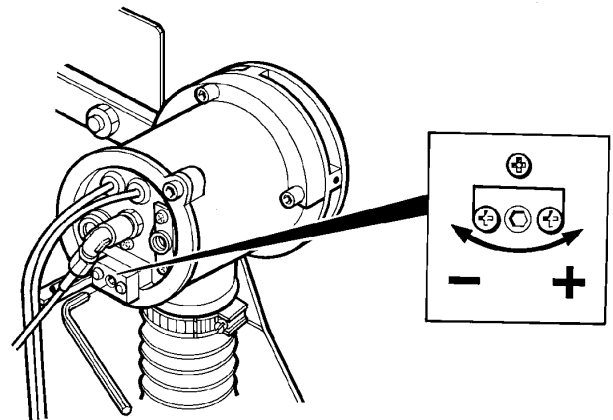


Fig. 18

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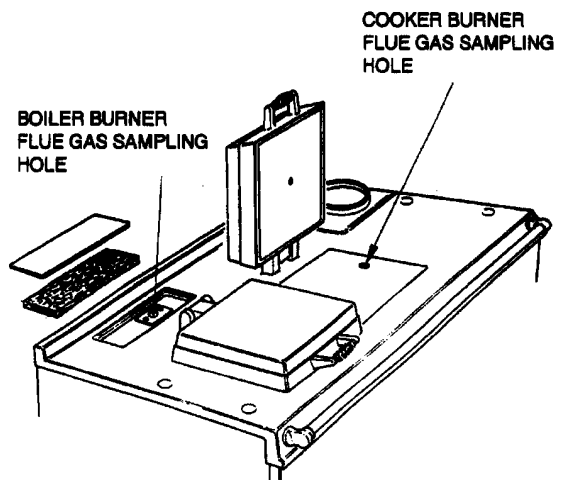


Fig. 18A

DESN 511588

FAN MOTOR

SEE FIG. 19 & 19A

Follow instructions in sections BURNER ACCESS, Steps 1 to 3 and BURNER REMOVAL, Steps 1 to 6.

1. Remove 3-pin plug.
2. Remove solenoid plug (499K ONLY).
3. Disconnect oil pipe.
4. Remove four socket head screws. Lift off motor.
NOTE: 440K ONLY - Remove 4 screws and withdraw motor.
5. Remove grub screw, slide off fan. Re-assemble in reverse order.

NOTE: Ensure that gaskets and seals are in place and in good condition.

440/460K ONLY

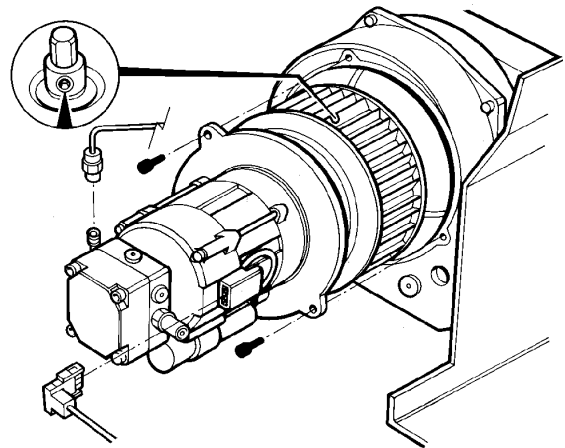


Fig. 19

DESN 511996

IGNITION ELECTRODES

Follow instructions in BURNER ACCESS, Steps 1 to 3 and BURNER NOZZLE REMOVAL, Steps 1 to 5.

SEE FIG. 20

1. Disconnect ignition leads.
2. Remove 2 socket head screws.
3. Remove head assembly complete.
4. Remove ignitor assembly by removing countersunk screw and clamp.
5. Fit new ignition electrode assembly, re-assemble in reverse order.
6. Check electrode gap and reset if necessary.

480/499K ONLY

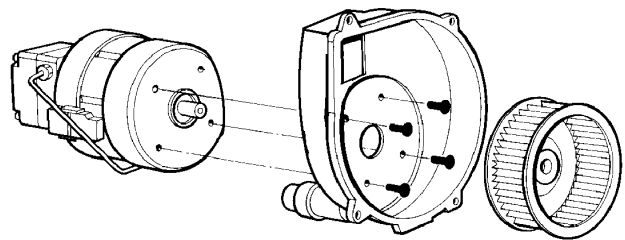


Fig. 19A

DESN 515884

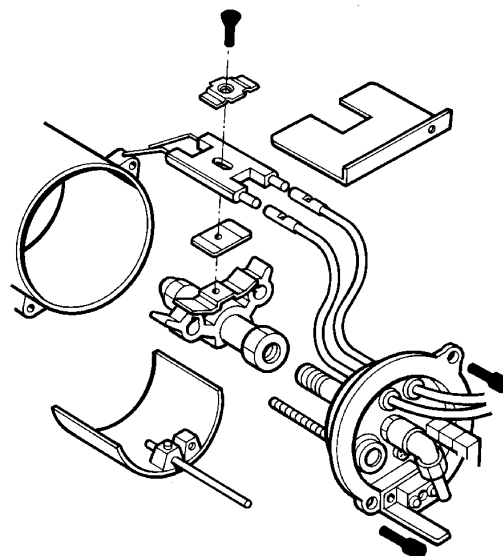


Fig. 20

DESN 512004

Replacement of parts (Burner)

IGNITOR

SEE FIG. 19

Follow instructions in sections BURNER ACCESS, Steps 1 to 3, BURNER REMOVAL Step 4.

1. Remove both HT leads from ignitor,
2. Remove mains plug from ignitor.
3. Remove earth screw.
4. Remove 2 ignitor securing screws.
5. Remove ignitor.
6. Fit new ignitor, re-assemble in reverse order.

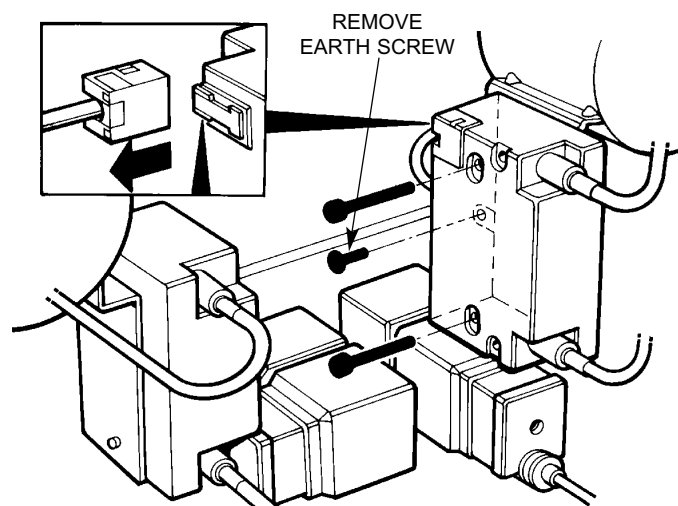


Fig. 19

DESN 511994

RELAY

SEE FIG. 20

Follow instructions in sections BURNER ACCESS, Steps 1 to 3, BURNER REMOVAL, Steps 1 to 6.

1. Remove push on connectors (noting position of each connector).
2. Remove two relay fixing screws.
3. Fit relay, re-assemble.

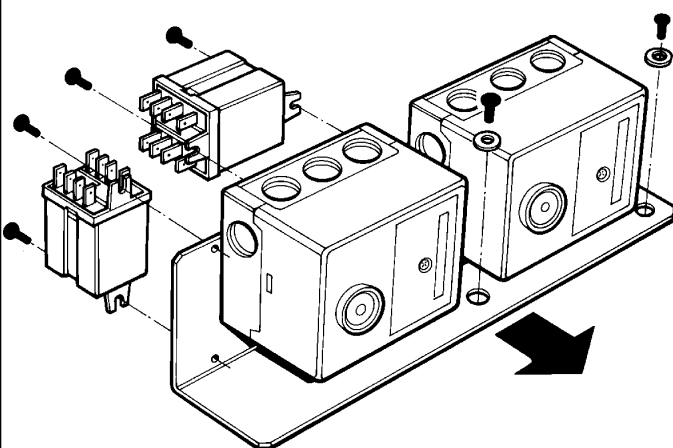


Fig. 20

DESN 511991

SOLENOID COIL

SEE FIG. 21

Follow instructions in sections BURNER ACCESS, Steps 1 to 3, BURNER REMOVAL, Steps 1 to 5 .

1. Slacken solenoid plug securing screw.
2. Remove plug.
3. Remove solenoid securing nut and washer.
4. Remove solenoid coil.
5. Fit new solenoid coil, re-assemble in reverse order.

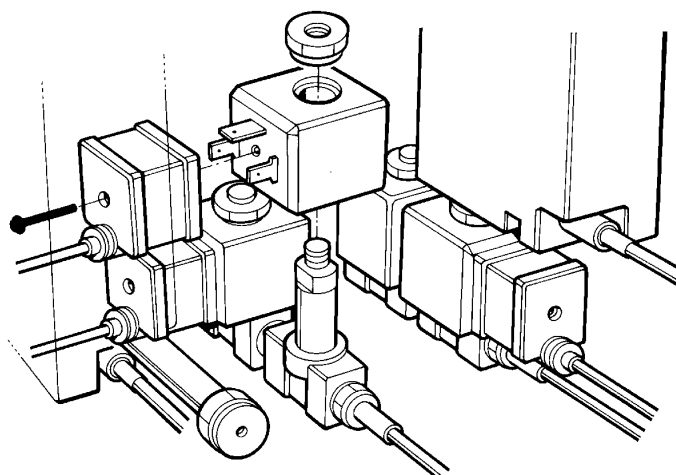


Fig. 21

DESN 511993

CONTROL BOX

SEE FIG. 22

Follow instructions in section BURNER ACCESS, Steps 1 to 3.

1. Undo centre fixing screw.
2. Gently pull control box away from base.
3. Fit new control box, re-assemble in reverse order.

