SEPTEMBER, 1975

VULCAN OIL HEATING

SERVICE INSTRUCTIONS

10 SERIES HEATERS

(INCLUDES 'BURWOOD')

Models

10-01 10-02 10-04 10-05
10-08 10-09 10-49 10-50

1968 – 1975

10 SERIES OIL HEATERS

INDEX

TO BREAKDOWN HEATER INTO MAJOR COMPONENTS

10 SERIES

BREAKDOWN A

To remove front assembly –

1. Remove door cover by lifting and pulling forward. [Fig. 1]

2. Remove two screws holding lower panel, tilt panel forward, remove screw holding neon light, earthwire push-on connector at electrics bracket. Lift panel out. [Fig. 2]

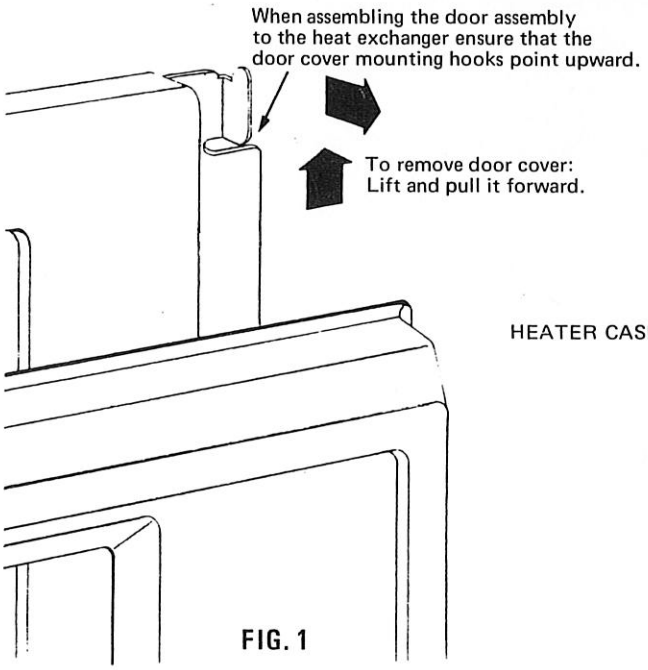
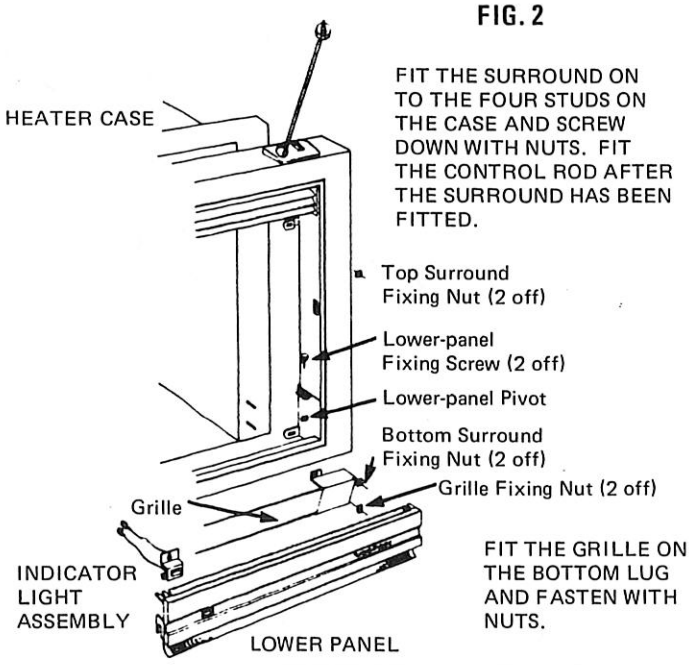


FIG. 1

FIG. 2



3. Remove oil and air control shaft. Turn air control to number 2 position. Depress draught rod retainer and pull control rod out. It may be necessary to twist shaft assembly to get through top air guide. [Fig. 3]

MAKE ABSOLUTELY SURE HEATER IS DISCONNECTED FROM POWER BEFORE REMOVING OR REPLACING ANY COMPONENTS

BREAKDOWN A (cont.)

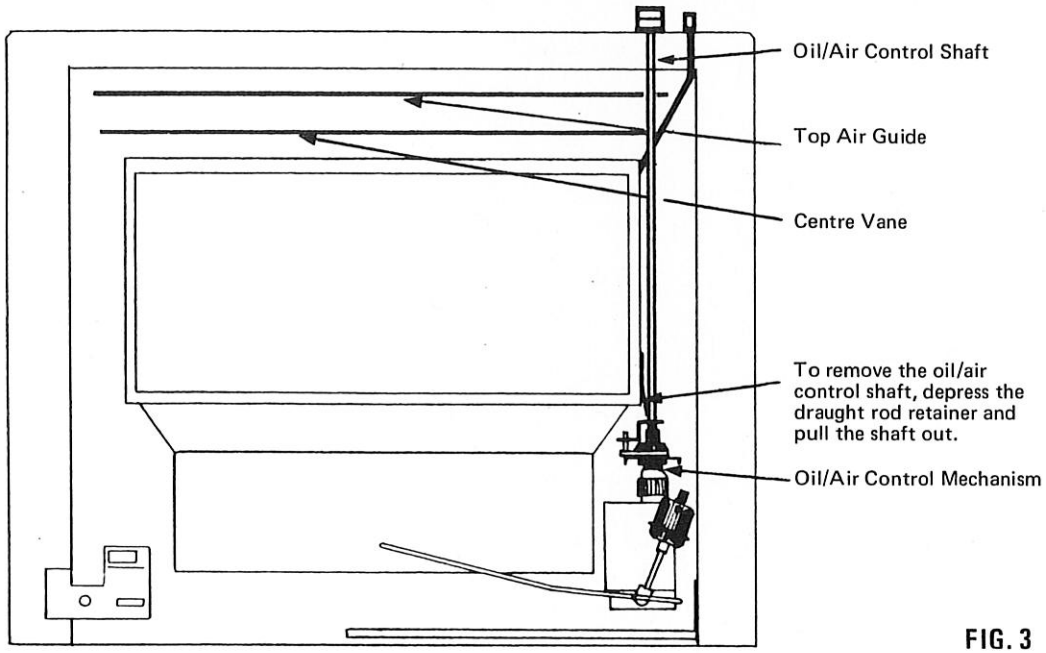


FIG. 3

4. Remove four nuts holding front frame assembly and pull forward until it clears studs, then lift up to clear reset button. [Fig. 2]

5. To remove bottom grille undo two nuts and pull forward. [Fig. 2]

BREAKDOWN B

To remove burner –

1. Remove door cover and lower panel. Steps 1 and 2, Breakdown A.

2. Remove door. Undo six large retaining nuts and pull off.

MAKE ABSOLUTELY SURE HEATER IS DISCONNECTED FROM POWER BEFORE REMOVING OR REPLACING ANY COMPONENTS

BREAKDOWN B (cont.)

3. Remove radiants. Lift to clear bottom support, tilt and bring out between bottom and top support bars. [Fig. 9]

   NOTE: Radiants are fragile and must be handled with extreme care.

