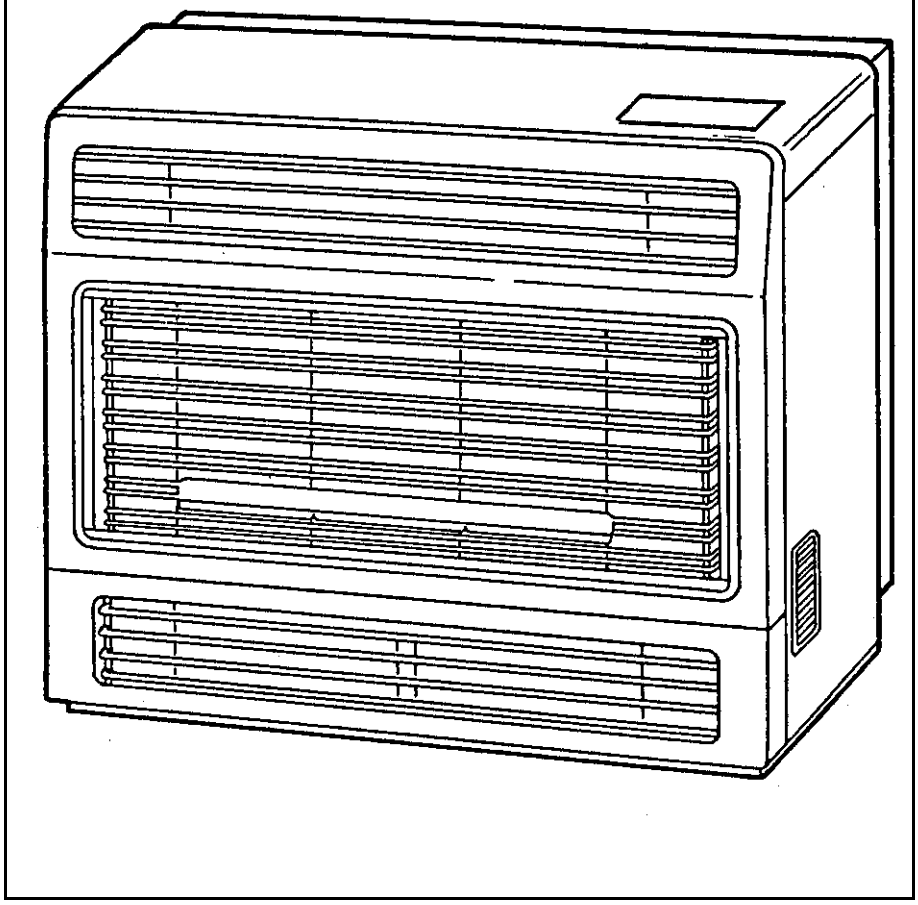
Rinnai

SERVICE MANUAL

ULTIMA REH301FT B/C

FLUED HEATER



The Australian Gas Association	All Rinnai products are certified by the Australian Gas Association as compliant to relevant Australian Standards.
Quality System™ Quality Endorsed Company ISO 9001 Lic 4983 SAI Global Head Office Certified Distributed and serviced in Australia under a Quality System certified as complying with ISO 9001 by SAI Global	Rinnai Australia Head Office is certified as complying with ISO 9001 by SAI Global.
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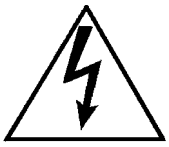
N10378	All Rinnai products carry the “C Tick” symbol. This signifies compliance with the Electromagnetic Compatibility (EMC) requirements of the Australian Communications Authority (ACA) which aim to minimise electromagnetic interference. Rinnai Australia Supplier Code N10378.

Produced by Technical Services Department
August 2003 - Issue 1

Key to Warning Symbols

Failure to comply with the following instructions may result in serious personal injuiry or damage to the appliance.



Be careful of possible electric shock. Wiring inside this appliance may potentially be at 240 Volts.

Remove the plug from the source when carrying out any of the following activities.

Read Fault Diagnosis and Wiring Diagram carefully to avoid incorrect wiring

Do not disassemble. Parts within cannot be exchanged or diagnosed faulty.

Please follow instructions carefully to ensure safe and appropriate service.
After completing the service and confirming that there are no water or gas leaks or incorrect wiring, test operation of unit according to the Customer Operating Instructions.
After confirming normal operation, explain what was serviced to the customer and operation principles if necessary.

This manual has been compiled by Rinnai Australia Technical Services Department. While many individuals have contributed to this publication, it will be successful only if you - the reader and customer - find it useful. We would like to extend an invitation to users of this manual to make contact with us, as your feedback and suggestions are valuable resources for us to include as improvements. Rinnai are constantly working toward supplying improved appliances as well as information, and specifications may be subject to alteration at any time.

Table of Contents

Glossary of Terms and Symbols

This glossary of terms and symbols is provided to assist you in understanding some of the language used throughout this manual.

dB(A)	-	sound pressure level in decibels, “A” range
DC	-	direct current
AC	-	alternating current
Hz	-	Hertz
IC	-	integrated circuit
kcal/h	-	kilocalorie per hour
kPa	-	kilopascals
LED	-	light emitting diode
mA	-	milliamps
MJ/h	-	megajoule per hour
mm	-	millimetres
OHS	-	overheat switch
PCB	-	printed circuit board
CPU	-	central processing unit
POT	-	potentiometer
rpm	-	revolutions per minute
SV	-	solenoid valve
ø	-	diameter
Δ °C	-	temperature rise above ambient
POV	-	modulating valve
TH	-	thermistor

1. Introduction

Development Background

High Efficiency Ultima 30. Fully automatic, thermostatically controlled, radiant and fan-forced downflow convection type space heater with fan-assisted flue. Available in Inbuilt and Console models.