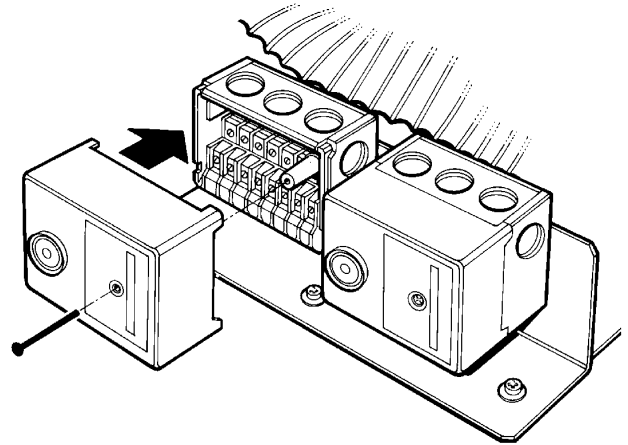


Fig. 22

DESN 511992

PEC

SEE FIG. 23

Follow instructions in section BURNER ACCESS, Steps 1 to 3.

1. Withdraw P.E.C. from burner head.
2. Push in retaining clip and slide P.E.C. out.
3. Fit new P.E.C.
4. Re-insert P.E.C. taking care to insert the correct way round.

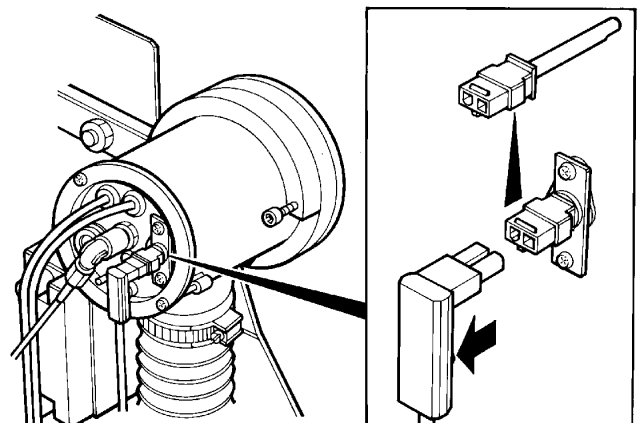


Fig. 23

DESN 512003

Replacement of parts (Burner)

PUMP ACCESS

SEE FIG. 24

Follow instructions in section BURNER ACCESS, Steps 1 to 3 and BURNER REMOVAL, Steps 1 to 5.

1. Isolate fuel supply.
2. Disconnect flexible hose. (This must be replaced annually).
3. Remove solenoid plug.
4. Remove feed pipe.
5. Slacken three securing screws and remove pump.
6. Check drive, replace if worn or damaged.
7. Replace pump, re-assemble in reverse order.

499K ONLY - SOFT START

(SEE FIG. 25)

1. SOFT START SOLENOID
2. RESTRICTOR DISC

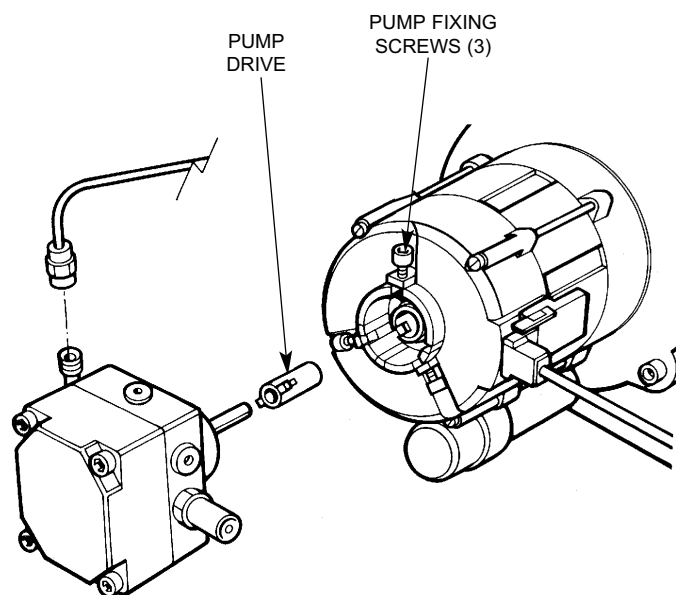


Fig. 24

DESN 511995

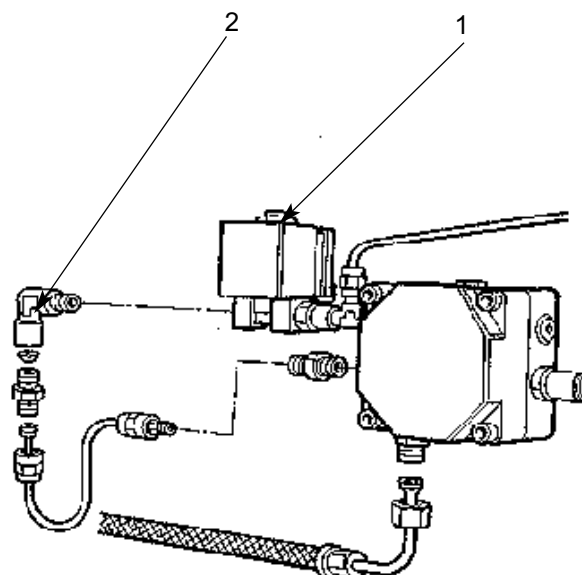


Fig. 25

DESN 512046

ELECTRICAL COMPONENT ACCESS

BEFORE REMOVING SERVICE ACCESS COVERS ENSURE THAT ALL ELECTRICAL ACCESS TO THE APPLIANCE HAVE BEEN SWITCHED OFF (SWITCH OFF AND REMOVE PLUG).

SEE FIG. 26

1. Remove the controls door and place in a safe position.
2. Remove both thermostat control knobs.
3. Remove the 2 cover panel fixing screws.
4. Disconnect cover panel. It will be necessary to disconnect the push on tags from the selector switch.

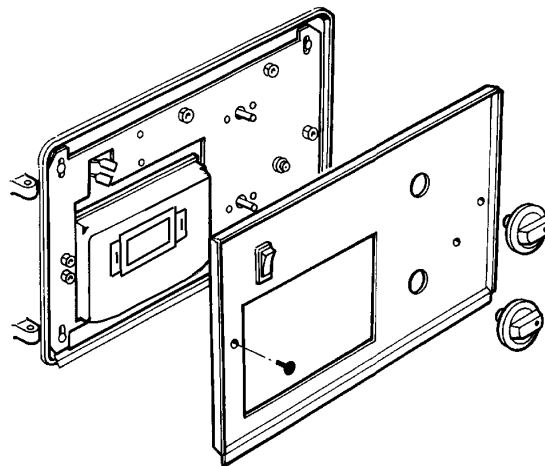


Fig. 26

DESN 511586 B

SEE FIG. 27

5. Remove the four control panel fixing screws.
6. Tilt the chassis forward from the top and lift out. To fully access the rear of the control chassis, the thermostat capillaries should be removed from their pocket.

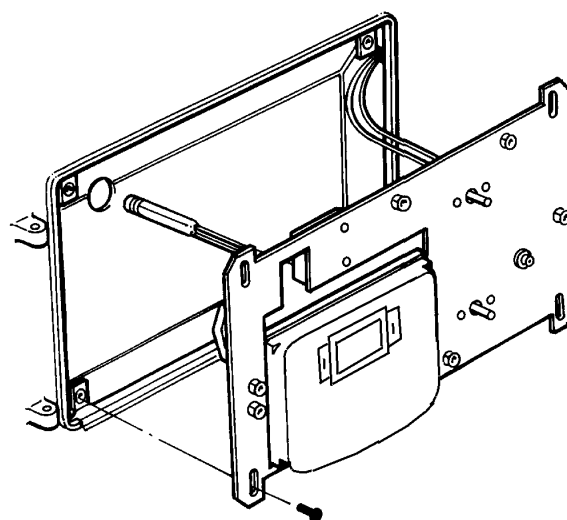


Fig. 27

DESN 511587 B

Replacement of parts (Electrical controls)