4. Undo two screws and remove burner heat shield. [Fig. 4]

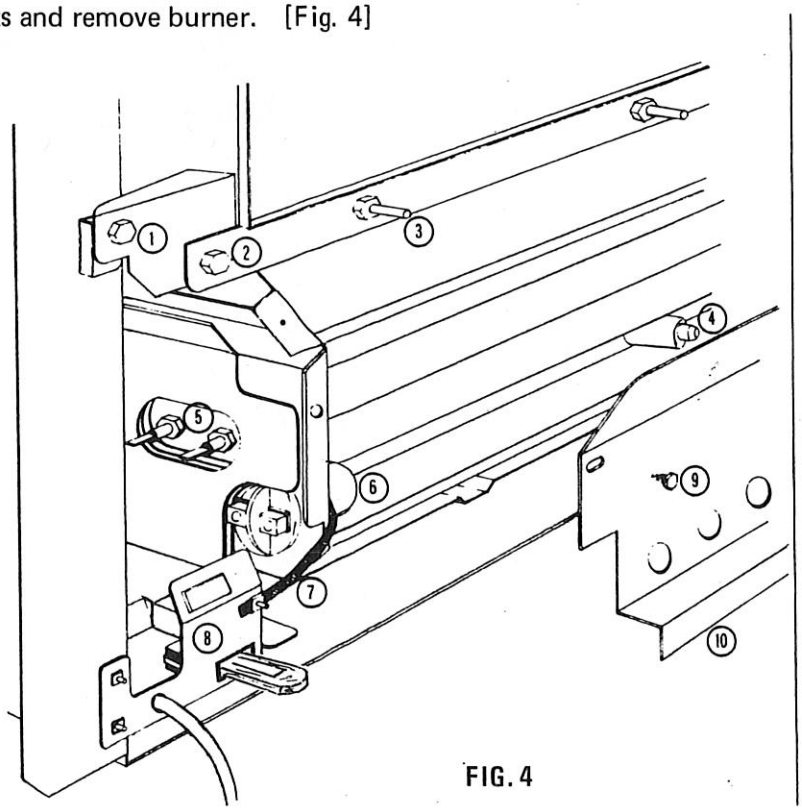
5. Loosen clamp screw and slide thermal switch out of clamp and clear of burner. [Fig. 4]

6. Remove wires from element. (Two push-on terminals)

7. Undo nut and remove earth braid. [Fig. 4]

8. Fold a piece of cloth and place under burner inlet connection. Undo burner inlet pipe nut, bend pipe down to clear bottom of burner. Take care to support the pipe near the valve so as not to loosen union at valve connection.
   (Note – This is the most common cause of oil odours after servicing.)

9. Remove burner fixing bolts and remove burner. [Fig. 4]



① Heat exchanger assembly fixing bolt (2 off)
② Burner assembly fixing bolt (2 off)
③ Door assembly fixing stud (6 off)
④ Oil input union
⑤ Ignition element
⑥ Thermal ('Otter') switch
⑦ Monel earth braid – to burner assembly
⑧ Terminal bracket assembly
⑨ Burner heat shield fixing screw (2 off)
⑩ Burner heat shield

FIG. 4

MAKE ABSOLUTELY SURE HEATER IS DISCONNECTED FROM POWER BEFORE REMOVING OR REPLACING ANY COMPONENTS

BREAKDOWN C

To remove blower assembly –

1. Remove burner as per Breakdown B.
2. Disconnect electrical connections by removing plug and earthwire.
3. Disconnect blower from mounting springs and remove through front of heater.

BREAKDOWN D

To remove valve assembly –

Isolate heater from power supply.

1. Turn off oil at tank valve.
2. Remove door cover and lower panel, steps 1 and 2, Breakdown A.
3. Remove burner heat shield and disconnect burner inlet pipe, steps 4 and 8, Breakdown B.
4. Undo oil feed pipe at filter. Use two spanners to avoid damage to filter. Drain some oil from valve into container at burner inlet position by turning valve to high fire position. This lowers the oil level in valve and helps to avoid spillage when removing.
5. Undo retaining screw at front of valve.
6. Pull valve forward until brass discs disengage from slots, lower until nylon tab is free of valve control knob and remove valve from heater. [Fig. 5]

   Valve should be kept upright so that oil does not spill from overflow hole.

MAKE ABSOLUTELY SURE HEATER IS DISCONNECTED FROM POWER BEFORE REMOVING OR REPLACING ANY COMPONENTS

BREAKDOWN D (cont.)

FITTING THE OIL/AIR CONTROL SHAFT

Fit the ball of the oil rod ① in the socket ③ , at the same time locating the connecting plate of the air tube ② on the pin ④ . The draught tube retainer ⑨ on the side of the heat exchanger must be depressed when fitting or removing the oil/air shaft.

To remove the valve disconnect oil pipes to it, unscrew the screw ⑤ and pull forward until the three brass discs ⑥ disengage from the slots. When replacing the valve see that the nylon tab of the controls engages the slot in the oil control knob. (Take care that engagement is not made 180° out of position.)

⑦ Oil filter.

⑧ Burner heat-shield fixing screw (2 off).

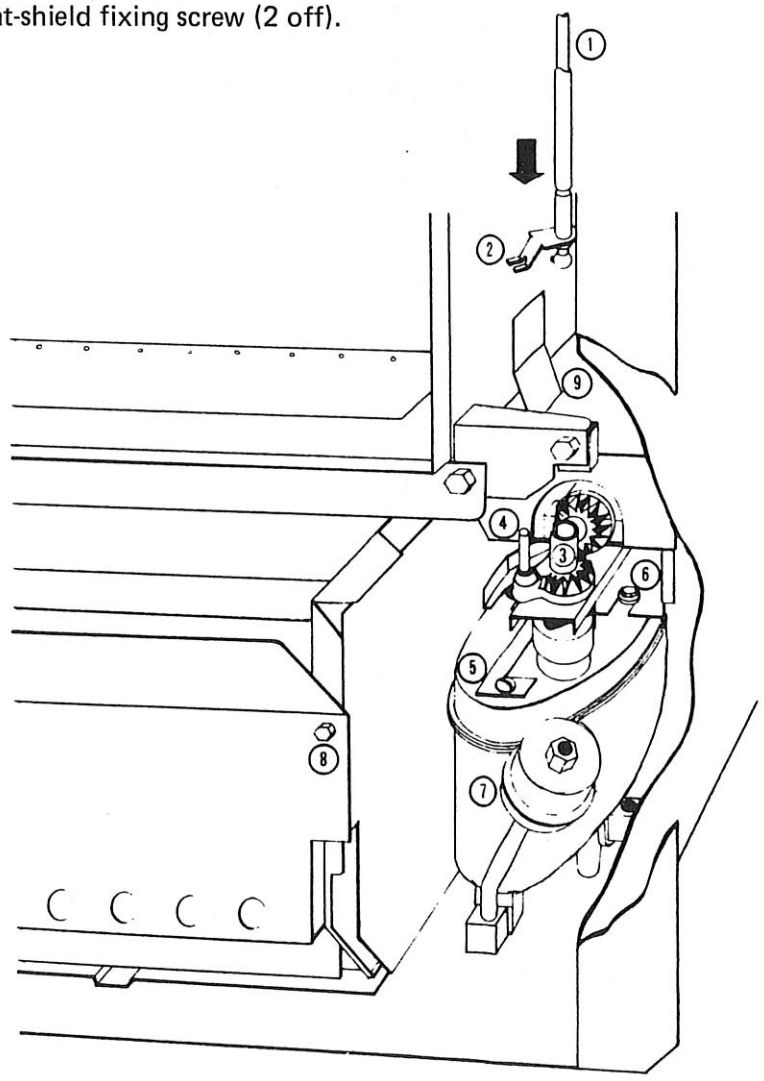


FIG. 5

MAKE ABSOLUTELY SURE HEATER IS DISCONNECTED FROM POWER BEFORE REMOVING OR REPLACING ANY COMPONENTS

BREAKDOWN E

To remove heat exchanger and combustion chamber assembly –

1. Dismantle unit as per Breakdowns A, B, C and D.
2. Remove top air guide by pushing back, lifting, then pulling out. [Fig. 6]
3. Remove centre vane by lifting it out of clips and pulling forward. [Fig. 6]