We recommend that the heater is regularly serviced by qualified service technician.

Features

- 30 MJ/h fan assisted, radiant convection space heater.
- Top mounted control for easy operation.
- All Rinnai safety features including overheat/flame failure protection.
- Large capacity fan to circulate warm air effectively.
- Electronic automatic ignition system.
- Fan filter to protect the fan against dust and lint.

2. Specifications

Model Number		REH-301FTB	REH-301FTC
Model Identification		**Ultima Inbuilt**	**Ultima Console**
Name of appliance		Inbuilt Flued Space Heater	Console Flued Heater
Average Efficiency Rating		80%	80%
Electrical Consumption (max). Watts		80 Watts	80 Watts
Dimensions (Fireplace) **Min.*** (mm)	Width	710 minimum	N/A
	Depth	330 minimum	
	Height	605 minimum	
Dimensions (Fireplace) **Max.** (mm)	Width	710 maximum	
	Depth	330 maximum	
	Height	650	
Dimensions (mm) (Enclosure inside Fireplace	Width	700	
	Depth	253	13
	Height	635	
Dimensions (mm) (Outside Fireplace)	Width	910	910
	Depth	235	370
	Height	650	650
Colours:		Beige / Gunmetal	
Weight	Kg	48	
Heating Output **Min. * / Max.**	(kW)	7.3	
		3.3	
Gas Consumption (MJ's)	(Max).	30	
	(Min).	15	
Clearances (mm)		Not to be installed into a mock fireplace	
	Sideways	150	
	Infront	1000	
	Above	150	
	Behind	150	
Burner		Stainless Steel Bunsen Ribbon burner	
Noise level range	dB (A)	High: 51	Low: 44
Gas Input (MJ/h) NG	High	30	30
	Low	15	15
LPG	High	30	30
	Low	15	15
Connections	Gas	1/2 inch (15mm) Copper flare connection	
	Electrical	240 V power point (10 Amp GPO)	
Room Temperature control		Thermostat control	
Controls		Slide heat control variable settings	
Gas Control		Electronic	
Fan Switch		Boost - Normal	
Ignition System		One touch electronic	
Timer		12 hour slide delay	
Safety devices		Automatic Fan delay switch Flame Failure Device Over-heat switch	
Accessories		Surround:75 mm or 100 mm fireplace	
Flueing		10' x 2' flueing is supplied from plumbing outlets only (not supplied by Rinnai)	

* minimum values are approximate only

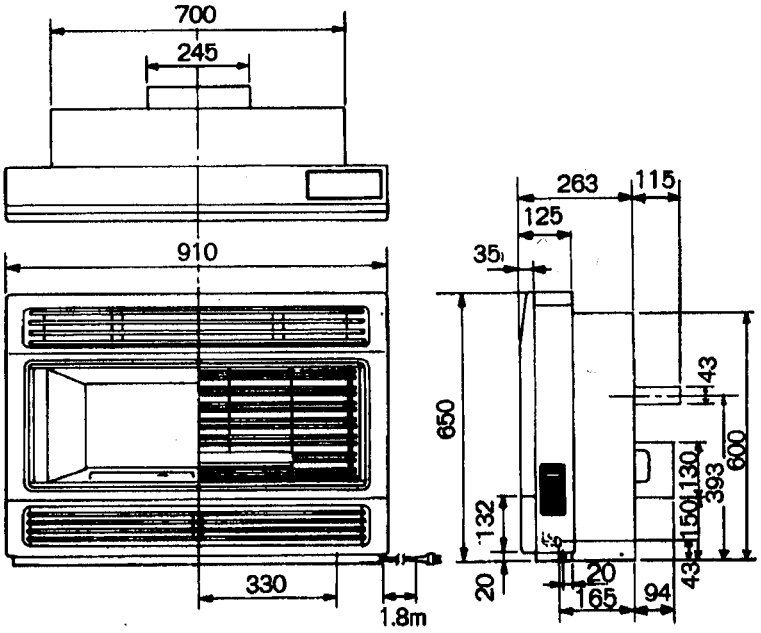
3. Combustion Specification

Gas Type	Main Burner			Bypass Screw	Regulator		Gas Rating	
	Main Burner Assy	Main Injector	Main Damper		Regulator Assy	Regulator Pressure kPa	Full	By Pass
Natural	REH300-71	CP-60013B ϕ2.45	REH300-73x03 30% open	C6C1-5 (Outer) ϕ3.50	C2E-5-3 Breather ϕ0.7	1.08 / 1.13	30 MJ/h	15 MJ/h
Propane	REH300-71	CP-60013B ϕ1.55	REH300-73x03 30% open	C6C1-5 (Inner) ϕ1.20	C2E-5-4 Breather ϕ0.35	2.46 / 2.75	30 MJ/h	15 MJ/h