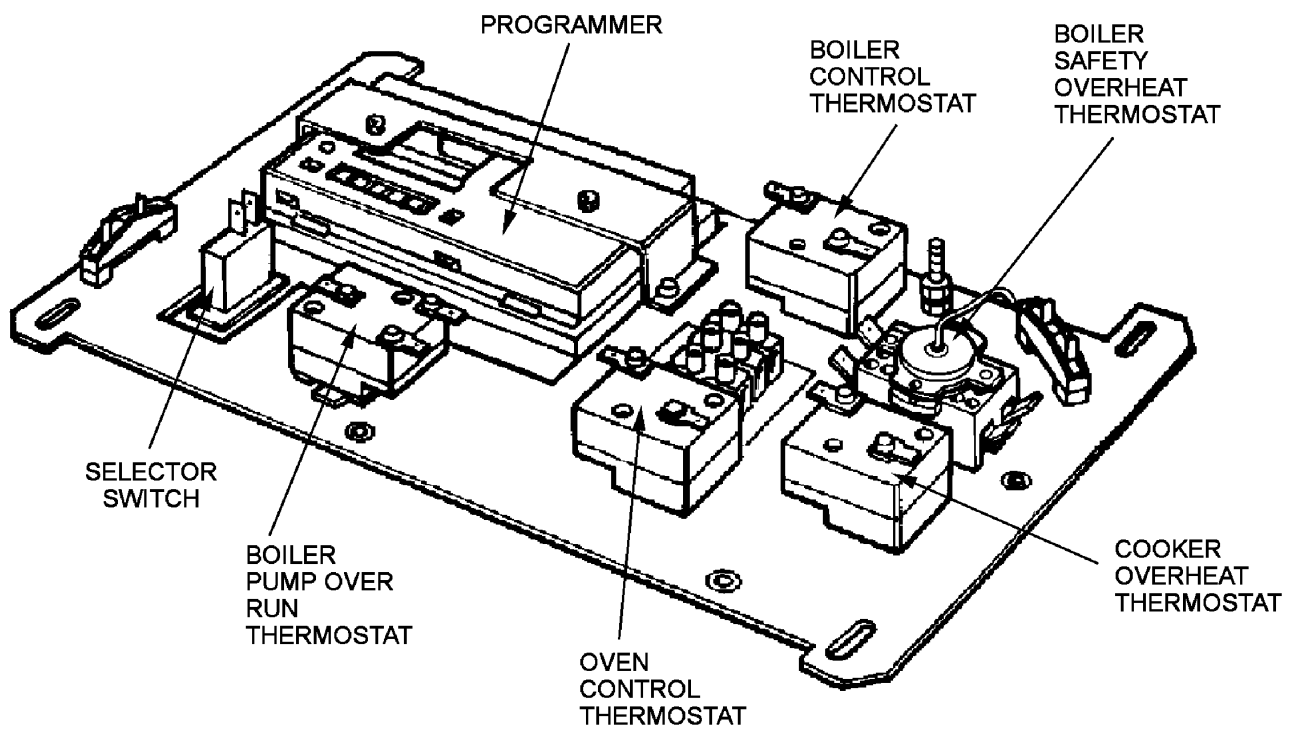


Fig. 28

TO FIT NEW BOILER CONTROL THERMOSTAT

SEE FIG. 29

Follow instructions in section ELECTRICAL COMPONENT ACCESS, Steps 1 to 6.

1. Undo the two screws on the front of the chassis which hold the thermostat in place.
2. Remove the two push on connectors from back of thermostat.
3. Replace thermostat. Take care to push thermostat phial correctly into the pocket provided. The thermostat should be mounted with tag P at the right hand side.
4. Re-connect push on connector wires. The red wire to 1 and YELLOW wire to P.

To complete follow instructions in section RE-ASSEMBLE, Steps 1 to 6.

TO FIT NEW BOILER PUMP OVERRUN THERMOSTAT

SEE FIG. 30

Follow instructions in section ELECTRICAL COMPONENT ACCESS, Steps 1 to 6.

1. Undo the two screws on the front of the chassis which hold the thermostat in place.
2. Remove the three push on connectors from back of thermostat.
3. Replace thermostat. The thermostat should be mounted with tap P at the left hand side. Take care to push thermostat phial correctly into the pocket provided.
4. Re-connect push on connector wires. The RED wire from the pump to P. the other brown wire to 2 and the YELLOW to 1.

To complete follow instructions in section RE-ASSEMBLE, Steps 1 to 6.

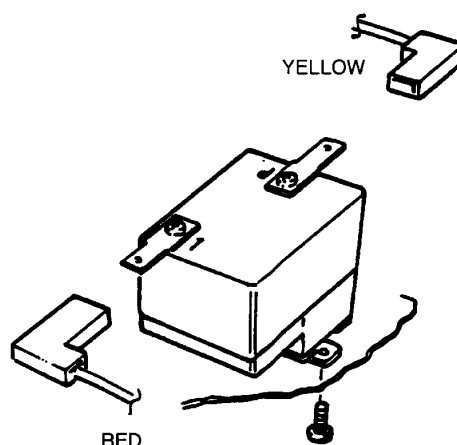


Fig. 29

DESN 510546 A

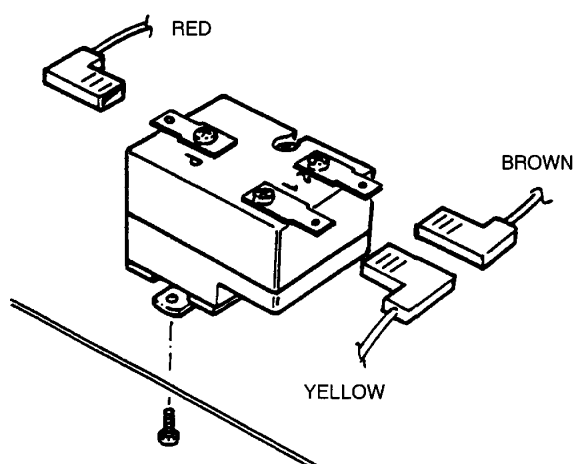


Fig. 30

DESN 510547 A

Replacement of parts (Electrical controls)

TO FIT NEW COOKER SAFETY OVERHEAT THERMOSTAT

SEE FIG. 31

Follow instructions in section ELECTRICAL COMPONENT ACCESS, Steps 1 to 6.

1. Undo the two screws on the front of the chassis which holds the thermostat in place.
2. Remove the two push on connectors from the back of the thermostat. Open oven door to access the thermostat phial which passes into the oven at top LH corner.
3. Remove LH side plate, slacken screw where the phial passes through RH side and rotate. Slacken screw front phial mounting bracket rotate. (See Fig. 33).
4. Replace thermostat, thermostat phial should be re-positioned in the same position as removed.

To complete, follow instructions in section RE-ASSEMBLE, Steps 1 to 6.

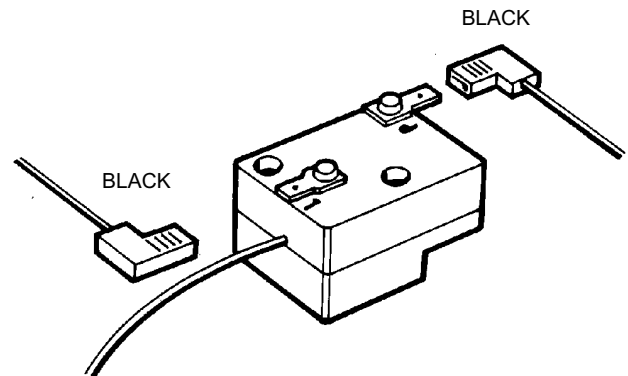


Fig. 31

DESN 512493

TO FIT NEW BOILER SAFETY OVERHEAT THERMOSTAT

SEE FIG. 32

Follow instructions in section ELECTRICAL COMPONENT ACCESS, Steps 1 to 6.

1. Undo the central hexagon nut on the front of the chassis which holds the thermostat in place.
2. Remove the push on connectors from back of thermostat.
3. Replace thermostat. Take care to push thermostat phial correctly into the pocket provided.
4. Re-connect push on connector wires, as Fig. 32.

To complete, follow the instructions in section RE-ASSEMBLE, Steps 1 to 6.

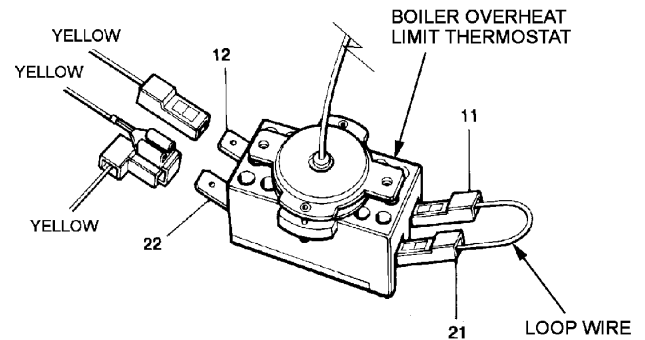


fig. 32

DESN 516734

TO FIT NEW OVEN CONTROL THERMOSTAT

SEE FIG. 33

Follow instructions in section ELECTRICAL COMPONENT ACCESS, Steps 1 to 6.

1. Undo the two screws on the front of the chassis which holds the thermostat in place.
2. Remove the two push on connectors from back of thermostat.
3. Open roasting oven door to access the thermostat phial and capillary which pass into the oven at the top left hand corner.
4. Remove LH side plate. Slacken the screw where the phial passes through the roasting oven side and rotate the cover plate to open up the access hole. Slacken screw front phial mounting bracket and rotate.
5. Replace thermostat. The thermostat should be mounted with tag P at the right hand side. Reposition the phial in same position as removed.
6. Re-connect push on connector. The VIOLET/BLACK wire to 1 and BLACK (3) wire to P, See Fig. 33A.

NOTE: Ensure phials do not make contact with oven sides.

To complete follow instructions in section RE-ASSEMBLE, Steps 1 to 6.

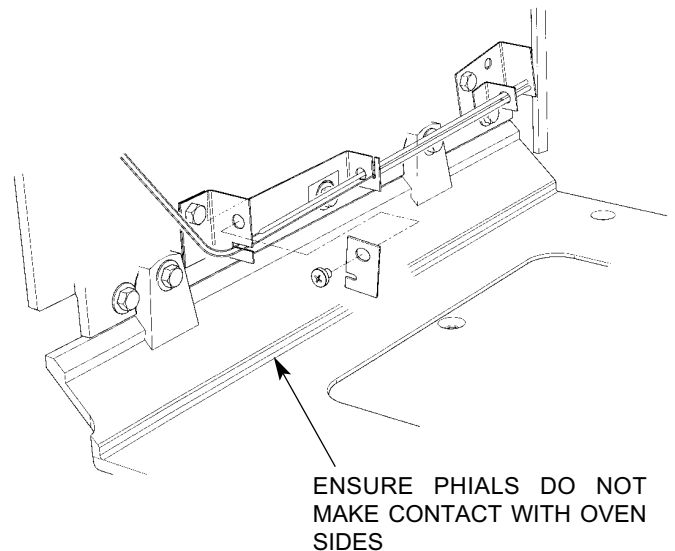


Fig. 33

DESN 515639

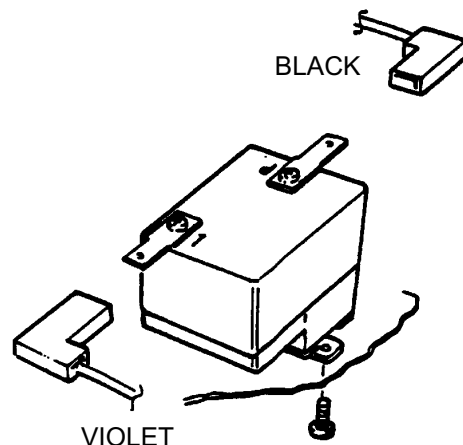


Fig. 33A

DESN 510546 A

Replacement of parts (Electrical controls)

TO FIT NEW PROGRAMMER

SEE FIG. 34

Follow instructions in section ELECTRICAL COMPONENT ACCESS, Steps 1 to 4.