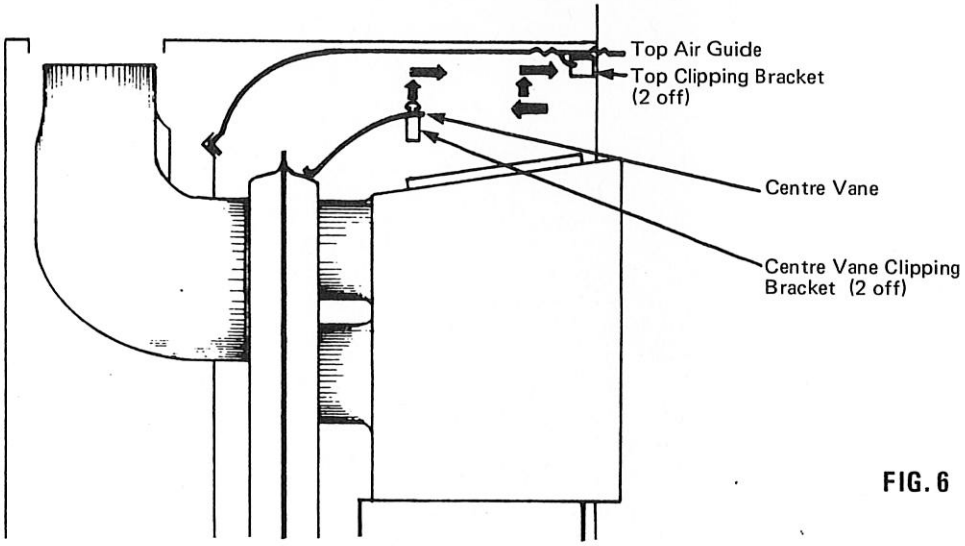


FIG. 6

4. Remove two screws from flue clamp, push clamp down on elbow.
5. Loosen terminal bracket assembly by undoing retaining nut and pulling forward.
   NOTE: If unit is direct wired it may be necessary to undo connections.

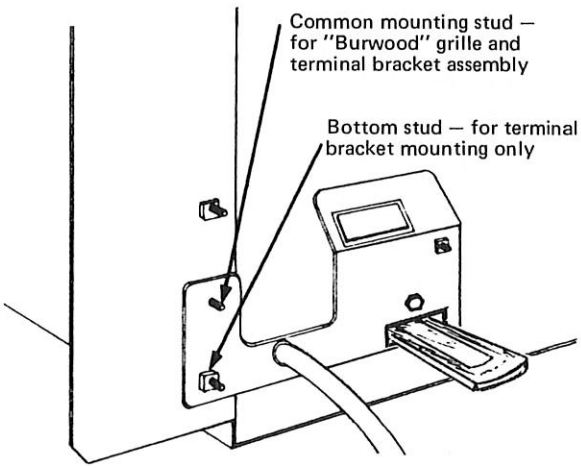


FIG. 7

MAKE ABSOLUTELY SURE HEATER IS DISCONNECTED FROM POWER BEFORE REMOVING OR REPLACING ANY COMPONENTS

BREAKDOWN E (cont.)

6. Remove blower assembly by supporting, removing springs. Disconnect plug-in power connector.

7. Remove heat exchanger retaining bolts, lift heat exchanger and pull out together with terminal bracket assembly. Place on end (micro switch up) to protect switch etc. from damage. If blower assembly has not been removed, be sure to support it.

FIG. 8

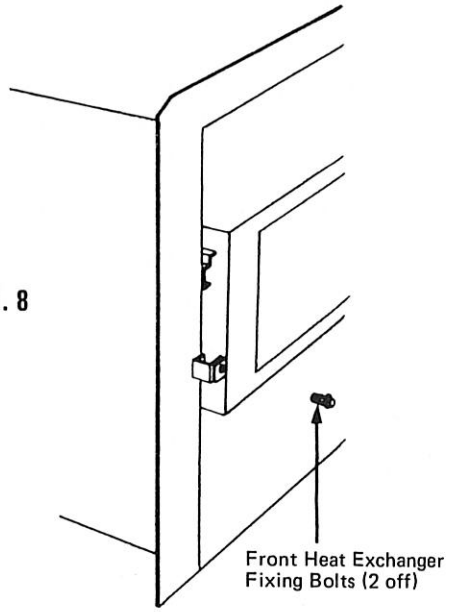
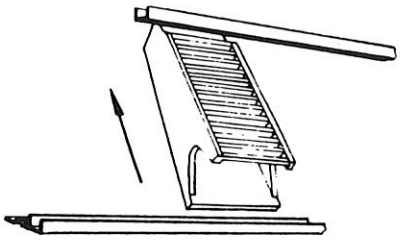
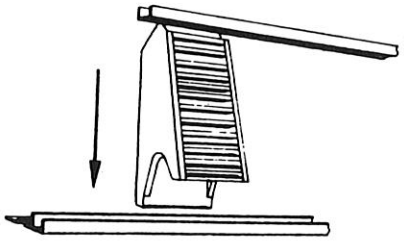


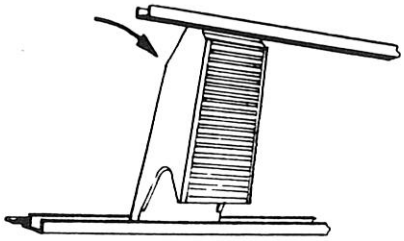
FIG. 9



Lift the radiant into the heat exchanger so that the top of the radiant is behind the radiant support bar.



Locate the leg of the radiant in the bottom channel.



Let the top of the radiant rest against the radiant support bar. After fitting, see that the five radiants are central.

MAKE ABSOLUTELY SURE HEATER IS DISCONNECTED FROM POWER BEFORE REMOVING OR REPLACING ANY COMPONENTS

BURNER SERVICE

DISMANTLING BURNER FOR SERVICE

A. TO REMOVE HEAT SHIELDS FROM BURNER :

1. Remove left hand end heat shield. (One screw at rear.)
2. Remove element cover by removing screw and lifting off.
3. Remove four screws (two at each end at top) and remove burner from heat shield right hand end first.