4. Dimensions

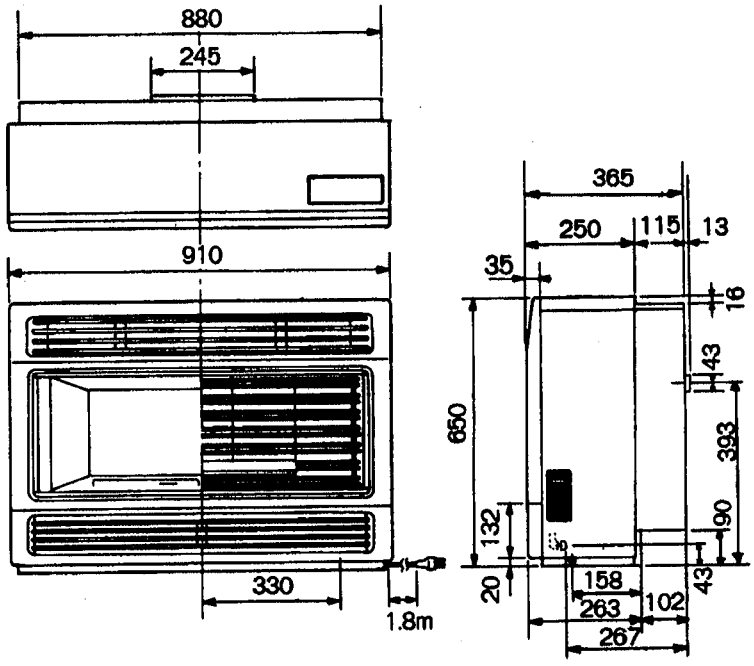
Note: All dimensions are in millimetres

Inbuilt



(mm)