1. Slacken two screws at bottom of programmer.
2. Pull the bottom of the programmer forward and lift.
3. Replace with new programmer clip onto the hinges at the top. Press bottom into place. Tighten two securing screws.

To complete follow instructions in section RE-ASSEMBLE, Steps 3 to 6.

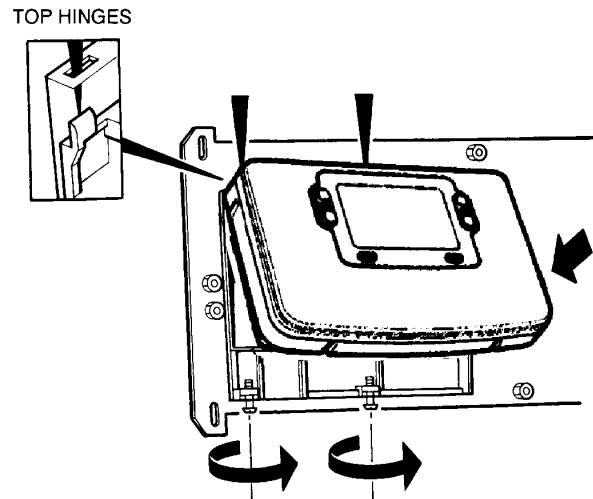


Fig. 34

DESN 511602 A

TO FIT NEW SELECTOR SWITCH

SEE FIG. 35

Follow instructions in section ELECTRICAL COMPONENT ACCESS, Steps 1 to 4.

1. To remove switch from the cover panel press the two toggles at top and bottom of switch, push switch through panel.
2. Push replacement switch into aperture and click into place. The switch should be fitted with terminal 1 at the top.

To complete follow instructions in section RE-ASSEMBLE, Steps 3 to 6.

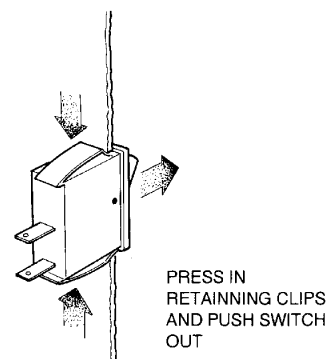


Fig. 35

DESN 510553 A

RE-ASSEMBLE

1. Locate thermostat phials into boiler pocket.
2. Locate the base of the control chassis into the bottom of the door way aperture, tilt the chassis backwards into position and secure with the four screws.
3. Thread the two wires for the selector switch through the aperture and connect them onto the rear of the selector switch fitted in the outer panel. Connect the ORANGE wire on 1 and the PURPLE wire on 2.
4. Refix the outer panel in position and secure with the 2 screws.
5. Replace the thermostat knobs.
6. Replace the controls door.

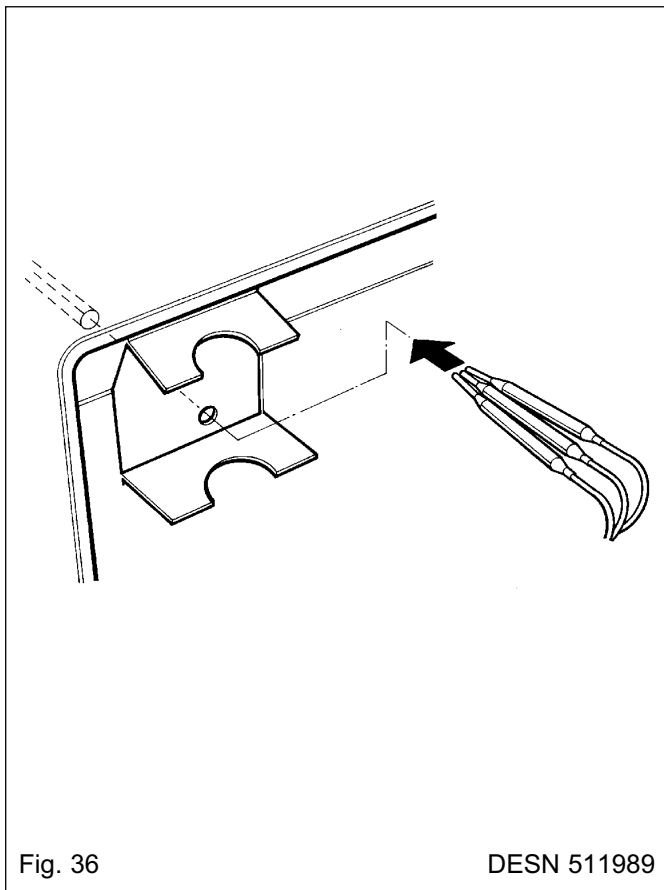


Fig. 36

DESN 511989

Electrical Controls

PUMP OVERRUN FACILITY

When the programmer switches off the BOILER channel then the water circulating pump will be switched off. If during the period shortly after this the residual heat in the appliance causes the water temperature in the boiler to rise above 65°C then the pump overrun thermostat will change over. This will switch on the circulating pump.

OVERHEAT SAFETY THERMOSTATS

BOILER

This thermostat is a safety cut-out device which is intended to operate if the other controls fail. This control will “lock-out” and switches everything off except for the programmer clock and the “Pump Overrun” facility.

This thermostat has to be manually reset once the temperature has cooled down.

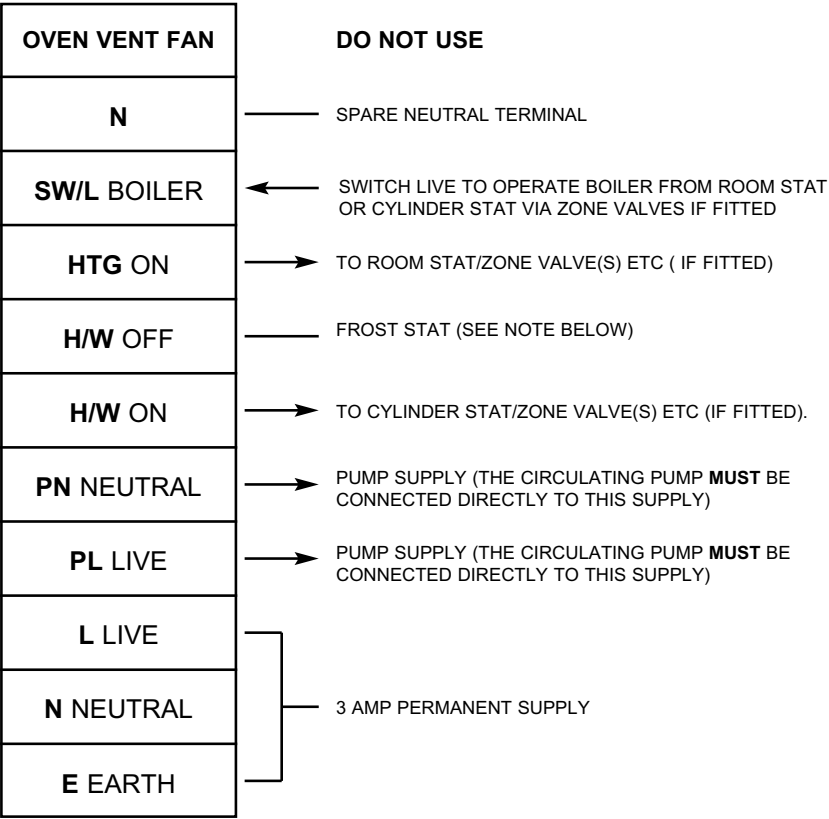
COOKER

This thermostat is a safety cut-out device which operates if the oven control thermostat fails.

This thermostat automatically resets once the temperature has cooled down.

CONTROL CIRCUIT-EXTERNAL

TERMINAL STRIP CONNECTIONS



NOTE:

If no Hot Water System Controls are used a link **MUST** be fitted between **H/W ON** and **SW/L BOILER**.

If no Central Heating System Controls are used a link **MUST** be fitted between **HTG ON** and **SW/L BOILER**.

If a Frost Thermostat is fitted it **MUST** be connected to **SW/L BOILER** and **H/W OFF**.