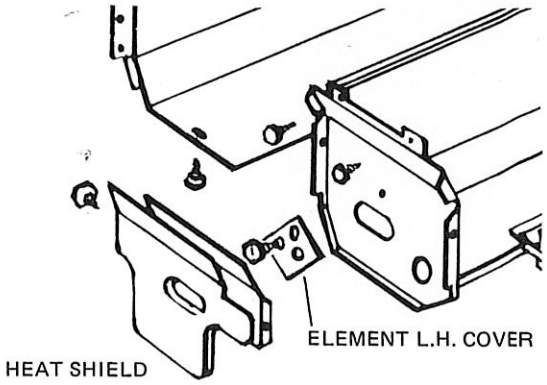


FIG. 10

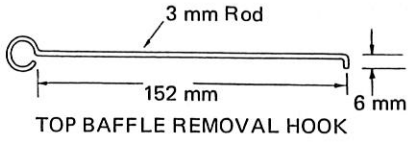
B. TO REMOVE END COVERS AND BAFFLES :

NOTE:
It is most important that baffles are not bent or distorted during removal or replacement.

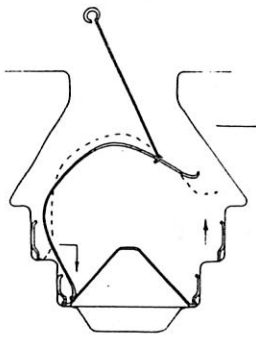
1. Remove end covers by placing hook through hole in top and pulling up. (See Fig. 11, Page 9)
2. Remove top baffle by sliding out of clip. Insert hook into a hole near centre of front side of baffle, lift slightly and push back edge of baffle until it drops down into space between bottom baffle and side of burner. Lift front side up and remove through top of burner.

MAKE ABSOLUTELY SURE HEATER IS DISCONNECTED FROM POWER BEFORE REMOVING OR REPLACING ANY COMPONENTS

B. TO REMOVE END COVERS AND BAFFLES (cont.)



TOP BAFFLE REMOVAL HOOK



Insert hook into a hole near the centre of front side of the top baffle.
Lift the front of the baffle and drop the back down into the space between the bottom baffle and the burner.
The baffle may then be lifted out of the burner.

FIG. 11

3. Remove bottom baffle by sliding out of clips, tilt and remove through top of burner.

C. TO REMOVE ELEMENT:

Undo two retaining nuts and remove element from inside burner.

NOTE CAREFULLY:
When handling elements the element electrical connections should be kept away from any fuel oil as the oil will enter insulation causing element to short out.
Before replacing element it should be checked for pitting of sheath or oil in insulation.
If sheath is pitted or insulation has turned brown, element should be replaced.

CLEAN BURNER

Remove all carbon from burner. Hard carbon can be loosened by a flat scraper and wire brush.
TAKE CARE THAT ALL AIR HOLES AND OIL INLET ARE FULLY CLEAR BUT DO NOT ENLARGE OR DISTORT THEM.
Check that baffle clamps have not been distorted.

REPLACE ELEMENT

When replacing element make sure that nuts are firmly tightened to prevent oil leaks.
Ensure that element is in correct position. The element should run parallel with burner bottom and parallel with burner sides.

MAKE ABSOLUTELY SURE HEATER IS DISCONNECTED FROM POWER BEFORE REMOVING OR REPLACING ANY COMPONENTS

REPLACE BAFFLES (ALSO CALLED REFLECTORS)

Before replacing baffles check widths.

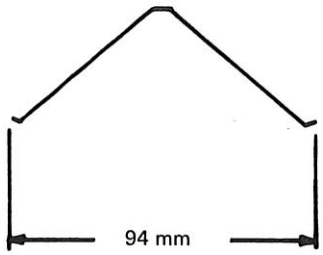
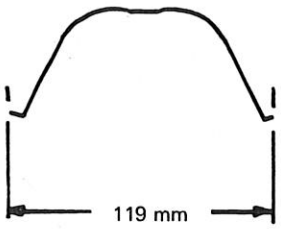


FIG. 12

DO NOT DISTORT BAFFLES BY SQUEEZING INWARDS.

FIG. 13



1. Drop bottom baffle into burner, so that its end is against right hand end of burner and front edge is under clamps. Push downwards and slightly forward, so that baffle springs past back clamp to shelf. Start baffle under clamps and push **gently** to the left with lever until baffle is up against stop on clamp. Do not use undue force.

2. Repeat with top baffle which is positioned against left hand end of burner, spring past clamp and slide under clamp to stop. Do not use undue force.

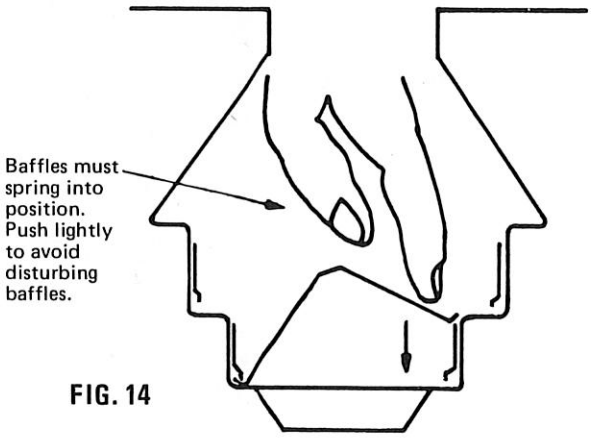


FIG. 14

NOTE:

When fitting baffles do not use excessive force. Baffles should slide firmly under clamps.

If they do not slide readily under clamps, remove and check clamps for distortion.

It is important that each baffle edge is held against its seat in the burner by clamps.

MAKE ABSOLUTELY SURE HEATER IS DISCONNECTED FROM POWER BEFORE REMOVING OR REPLACING ANY COMPONENTS

REPLACE BAFFLES (cont.)