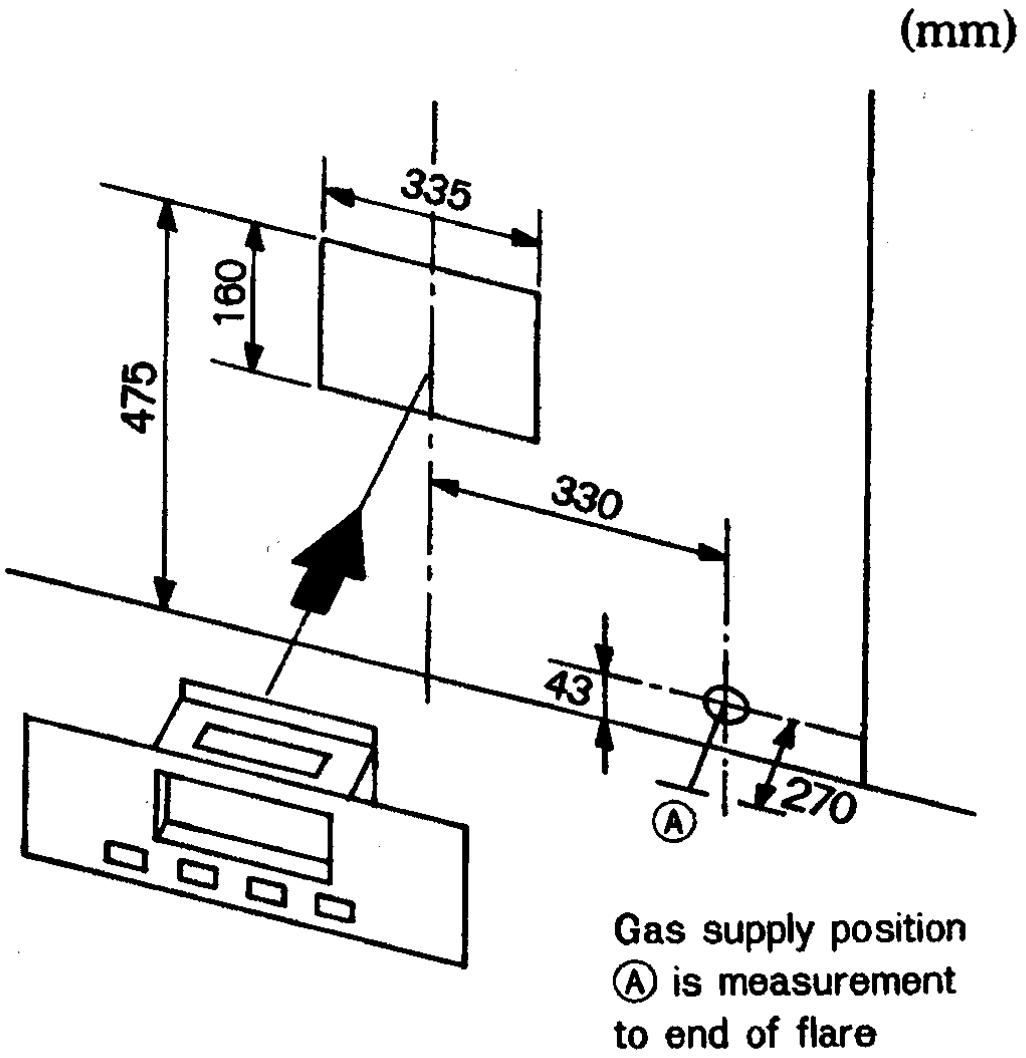
Console



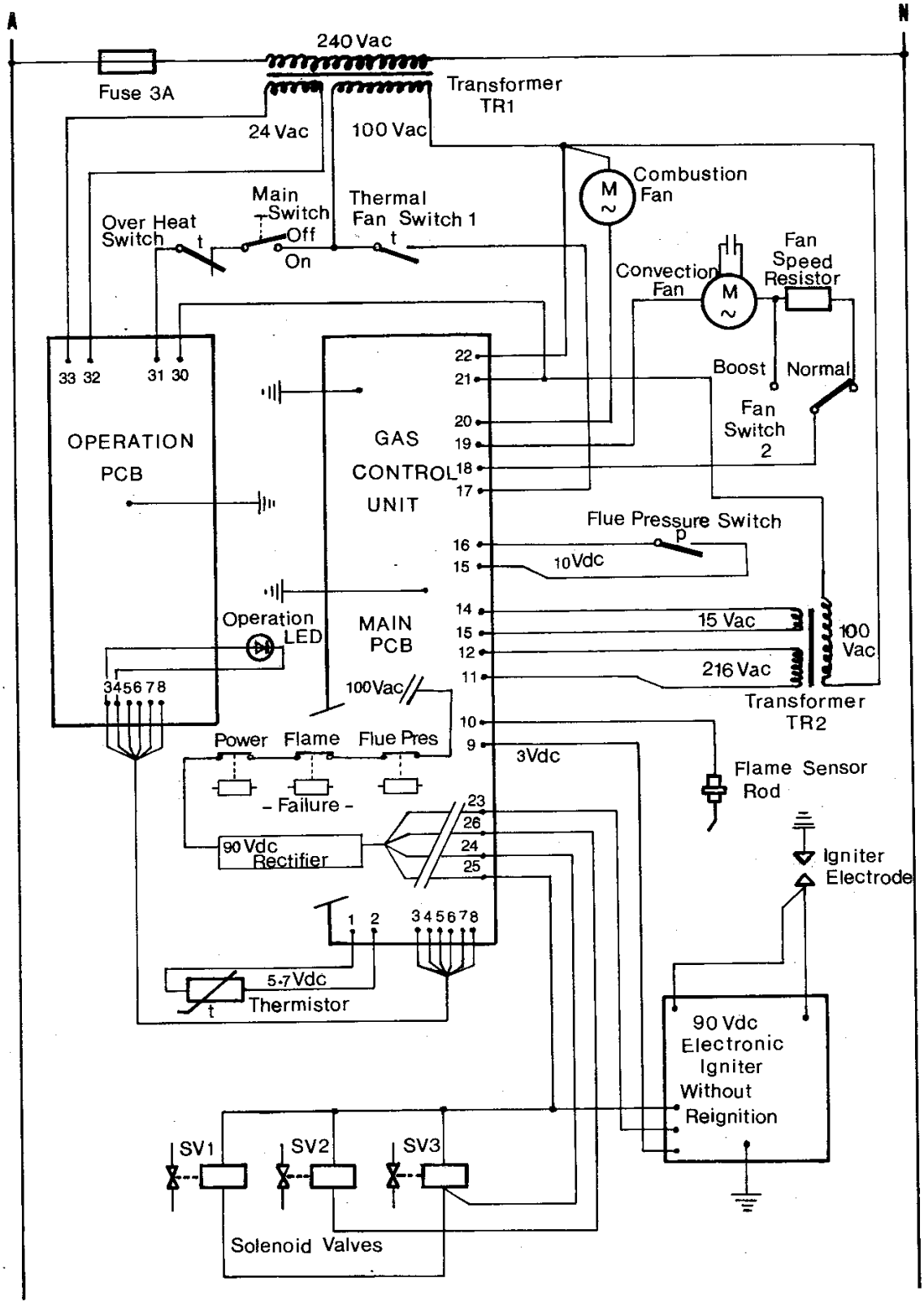
(mm)

5. Installation

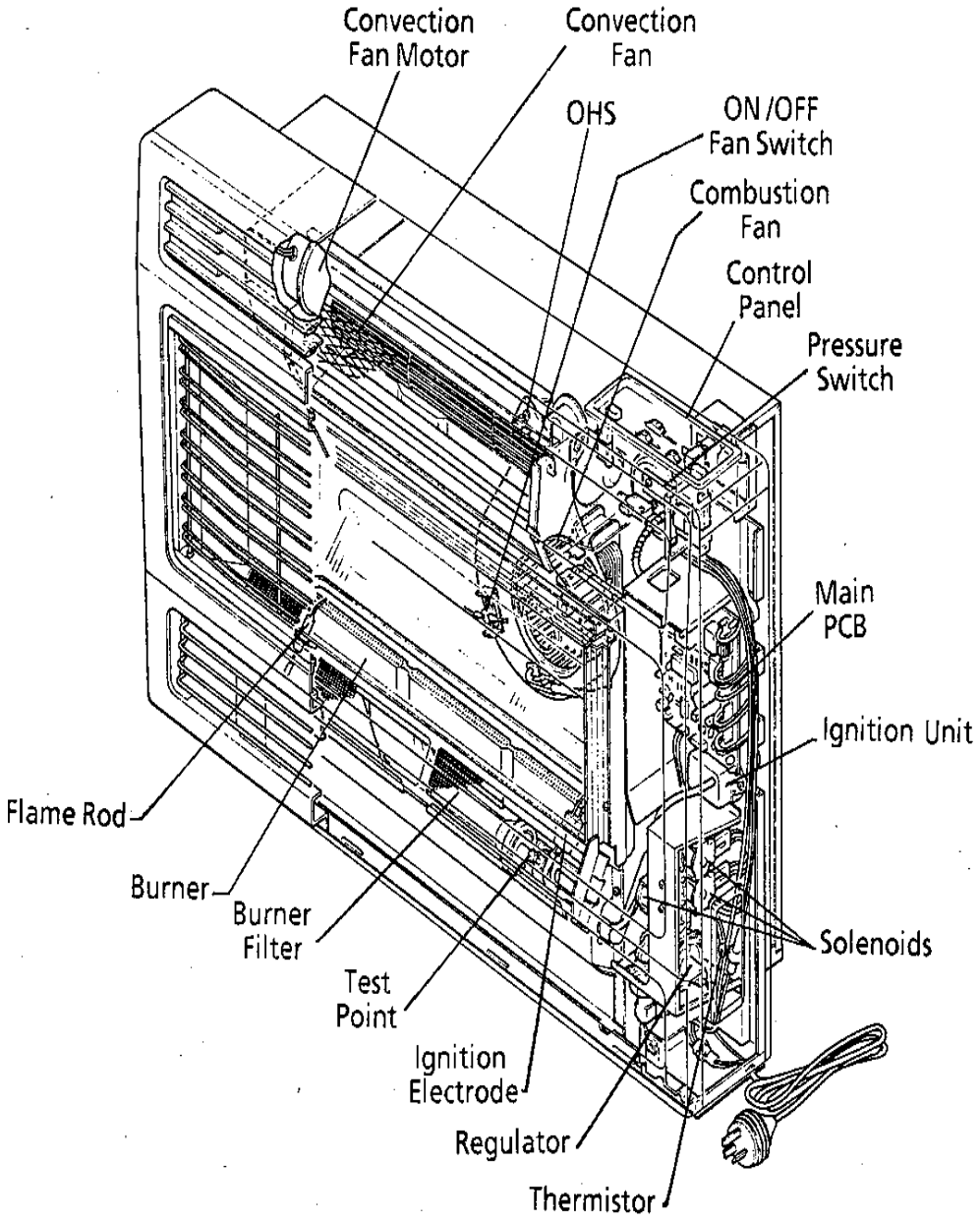
The following clearances are recommended for installation.