CONTROL CIRCUIT-BOILER

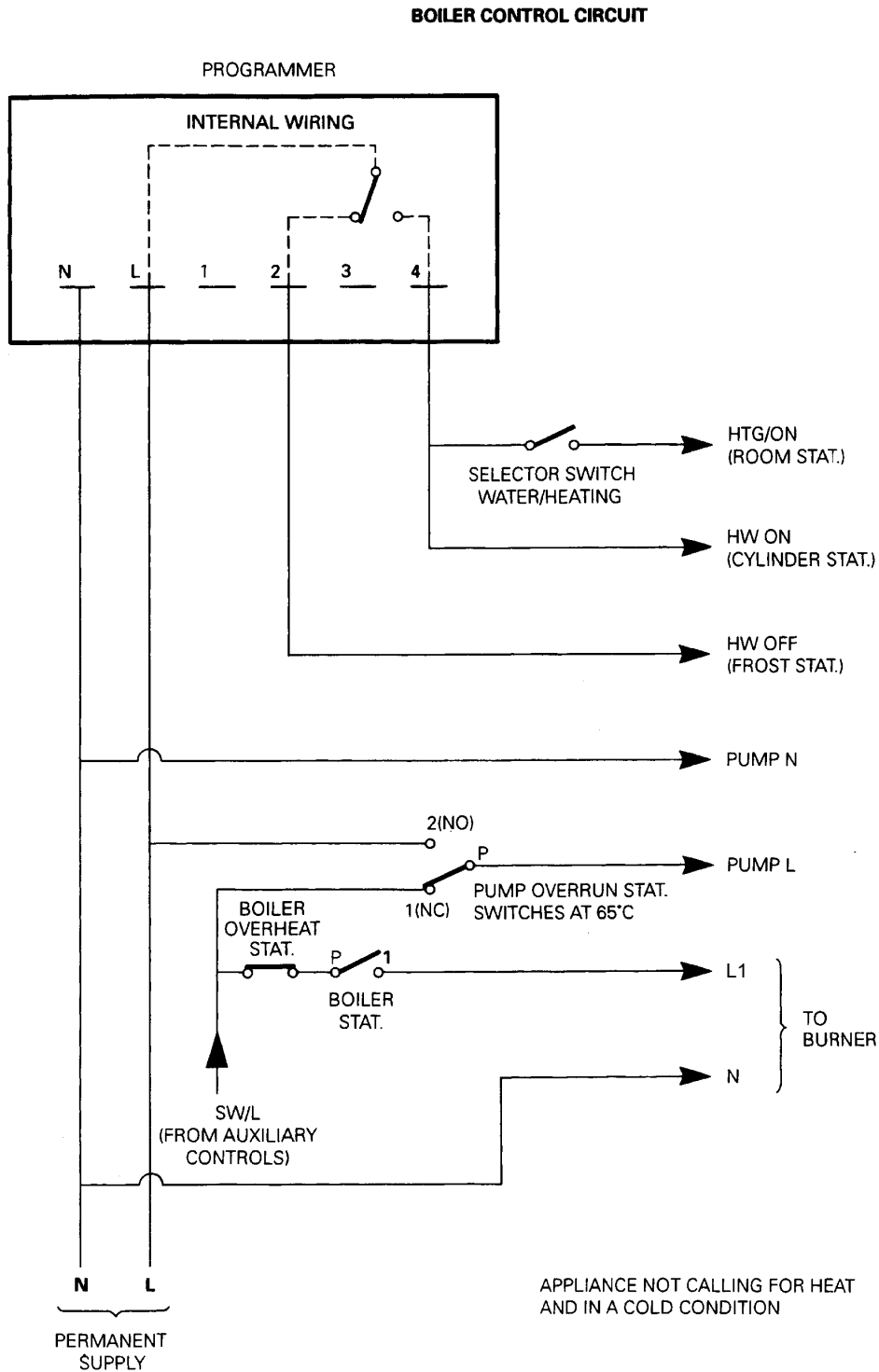


Fig. 37

CONTROL CIRCUIT-COOKER

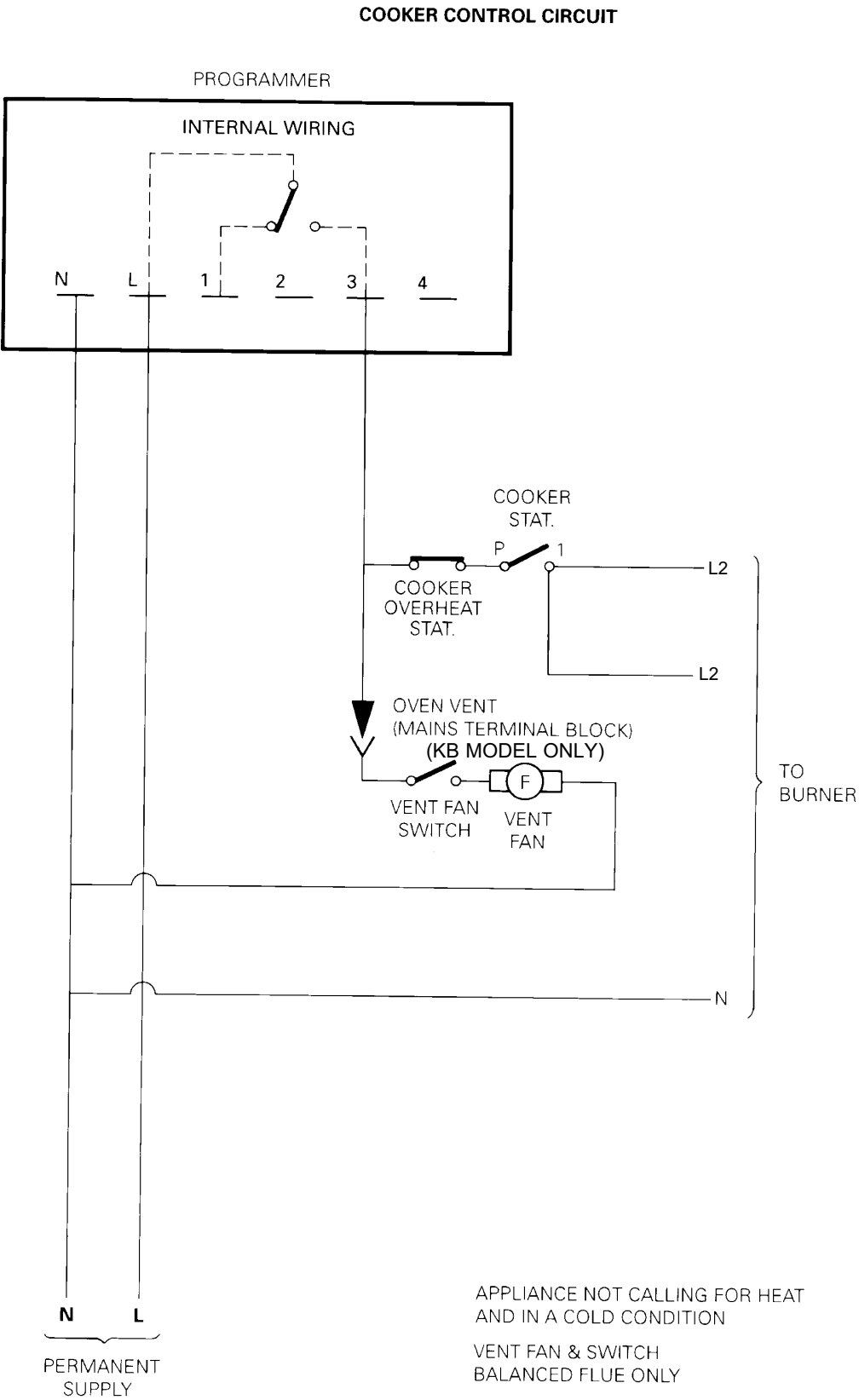


Fig. 38

Fault Finding

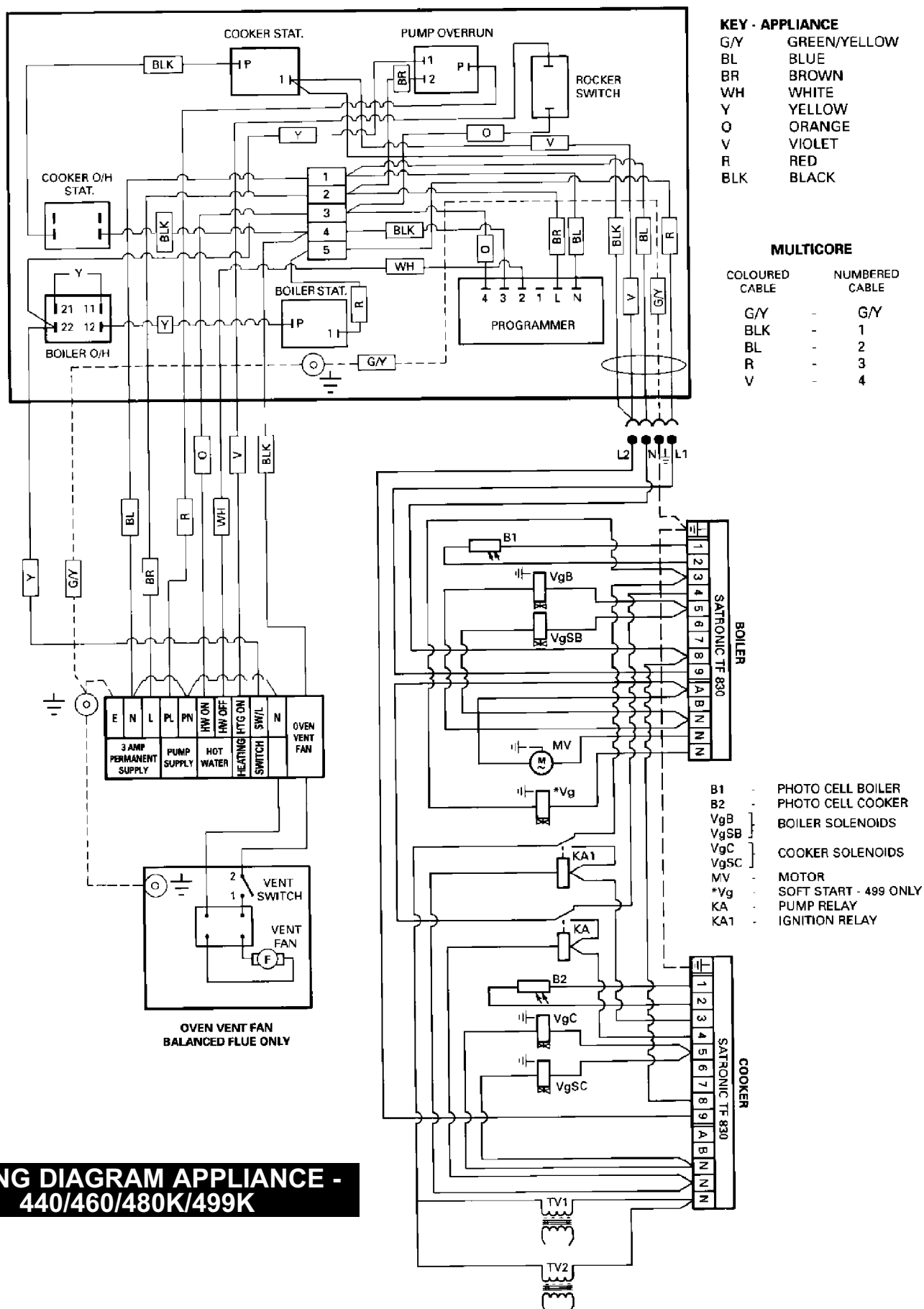


Fig. 39

BURNER DOES NOT START**Burners**

Check that the burners have not gone to lock-out.