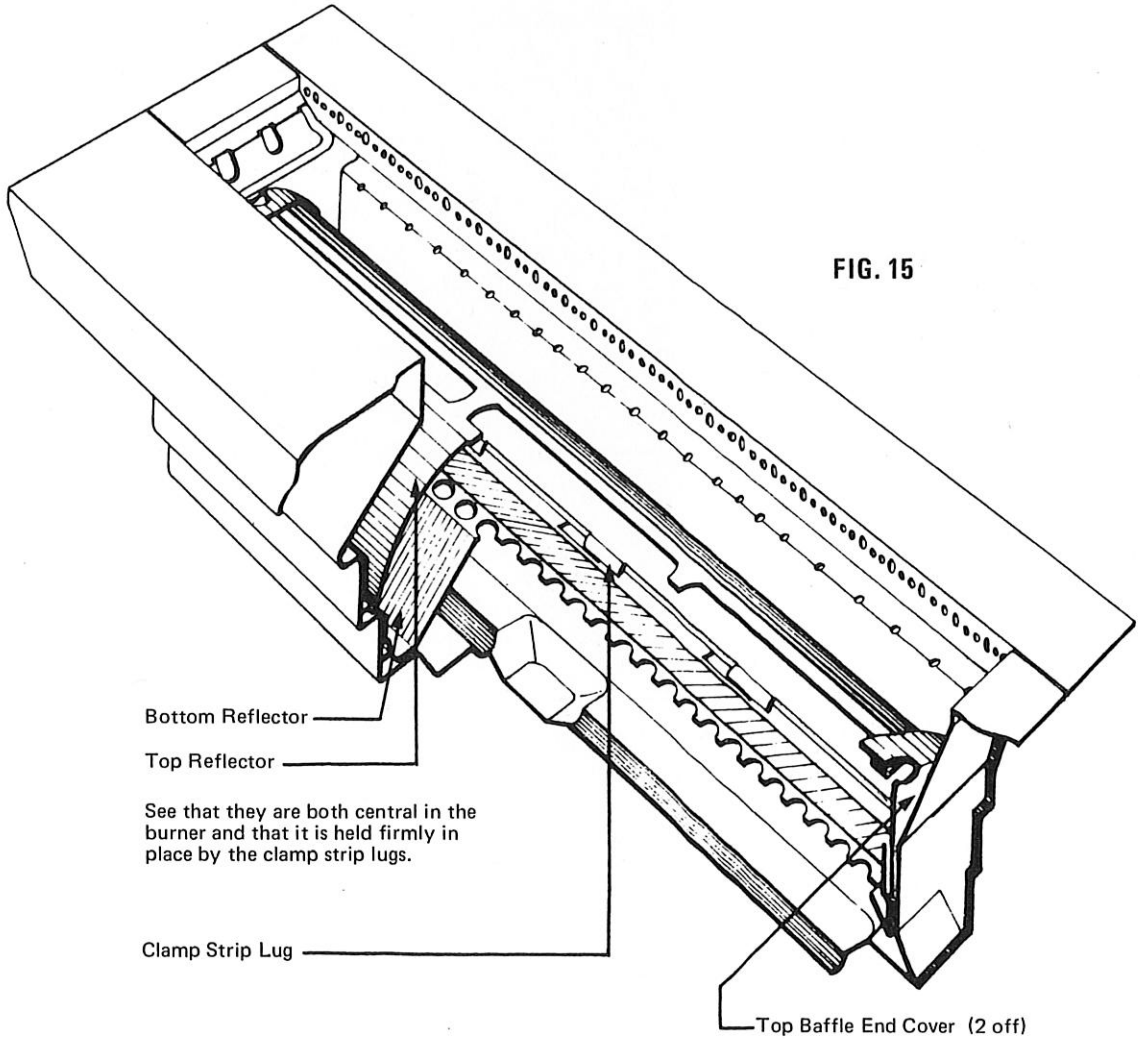


FIG. 15

3. Replace burner into burner box.

MAKE ABSOLUTELY SURE HEATER IS DISCONNECTED FROM POWER BEFORE REMOVING OR REPLACING ANY COMPONENTS

ELECTRICAL COMPONENTS

DESCRIPTION OF CURRENT FLOW

When the unit is switched on, current flows through the closed contacts of the on/off switch to the thermal cut-out switch, through the closed contacts (closed when switch is cool) of the cut-out switch to the flue element, through the flue element to ignition element, through ignition element to neutral connection at terminal block. The indicator light is connected between the cut-out switch and neutral connection at terminal block.

When the bottom of burner reaches operating temperature (approximately 11 minutes) the thermal cut-out switch contacts open, stopping current flow through circuit.

Fan circuit current flows from terminal block to two speed switch, through switch to three pin plug, through plug to motor, through motor windings back through three pin plug to neutral connection at terminal block.

CIRCUIT DIAGRAM – OIL HEATERS

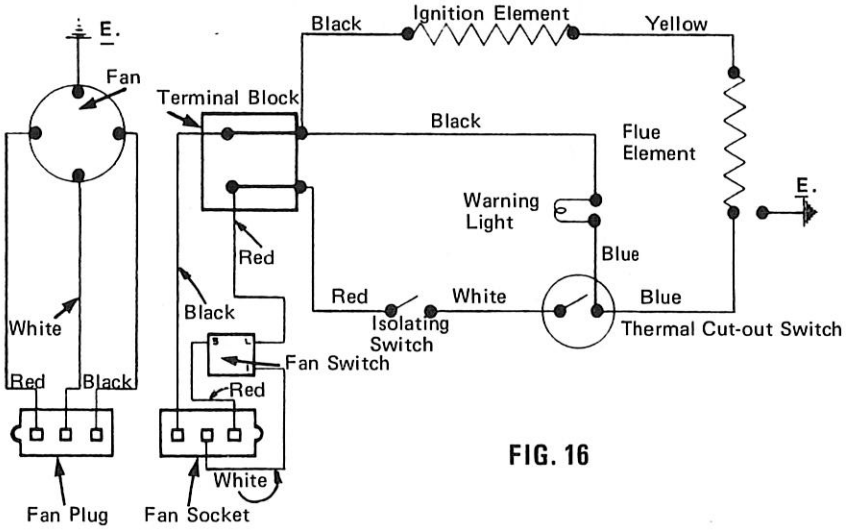


FIG. 16

MAKE ABSOLUTELY SURE HEATER IS DISCONNECTED FROM POWER BEFORE REMOVING OR REPLACING ANY COMPONENTS

IGNITION ELEMENT

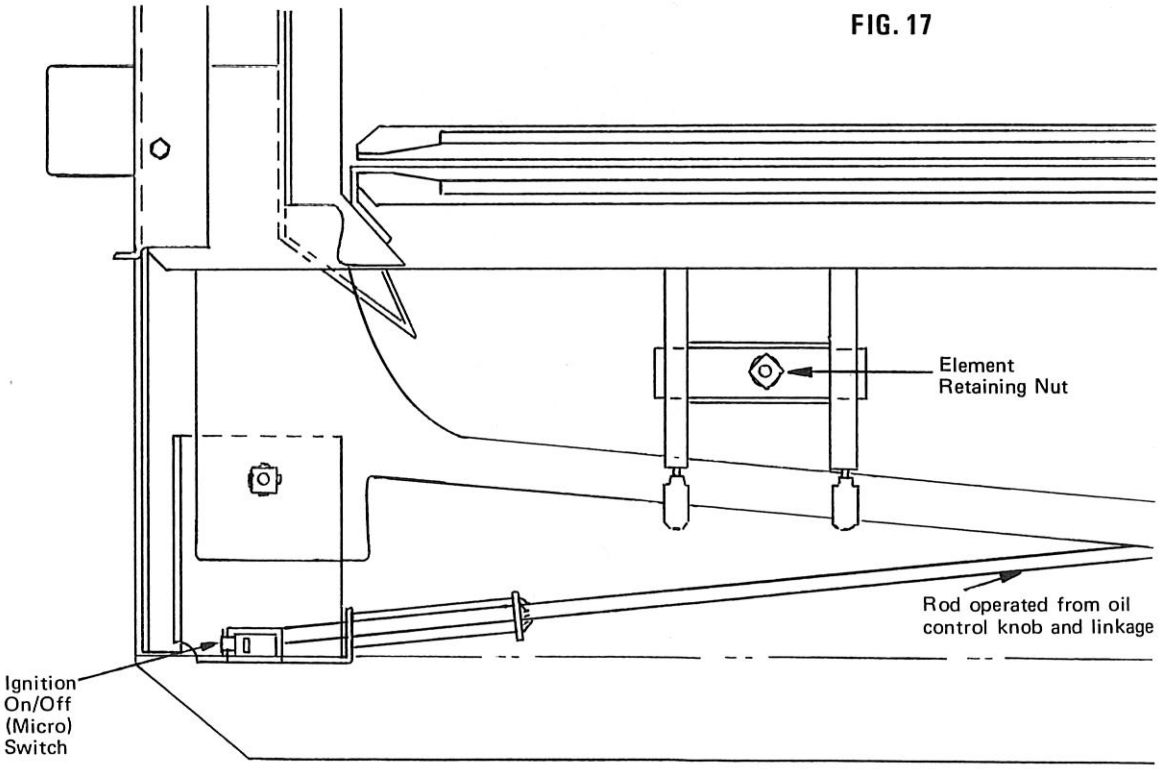
To change ignition element refer to Burner Service.