6. Schematic Diagram



7. Cut - Away Diagram



8. Operation Principles

For trouble free operation, please read the following information carefully:

This heater has been designed to be simple to operate, using the latest technology to provide a high level of safety and high efficiency.

For your convenience, the controls of your new High Efficiency 30 are situated under the cover on the right hand side of the heater, all necessary adjustments to the operation of your heater can be made with these controls.

Control Panel

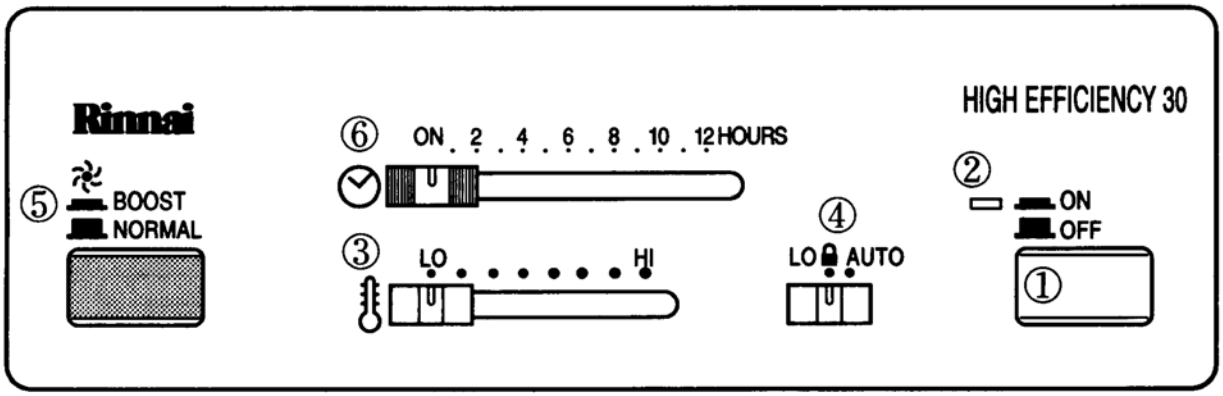


Fig. 2 Control Panel

Timer Operation

Setting the Timer:
1. Slide the timer control indicator to line up with the hours delay required.
2. Turn the heater on.
3. Set room temp requirement.
4. Set fan switch to boost or normal.

Setting the Timer when heater is alight:
1. Slide timer control to required time.
2. The burner will go out and fan will stop after heater has cooled.
3. The heater will light after the preselected delay.

Cancel preset Timer setting:
1. Slide timer control back to ON position.
2. The heter will resume normal operation.

9. Main Componentry

Test Point Location

On the injector block in front of the burner.

Regulator

Spring loaded adjustable type, with inlet gas filter located after the brass elbow coupling.

Gas Control

Fully automatic Electronic controlled system. Rinnai gas control unit printed circuit board electronically controls one ON/OFF and two HI/LO gas solenoid valves.

ON/OFF Solenoid Valve Assembly - is a single solenoid valve assy (SV1), 90 Vdc, with a approx. winding resistance of 1.5 Ohms.

HI/LO Solenoid Valve Assembly - a double solenoid valve assy (SV2-bottom, SV3-top), 90 Vdc, winding resistance 1.7 Ohms approximately, with replaceable LP or NG by-pass restrictor screw.

Ignition

Automatic electronic ignition system without re-ignition supplying continuous spark direct to main burner.
On initial light-up, two ignition attempts are made before lockout occurs.

Ignition unit:	K105S, 100 Vdc, 11 kV
Spark electrode gap:	3 mm ± 1 mm

Flame Safeguard

Electronic flame failure system, plugged into the gas control PCB (connector CN3). Flame current must be more than 1µ Adc or lockout will occur. (ON/OFF gas valve immediately shuts-off).
Ignition unit output to flame failure system is 3Vdc.

Burner

Pressed stainless steel ribbon burner with a single injector. Primary air is adjustable by rotating the graduated air-metering cover on the burner air/gas intake nozzle. Combustion air is filtered at the air intake. The ignition electrode and flame sensor rod are both mounted on the burner assembly.

Pilot Burner Assembly

The pilot burner assembly consists of the assembly mounting plate and pilot burner. Pilot injector orifice is located in the pilot/pilot gas pipe connection. Pilot injector has an integral filter screen. Gas flows to pilot whenever the left hand control push button is in the depressed position, provided that the thermo-electric safety shut off valve is open.

Radiants

Six ceramic box type radiants with 14 cross bars.

Dimensions:	Length: 220 mm
	Width: 84 mm
	Depth: 56 mm

Gas Supply Filter

Removable mesh type filter installed in the brass elbow coupling to regulator.