Causes of lock-out can be:-

- No ignition, ignition electrode incorrectly positioned, insulation cracked, spark generator fault.
- No oil supply.
- Poor combustion.
- Photo electric cell incorrectly positioned, cracked or needs cleaning.
- Live and Neutral connections reversed.
- Faulty control box.
- Faulty fire valve.
- Faulty relays.

REFER TO FLOW DIAGRAM FOR ELIMINATION PROCEDURE.

General

You can carry out some checks on the controls before you need to access the controls compartment behind the control door.

If only one of the burners is not running then the fault must be after the safety overheat thermostat.

Conversely if both burners are affected then the fault lies before the programmer connections.

For access to individual controls refer to section Replacement Parts and for wiring continuity checks refer to Figs. 37, 38 and 39 for detailed and schematic wiring diagrams.

To check out the electrical wiring at the burners you will first have to access the burner chamber. Use the following procedure:-

1. Isolate the electrical power supply.
2. Open up the bottom burner access door. Remove door and put in a safe place.
3. Unscrew the 4 screws holding the inner panel in place and remove panel.
4. Unscrew the 3 screws holding the louvered plinth in place and remove plinth.

The external mains connections are made to a terminal block situated in the front left-hand corner of the burner chamber. Re-connect the electrical supply and check that there is 230V power supply available across the mains input connection L & N on the terminal block, if not then check connecting leads, fuses and whether power is available at mains plug.

If power is available across L & N then check to see whether the overheat cut-out switch has cut-out., if it has been reset by pushing the centre with a small round tool (i.e. a pencil). Check for continuity across the cooker overheat thermostat.

Fault Finding

Cooker Burner (Control Box Type - DKO 970)

Information system

The information system communicates with the outside world using a LED (the used Flash-Code is similar to the Morse Code). The messages are optically transmitted by flashing appropriately a LED. Using an (optional) additional terminal the messages can be recorded and displayed in easily readable form.

Programming sequence display

The built-in microprocessor controls not only the programming sequence but the information system too. The individual phases of the programming sequence are displayed as Flash-Code.

The following messages can be distinguished:-

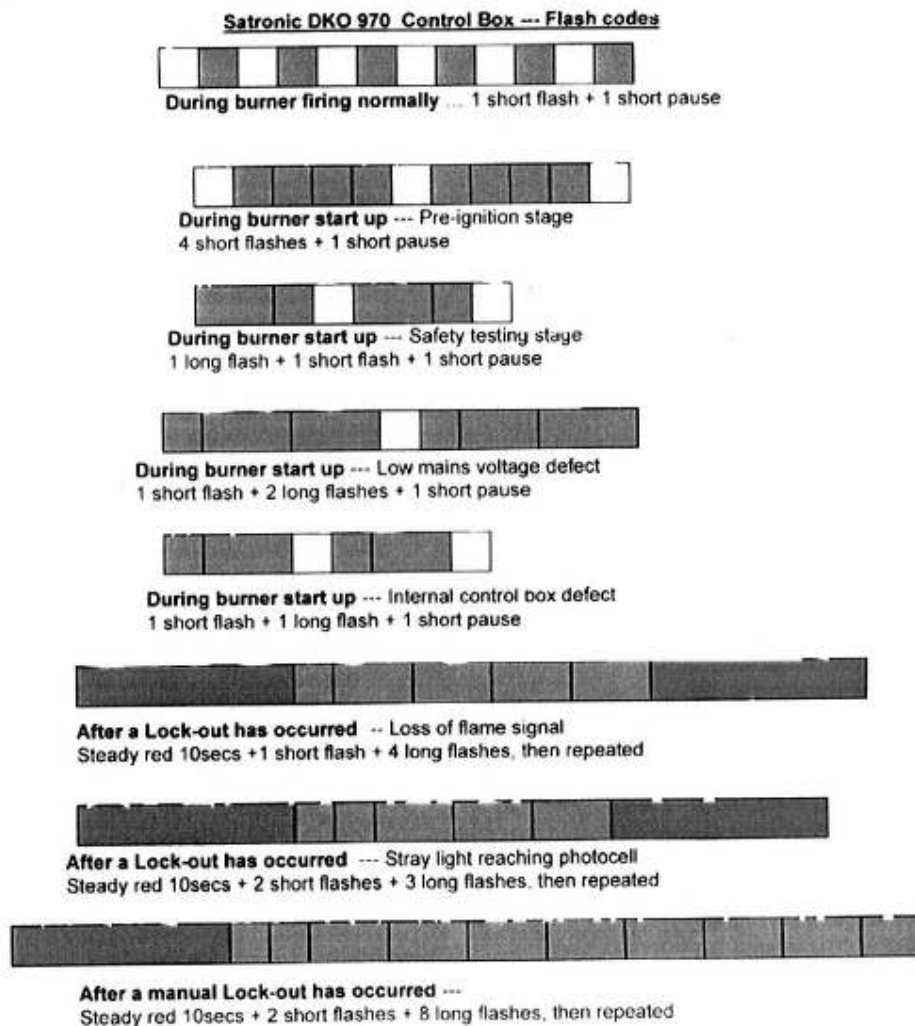
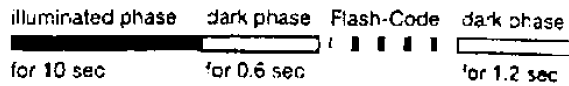


Fig. 40

Cooker Burner (Control Box Type - DKO 970)

In case of failure the LED is permanently illuminated. Every 10 seconds the illumination is interrupted by a flash code which indicates the cause of the error. Therefore the following sequence is performed which is repeated as long as the unit is not reset.

Sequence:



Error diagnosis

Error message	Flash-Code	Possible fault
lockout	1 1 1 1 1	within lock out safety time no flame establishment
stray light	1 1 1 1 1	stray light during monitored phase, detector may be faulty

Flash-Code for manual lock out

manual/external	1 1 1 1 1 1 1 1 1 1
lock out	
(see also 3. lock out and reset)	

Stray Light Monitoring

The stray light check is performed at the end of the pre-purge timer for the duration as mentioned in the table of timings.

Low-voltage protection

at 220 / 240V (110 / 120V) nominal usage

The mains voltage has to be more than 187V_{eff} (94V_{eff}) in order to allow the unit to perform a start-up.

The mains voltage is not only mentioned in the start-up phase but also permanently during operation. If the voltage drops below <160V_{eff} (80V_{eff}) during start-up or run time the control box goes into lock-out mode. If the voltage rises again, the control box performs automatically a start-up as soon as the mains voltage is >187V_{eff} (94V_{eff}).

Table of timings (sec.)

Model	Pre-purge and pre-ignition time tv1	stray light monitoring tf	safety time ts	post-ignition time after V1 tn	delay time to V2 DKO 972 only tv2
05	15	5	5	7	20

Cooker Burner (Control Box Type DKO 970N) - Information system

The information system is microprocessor based and reports on all aspects of burner control box operation and flame supervision. It informs continuously about the actual programming sequence the unit is just performing. Besides monitoring of the programming sequence it also allows to identify errors during start-up of operation without any additional testing devices. The automatically performed diagnoses is a valuable tool which facilitates service/maintenance work and therefore saves costs. The analyses of the error cause can be done directly on stage or if not possible afterwards at the lockout reason is stored in a non-volatile lock out mode memory.

The information system communicates with the outside world using a LED (the used Flash-Code is similar to the Morse-Code). The messages are optically transmitted by flashing appropriately a LED. Using an (optional) additional terminal the messages can be recorded and displayed in easy readable form.

Programming sequence display

The built-in microprocessor controls not only the programming sequence but the information system too. The individual phases of the programming sequence are displayed as Flash-Code.

The following messages can be distinguished:

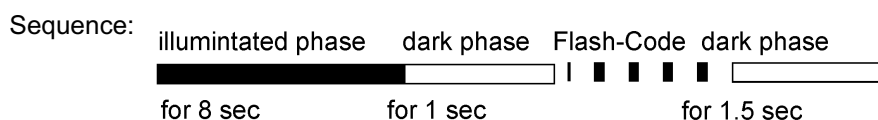
Message	Flash-Code
start	
burner in operation (from end of safety time)	
stop	■ ■
Description	
= short pulse	
■ = long pulse	

Fig. 41

DESN 516837

Lock-out diagnoses

In case of failure the LED is permanently illuminated. Every 10 seconds the illumination is interrupted by a flash code, which indicates the cause of the error. Therefore the following sequence is performed which is repeated as long as the unit is not reset.



Blinking Codes: See Fig. 41A

Stray Light Monitoring

The stray light check is performed at the end of the pre-purge time for the duration as mentioned in the table of timings

Table of timings (sec.)