FLUE ELEMENT

To change flue element –

1. Carry out Breakdown B.
2. Remove wires from element connections.
3. Undo retaining nut and remove shakeproof washer.
4. Slide element out of heat exchanger cavity.

FIG. 17



MAKE ABSOLUTELY SURE HEATER IS DISCONNECTED FROM POWER BEFORE REMOVING OR REPLACING ANY COMPONENTS

TO REMOVE ON/OFF SWITCH

1. Remove door cover.
2. Remove lower panel.
3. Straighten metal tags holding switch.
4. Pull switch forward and remove wires.

TO REMOVE THERMAL CUT-OUT SWITCH

1. Remove door cover.
2. Remove lower panel.
3. Remove burner front heat shield.
4. Remove wires from switch.
5. Loosen clamp screw and slide switch out of clamp.

   NOTE:
   When replacing switch, heat shield/ spacer must be fitted.

   If heat shield is assembled in reverse position, symptom will be – ignition cutting out prematurely.

FIG. 18

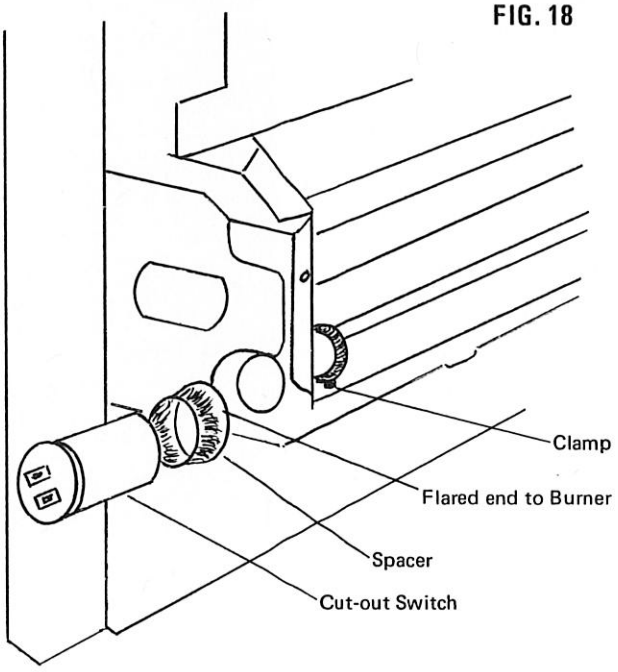
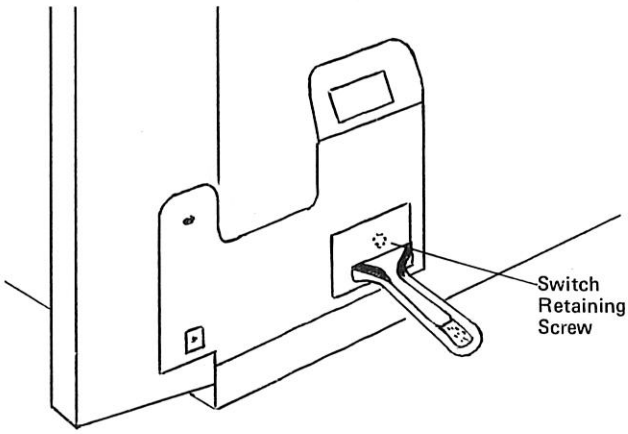


FIG. 19



TO REMOVE FAN SWITCH

1. Remove door cover.
2. Remove lower panel.
3. Undo switch retaining screw.
4. Slide switch back until lever clears slot in bracket.
5. Lift up and remove wires.

MAKE ABSOLUTELY SURE HEATER IS DISCONNECTED FROM POWER BEFORE REMOVING OR REPLACING ANY COMPONENTS

BLOWER ASSEMBLY

TO REMOVE BLOWER see BREAKDOWN C.

The blower assembly requires no maintenance except to remove dust. Should a damaged or inoperative blower be encountered it should be replaced with a replacement blower available from all Vulcan Service Depots or Parts Distributors.

Until approximately mid 1972 all oil heaters were fitted with Model 1204 blower, which was then superseded by the Model 1210.

Correct Mounting of 1210 Blowers:

Investigations have shown that the air output through the louvres is reduced if the fan is not correctly aligned under the heat exchanger. It is essential that the fan is fitted exactly as illustrated below.

If Model 1204 blower is to be replaced with 1210 (illustrated) installation instructions are packed in the carton.

10 SERIES AND "BURWOOD" MODELS

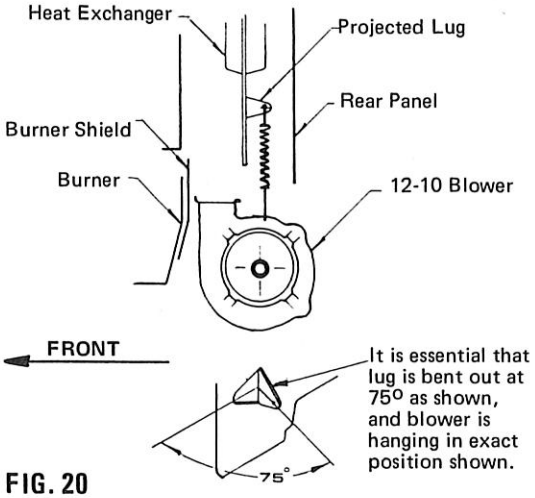
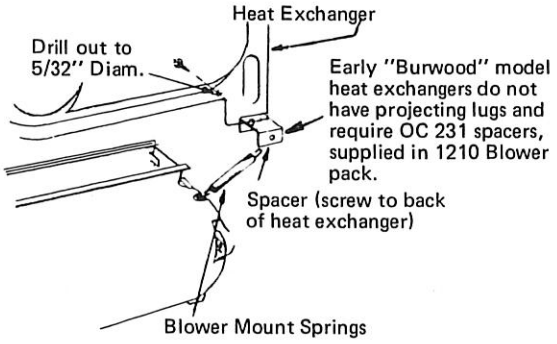


FIG. 20



VIEW FROM BACK OF HEATER

FIG. 21

MAKE ABSOLUTELY SURE HEATER IS DISCONNECTED FROM POWER BEFORE REMOVING OR REPLACING ANY COMPONENTS

OIL CONTROL VALVE

As the oil control does not come out of adjustment during service all other components should be checked before the valve is suspect. Variations of output and flame pattern are caused by carbon build up in burner, draught conditions, blockage or air lock in fuel lines, and cannot be corrected by oil control adjustment. Be particularly careful to change the filter first, on a heater which has been in operation for a few seasons.

Heaters are fitted with either "A.P." or "B.M." makes of oil control valves.

Both are similar in operation and are fully interchangeable as assemblies.