Overheat Switch

Mounted at the top of the flue extraction housing on the inside back panel of the unit. Normally closed, automatic reset-bi-metal type heat operated switch. Screw mounted, with push-on type terminals.
Opens at 120° C and closes at 100° C.

Fan Switch 1

Mounted at the bottom of the flue extraction housing on the inside back panel of the unit. Normally open, automatic reset, bi-metal type heat operated switch. Screw mounted, with push-on type terminals. Allows the convection fan to run after burner shut-down until unit cools. Opens at 70° C, and closes at 58° C.

Pressure Switch

Mounted at the top right hand corner inside the appliance. Normally open switch, closed by air pressure. Monitors the flue extraction chamber air pressure and shuts the unit down if the combustion fan fails. Screw mounted, with push-on type terminals.

Main On-Off Switch

On/Off push button type switch mounted on the control panel. Rated at 5A/40A 240 V. Screw mounted with soldered connections.

Fan Switch 2 (Normal - Boost)

Normal/Boost fan selector switch, push-button type mounted on the control panel. Rated at 5A/40A, 250V. Screw mounted with soldered connections.

Supply Fuse (240 V)

Mounted at the lower right hand corner, inside the unit. Three amp (3A) 3AG cartridge type fuse (standard type 30 mm x 6 mm dia). Accessed through the plastic grill on the right hand side panel.

Room Temperature Control

Electronic / Thermistor type thermostat.
Incorporates room temp. manual control on control panel. Negative temperature co efficient (NTC) type thermistor, senses room temperature. Mounted on the plastic grill on the right hand side of unit. Plugged into the main PCB at connector CN7. Typical resistance range 10 k - 100 k Ohms.

Slide Control resistor-room temperature.
Room temperature HI/LO slide control potentiometer, mounted beneath the control panel. Controls room temperature between 13 and 39°C (± 3°C). Resistance readings: **HI** - 0 Ohm - **LO** - 32 k Ohm.

Convection Fan

Tangential type blower 90 mm dia. x 380 mm long, direct coupled to the fan motor.
Induction type 4-pole, dual speed electric motor 100 V, 6W, with a 4 µF capacitor in the start/run circuit. Fan speed circuit includes the ceramic resistor (102 Ohm). Convection fan can run at three speeds:
- Normal / Boost or Low (low setting is automatically switched).
Fan speed (RPM) : **LOW:** 1020, **NORMAL:** 1155, **BOOST:** 1260.

Typical motor winding fan speed resistor values:

NORMAL - red (2), black (1) = 80 Ohm + 102 Ohm resistor.
BOOST - red (2), black (1) = 80 Ohm
LOW - red (2), white (1) = 226 Ohm

Start / run winding - orange, orange wires = 335 Ohm.

Start run capacitor

Capacitor type SH-CAP, 4 µF, F-M, 200 V.
Screw mounted with two push-on spade terminals. Capacitor is in series with the convection fan motor start windings (335 Ohm) for both starting and running.

Ceramic Resistor

Fan speed circuit component. White ceramic type 102 Ohm, 65 x 10 x 10 mm, screw mounted with two push-on spade terminals. Located at top right hand corner inside the unit.

Combustion Fan

Single speed 2350 RPM (hot), 100 V motor direct coupled to two fan rotors:

1. Flue chamber extraction fan (impeller wheel type) located inside the unit heat exchanger compartment.
2. Blade type cooling fan mounted in front of the motor on the outside of the unit rear casing panel.

Motor is screw mounted on four anti-vibration mounts and has a polarised two-pin plug type connector. Typical motor winding is 21 Ohm.

Printed Circuit Board (PCB)

Gas Control unit (main PCB). Has seven plug-in connectors identified as CN-1 to CN-7.
It computes the room temperature requirements set on the control panel against the current room temperature and delivers the heat / air output to satisfy those requirements.
Safety circuits monitor flame failure, power failure and combustion fan failure conditions and the unit will show down should a failure be detected. The PCB also supplies 90 V for the ignition unit and solenoid valves.

Main Transformer TR1

Primary power transformer 240 /100 / 240 V. Located at the top right hand corner inside the cabinet, the larger of the two transformers.
Typical winding resistances are:

240 V winding - brown (1) and black (5) = 21 Ohm.
100 V winding - red (2) and black (6) = 6.7 Ohm.
240 V winding - orange (3) and orange (7) = 12.2 Ohm.