Model	Pre-purge and pre-ignition time tv1	stray light monitoring tf	safety time ts	post-ignition time after v1 tn	delay time to V2 DKO 972-N-only tv2
05	15	5	5	7	20

Blinkcode Dxx-N

1 Normal Operation

● —	Idle state, no heat demand
● — —	Power supply not ok (frequency or voltage)
● ● —	Start delay (cooling down ignition device, RT is on)
● ●	Waiting for FT-on, LW-off, LK-open
● ● ●	Burner is starting
●	Burner is in operation (from end of safety time)
● ● — —	Burner is stopping (e.g. in post-purge)

Code is sent every 5 s; in between the LED is off

2 Special Codes (no lock-out)

● ● ● ● ● ●	Device in Status „Parameter-Download“
● ● ● — — —	Parameter set for test; device will start only after release with serial communication
— — — — — —	“End of Life” warning

Code is sent every 5 s; in between the LED is off

3 Burner lock-out

— ●	False flame
● —	No flame at end of the safety time
● ● —	Flame failure in operation
— ● ●	Flame present after the end of operation phase
● ● ● —	No flame signal during ignition spark supervision
— ● ● ●	Two flame sensors connected
● — —	Air pressure switch (LW) opened during supervised phase
— — ●	Air pressure switch (LW) didn't close
● — — —	Air pressure switch (LW) didn't open
● ● — —	Oil pre-heater release temperature couldn't be reached (FT didn't close)
— — ● ●	Oil temperature below threshold during supervised phase (FT opened)
— — — —	Manual lock-out
● ● ● ●	Unknown error code

Code is sent every 10 s; in between the LED is always on

4 Special Codes (lock-out)

— — — — —	„End of Life“ lock-out
XXXXXX	Other 6-pulse code indicates system lock-out (internal failure)

Code is sent every 10 s; in between the LED is always on

Legend: flashlight signal — long (½ s) ● short (0.1 s)
RT: heat demand
FT: pre-heater release thermostat
LW: air proving switch
LK: air damper

Fault Finding

FAULT FINDING (BOILER)

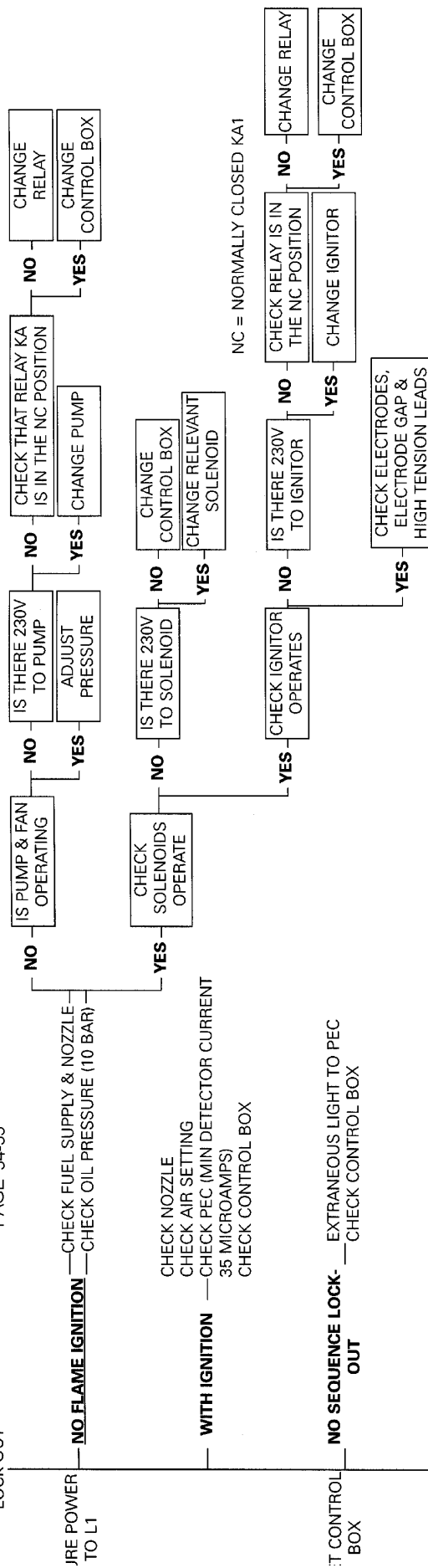
IS THERE 230V TO THE APPLIANCE

TESTING:

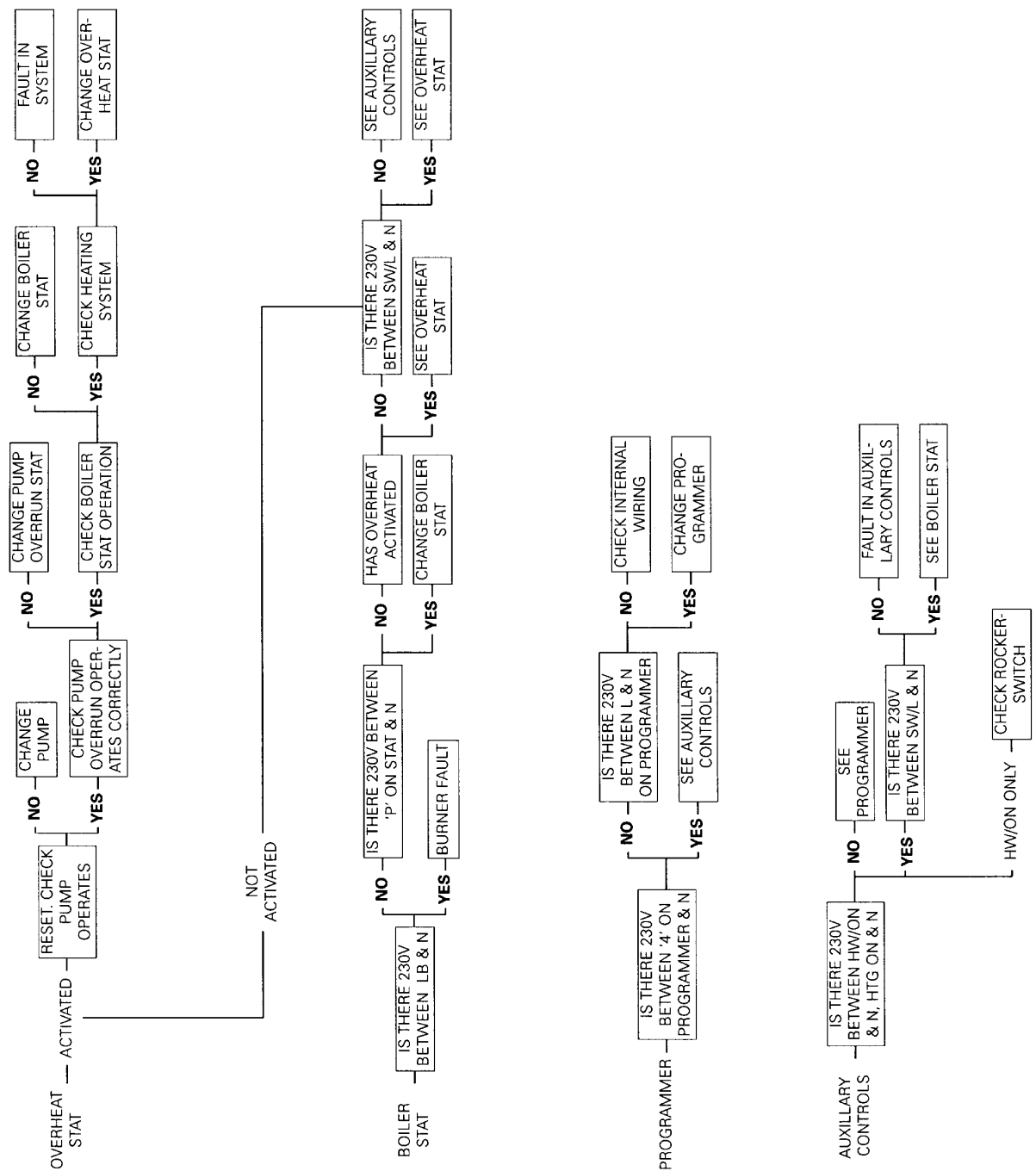
POWER SUPPLIED
PROGRAMMER BOILER SLIDER SET TO 'CONT';
BOILER STAT SET TO MAX.
AUXILIARY CONTROLS CALLING FOR HEAT

BURNER NOT OPERATING

CONTROL BOX GONE TO LOCK-OUT — SEE INFORMATION SYSTEM
PAGE 34-35



NOTE: ON 499K & KB ONLY Vg IS A SOFT START SOLENOID FOR THE BOILER - FAILURE OF THIS COMPONENT CAUSES THE BOILER TO START UP NOISY.