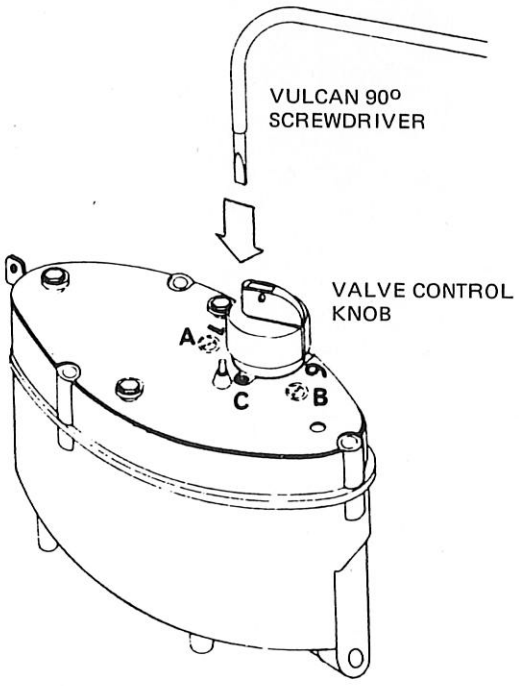


FIG. 22

A.P. Valve Setting Screws : (A and B)

For the A.P. valve both the high fire (B) and low fire (A) adjustment screws are visible at the same time. To decrease flow on low fire turn screw A anti-clockwise. To decrease flow on high fire turn screw B clockwise.

B.M. Valve Setting Screw : (C)

View shows high fire adjustment screw. Low fire adjustment screw appears when oil control knob is on setting No. 1. To increase the flow on either screw turn it anti-clockwise, to decrease flow turn it clockwise.

MAKE ABSOLUTELY SURE HEATER IS DISCONNECTED FROM POWER BEFORE REMOVING OR REPLACING ANY COMPONENTS

TO CHECK HIGH AND LOW FIRE ADJUSTMENTS

High Fire

Make sure heater has been burning long enough on high setting to heat flue system and properly stabilise – 30 minutes MINIMUM from cold start.

Measure draught with draught meter and set heater air control knob to read .07". If necessary adjust high fire screw to give yellow tips at least 1" long right across top row of holes.

Adjust only one-eighth turn at a time and leave sufficient time to observe change in flame pattern.

Low Fire

Turn oil setting to 1 (5½ cc's or 5.5 ml/min.) and allow burner temperature to stabilise. Allow at least 10 minutes. Measure draught with draught meter and set heater air control knob to give .02". Flame should burn up to, but not out of, top holes of the burner.

NOTE CAREFULLY:

Although this is the correct procedure for **VALVE ADJUSTMENT**, it is not the correct low fire operation setting for everyday use. Low fire **OPERATION** should be with air knob adjusted back (in most instances right off) to achieve as much yellow content as possible without flaring or blackening radiants (approximately .005" W.G.)

If an unserviceable oil control valve is encountered during service it should be replaced with a change-over control valve assembly. Change-over oil control valves are available at any Vulcan Spare Parts Depot for a nominal charge.

MAKE ABSOLUTELY SURE HEATER IS DISCONNECTED FROM POWER BEFORE REMOVING OR REPLACING ANY COMPONENTS

TO REMOVE DRAUGHT BREAKER ASSEMBLY –

1. Carry out Breakdowns A, B, C, D and E.
2. Remove split pin from draught breaker arm.
3. Remove screws holding back air guide.
4. Air guide and draught breaker assembly can now be lifted free.

NOTE:
Whenever heater is serviced draught breaker should be checked and all dust and fluff removed. Ensure that felt sealing strips are firmly adhered to the draught breaker body.