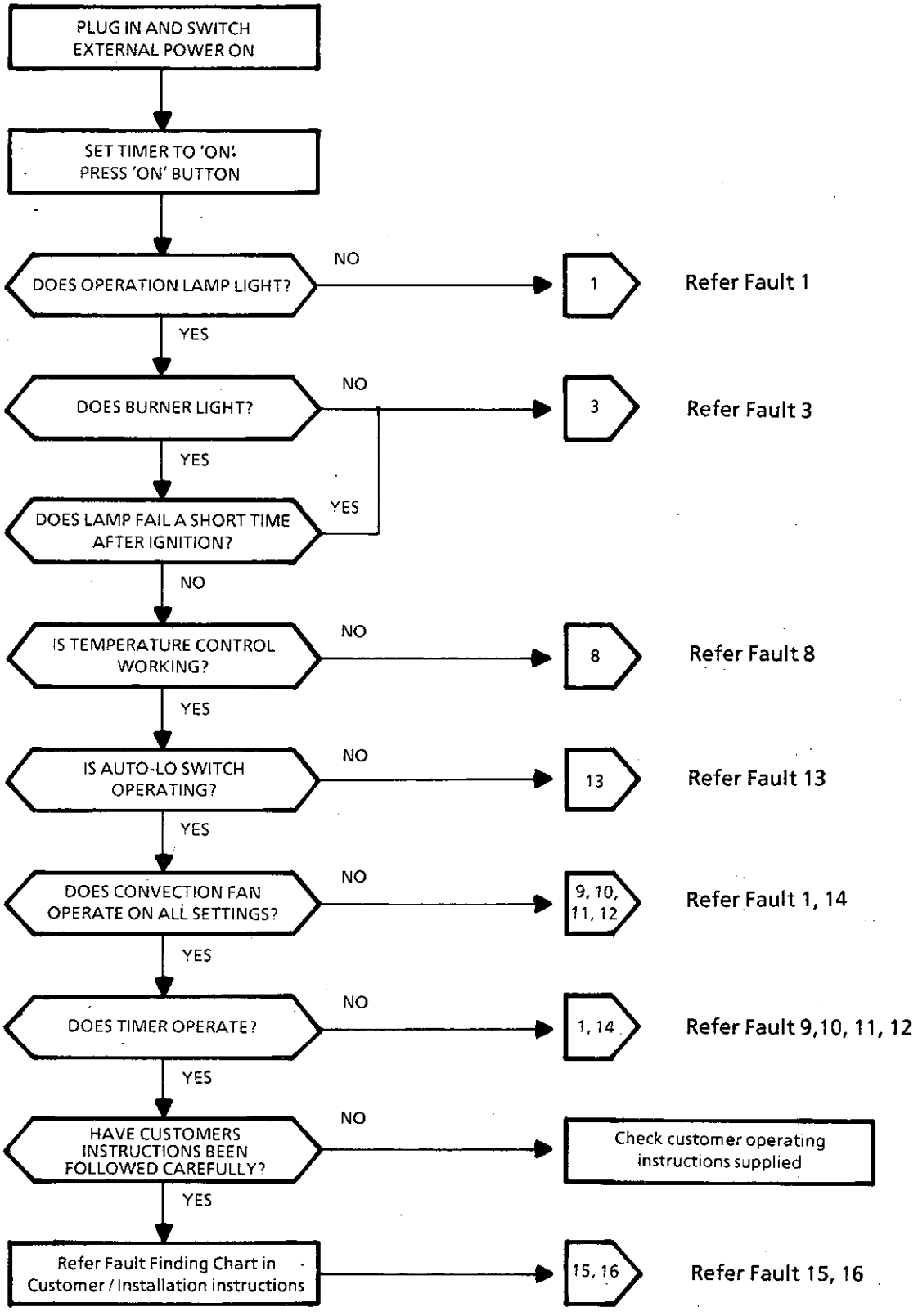
Small Transformer TR2

Power transformer 100 / 216 / 15 V. Located the at top right hand corner inside the cabinet, the smaller of the two transformers.
Typical winding resistances are:

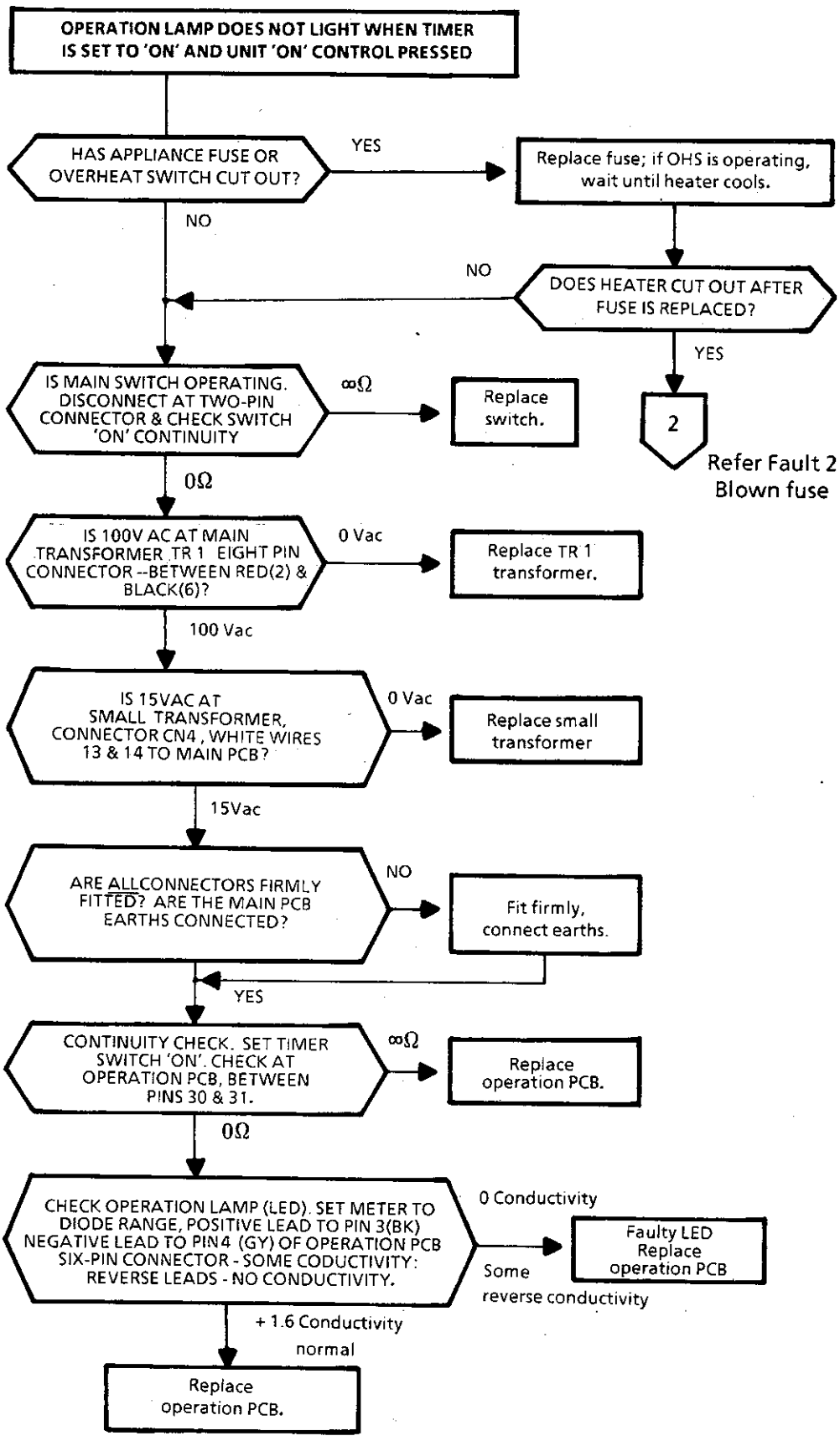
100 V winding - black (2) and yellow (1) = 85 Ohm.
216 V winding - red (11) and red (12) = 1.5 Ohm.
150 V winding - white (13) and white (14) = 2.8 Ohm.