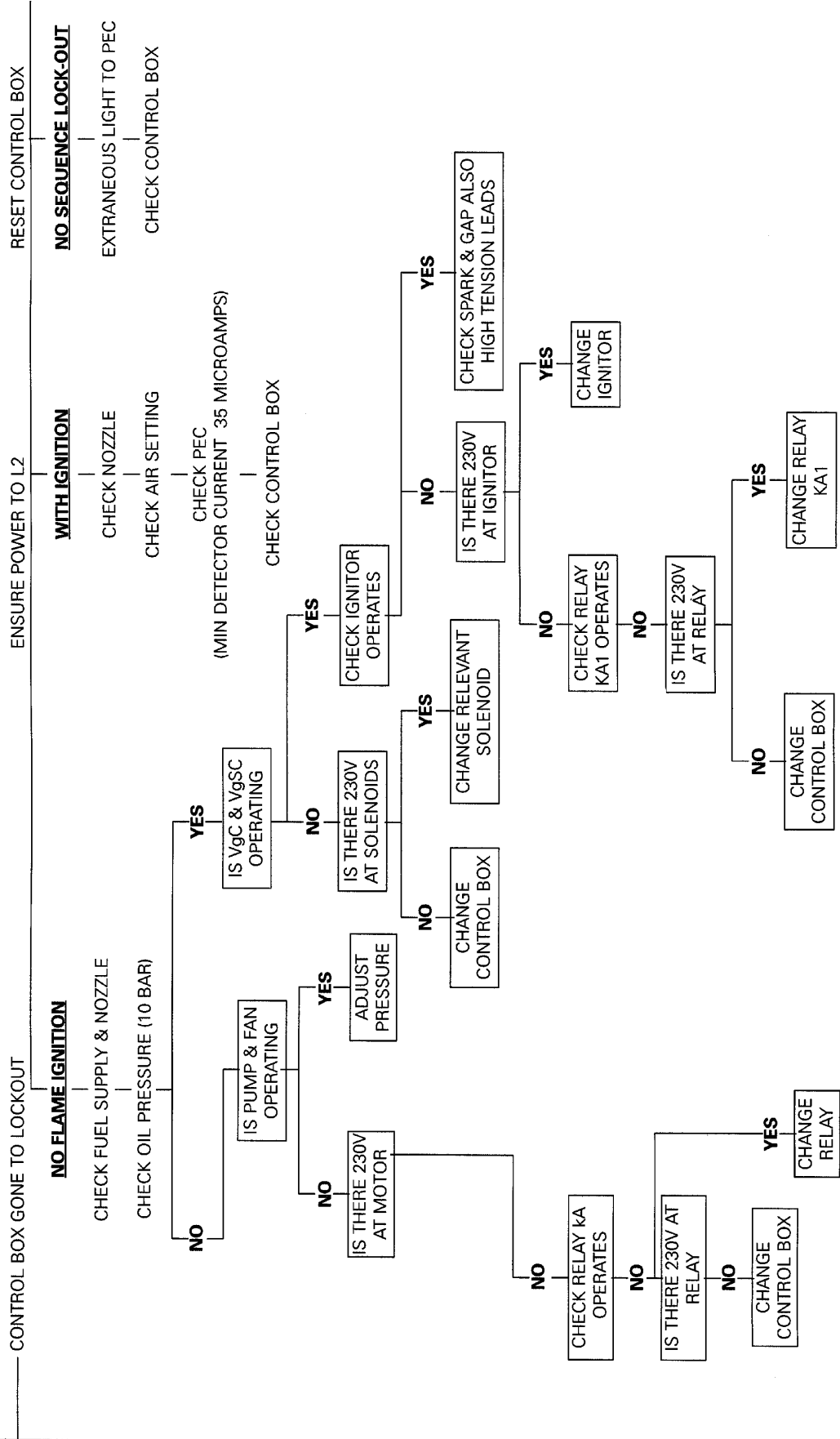


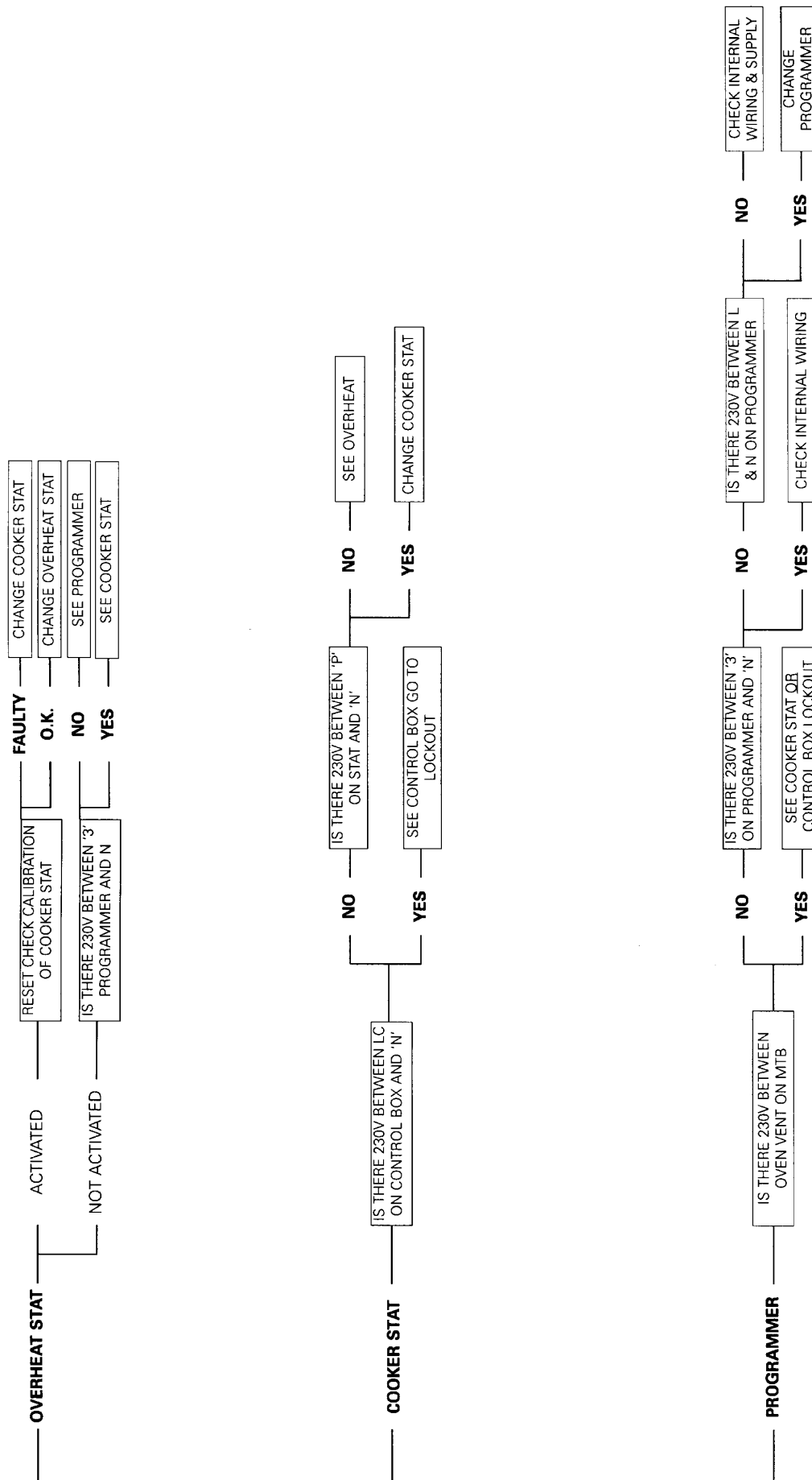
Fault Finding

FAULT FINDING - COOKER

TESTING: POWER ON
PROGRAMMER COOKER SET TO 'CONT'
COOKER STAT SET TO MAX

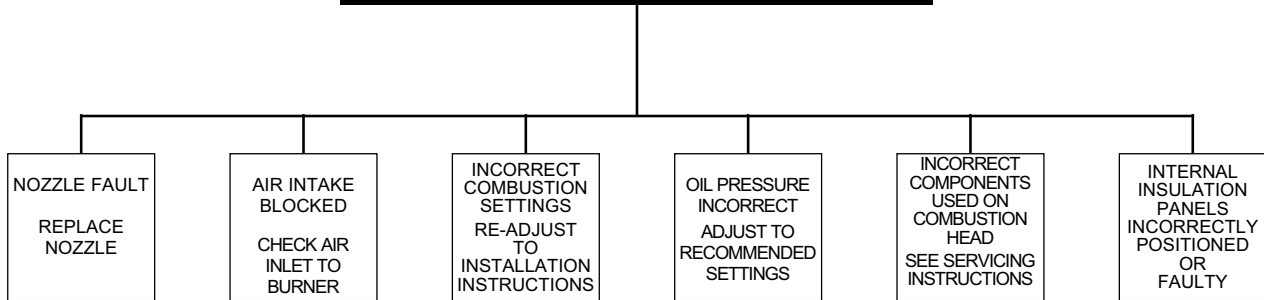
COOKER BURNER NOT OPERATING — SEE INFORMATION SYSTEM
PAGE 34-35



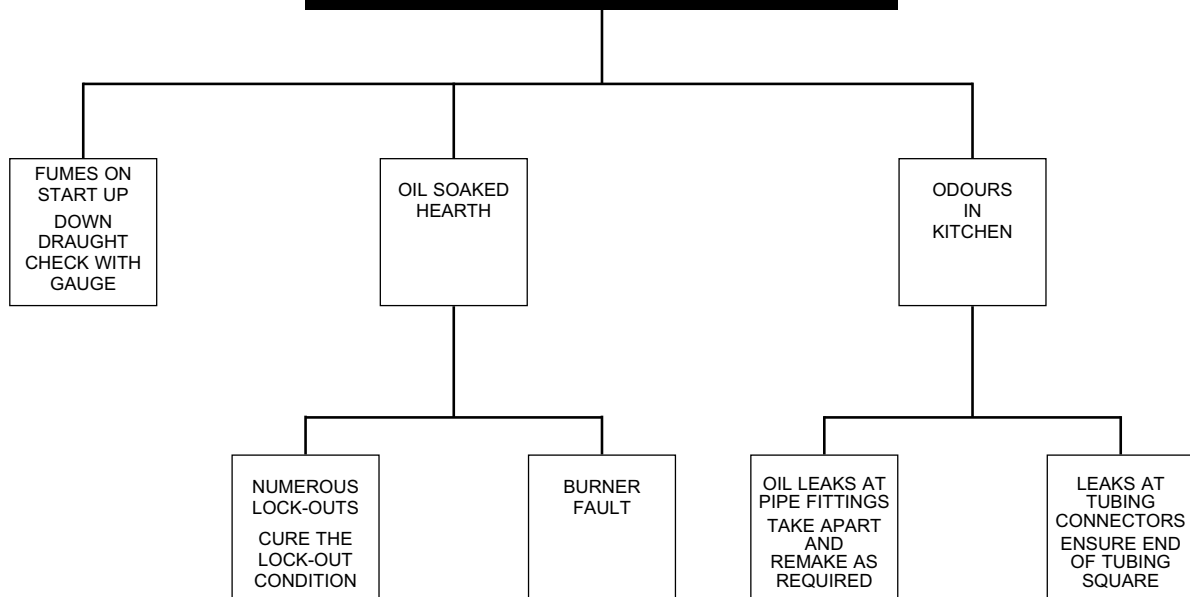


Fault Finding

HIGH SMOKE NUMBERS



OIL SMELLS



For further advice or information contact your
local distributor/stockist

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