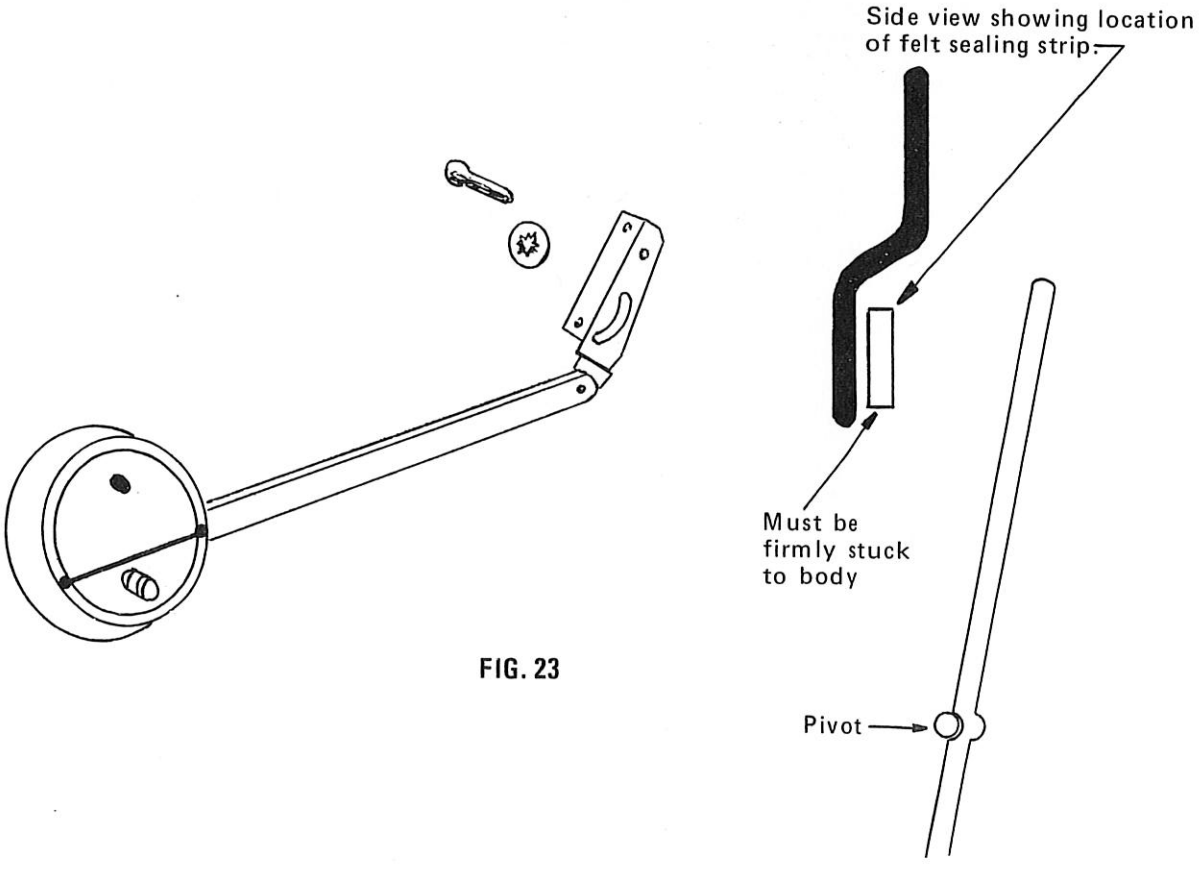


FIG. 23

MAKE ABSOLUTELY SURE HEATER IS DISCONNECTED FROM POWER BEFORE REMOVING OR REPLACING ANY COMPONENTS

TROUBLE SHOOTING CHART

Burner will not come to HI FIRE (Flame pattern is otherwise correct)	1. Fuel tank tap not fully open – open. 2. Filter in fuel line at valve is partially blocked – replace filter. 3. Burner inlet is restricted with carbon deposits – clean. 4. Fuel valve maladjusted – adjust valve or replace. 5. Primary air holes (bottom row) in burner blocked – clean out. 6. Fuel tank height lower than specified (problem exists when tank is not full).
Burner "pops"	1. Incorrect air-fuel mixture – adjust air knob. 2. Baffles (reflectors) poorly seated – re-seat baffles after ensuring they are not distorted. 3. Burner out of level – check burner is assembled level.
Red light stays on	1. **No sustained flame at burner** (a) No oil in fuel tank. (b) Valve flooded – has shut off automatically. Re-set trip mechanism after ensuring cause of flooding has been eliminated. (NOTE: If valve has just been replaced, ensure it is level and located correctly as this will affect the fuel level in the valve chamber, and could cause the valve to trip off. 2. **Flame pattern is incorrect – high flame on left hand side** (a) Thermal cut-out ("Otter") switch is not in correct position or has worked out of clamp – re-position or replace switch. Refer Page 14, Fig. 18. (b) Thermal cut-out switch points not opening – replace switch.
Burner flares	1. Insufficient draught – check with draught meter – if below .07" on Hi Fire check draught breaker and flue assembly. 2. Overfuelling – if .07" draught available on Hi Fire – reduce Hi Fire valve adjustment. 3. Burner flooded. (Will stop flaring once heater is up to temperature.) Check valve for leaking in "off" position.

MAKE ABSOLUTELY SURE HEATER IS DISCONNECTED FROM POWER BEFORE REMOVING OR REPLACING ANY COMPONENTS

TROUBLE SHOOTING (cont.)

Burner flares (contd.)	4. Door gasket not sealing – door assembled without gasket, or gasket is out of position. Check gasket, renew if necessary. 5. Air leaks in heat exchanger or combustion chamber.
Burner flares on left	1. Wiring incorrectly connected, bypassing cut-out switch – rewire correctly so that ignition element is "off" when red light is out. (Refer wiring diagram, Page 12.) 2. Burner assembly not level transversely. 3. Door seal not airtight on left hand side. 4. Red ignition indicator stays on. (See "Red light stays on," Para. 1) 5. Poorly fitted baffle end cap.
Burner flares on right	1. Door seal not airtight on right hand side. 2. Burner not level – check cause. 3. Poorly fitted baffle end cap – refit correctly.
Unstable flame pattern (cyclic flaring)	Wind gusts over cowl. Ensure flue termination is to specifications and also clear of pressure area.
Orange flame in centre of burner. Poor flame pattern. Glass constantly carbons up. (Burner has been dismantled, cleaned and re-assembled)	1. Baffles are not seating correctly – ensure baffles are fitted in accordance with instructions on Pages 10 and 11, Fig. 12 thru 15. 2. Heater not operated in accordance with instructions. 3. Incorrect air/fuel mixture. 4. Excessive fuel flow. 5. Insufficient combustion chamber draught.
Radiants blacken on ignition	1. Operator not following lighting instructions properly. 2. Burner flooded. Valve leaking oil into burner when knob is in "off" positon – repair or replace valve. 3. Flue element weak – check starting draught, should be .005" W.G. If not, test flue element – replace if defective. 4. Flue assembly not sealed at joints or not long enough. Check with draught meter. Repair or extend flue. 5. Time to ignition from start too long (4 minutes is correct). 6. Low fire adjustment set too high – check draught and if O.K. (.005"–.02") adjust low fire at valve at .02" draught. 7. Draught breaker jammed open. (Check that felt strip is not hanging off.) Free draught breaker.

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TROUBLE SHOOTING (cont.)

Radiants blacken on ignition (cont.)	8. Cut-out switch operating too soon. Check switch location first as per Page 14, Fig. 18. If O.K., replace switch. 9. Burner out of level – check burner is assembled level.
Oil consumption appears high	1. Check that oil tank, oil line and valve are not leaking. 2. Check that low fire adjustment is correct. 3. Use the following figures as a guide : Lo Fire 24 hours a day (5½ ml/min.) – 50 gals. per month. Lo Fire mostly, higher settings occasionally – approximately 80–100 gals. per month. 4. Incorrect fuel/air ratio requiring oil control to be turned to higher setting for more heat output – adjust air knob to obtain yellow element in flame pattern. NOTE: Position of oil control knob is only influencing factor affecting oil consumption, if no leaks exist.
Fan noisy	1. Fan not located properly. Ref. Page 15, Figs. 20 and 21 – reposition correctly. 2. Fan impellers dirty (imbalance) causing vibration – clean. 3. Fan defective – replace fan. 4. Foreign matter (toys, paper etc.) caught in, or impinging on, fan impellers.
Fan air output reduced	1. Air guide position incorrect – reposition. 2. Fan dirty – clean fan, impellers. 3. Fan position (See Page 15, Figs. 20/21). 4. Fan switch defective – replace. (use part 1001-869) 5. Fan bearings tight – replace fan. 6. Fan motor poling – replace fan. 7. Electric supply voltage very low.
Oil odours	1. Leaking of oil at any joint – seal joint affected. 2. Leaking filter – replace. 3. Leaking oil valve – replace. 4. Oil lying in tray – overflow inoperative – repair and clean. Correct cause of oil leak. 5. Oil lying in overflow line. Re-lay correctly and flush out with water and detergent.

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TROUBLE SHOOTING (cont.)

Oil odours (cont.)	6. Chimney soot dropped on to case – remove heater and case and clean off. Sweep chimney and re-install heater. NOTE: It is mandatory that a chimney is swept (unless previously unused) before a heater is installed. 7. Oil odours are mainly the result of oil leakage, NOT a hole in flue or heat exchanger. (If hole were in flue or heat exchanger air would enter combustion chamber or flue and products of combustion would not escape into the room.) 8. Check that flue terminates outside any pressure area. (See Installation Instructions.)
Stains or deposits on ceilings, walls, etc.	Particles in suspension entering with airflow over heat exchanger and becoming incinerated and deposited on cooler surfaces. It should be noted that cracks or holes in a heat exchanger will NOT cause products of combustion to enter the room.
Not enough heat (Heater appears to function properly, and radiants glow)	1. Hole left in base of hearth from previous Solid Fuel heater installation – repair hearth. 2. Large area within chimney around heater case – insulate. 3. Draughts within chimney cooling case – insulate. 4. Lack of heat is characteristic of lack of oil and the causes of this in order of probability are : (provided there is sufficient fuel in tank) (a) Tank, tap, or fuel line restrictions. (b) Clogged or partially clogged filter. (c) Carbon accumulation in burner and/or burner inlet. (d) Blocked metering stem in fuel control valve. (e) Malfunction in fuel control valve.
Overdraughting	Draught breaker not operating (could be rusted). Check and clean and correct any water leaks. Replace felts if needed.
Stiff air control operation	Corroded or water affected draught breaker assembly – remove draught breaker – clean off or replace and re-assemble. Check operation. Check cause of corrosion – leaking water at flue, flashing, cowl plate, cowl, etc. Tight linkage – correct cause (binding or corrosion).

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