10. Error Code Messages and Maintenance Data

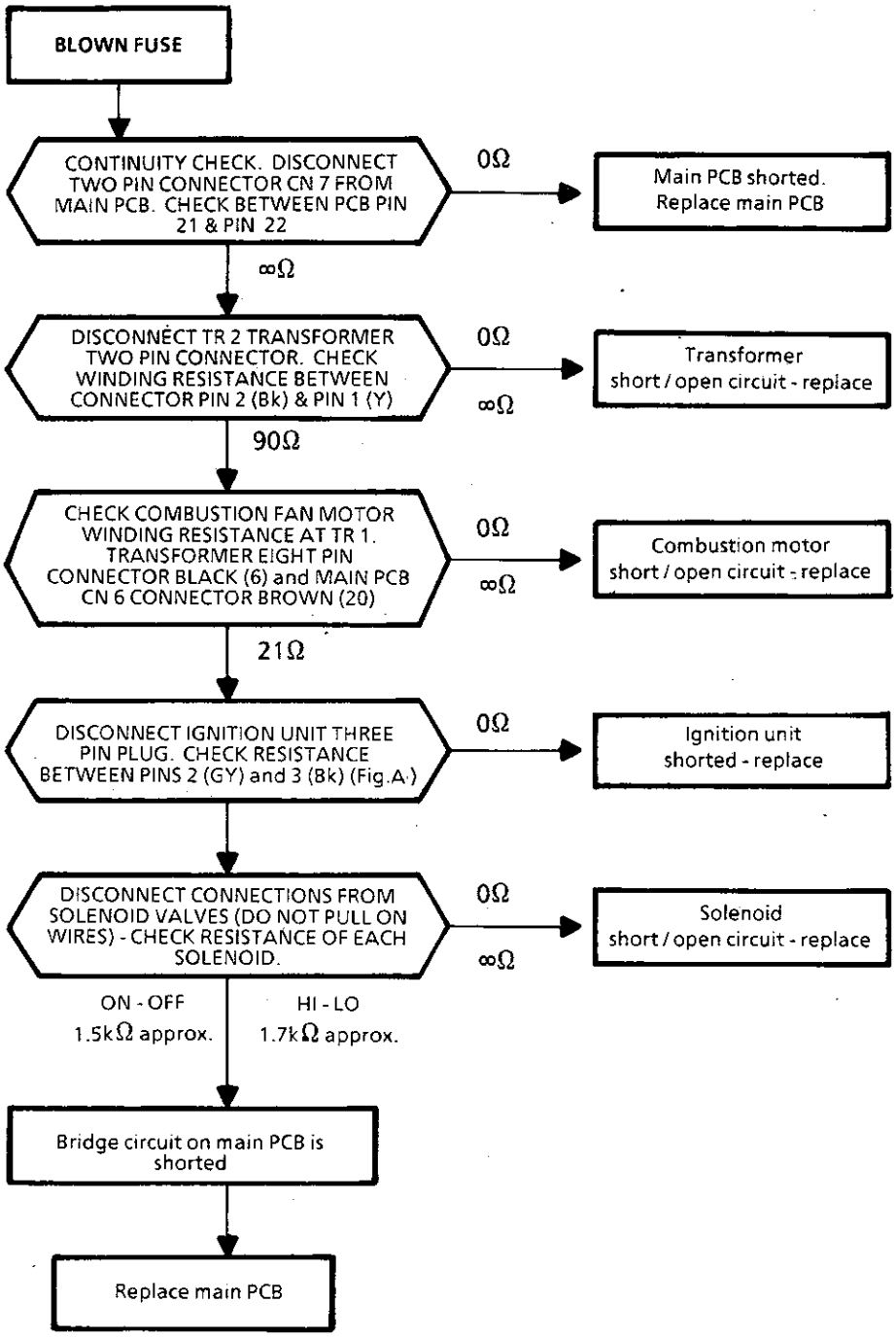
FAULT FINDING FLOW CHARTS



FAULT No. 1


OPERATION LAMP DOES NOT LIGHT WHEN TIMER IS SET TO 'ON' AND UNIT 'ON' CONTROL PRESSED
HAS APPLIANCE FUSE OR OVERHEAT SWITCH CUT OUT?
YES
Replace fuse; if OHS is operating, wait until heater cools.
NO
DOES HEATER CUT OUT AFTER FUSE IS REPLACED?
NO
YES
IS MAIN SWITCH OPERATING. DISCONNECT AT TWO-PIN CONNECTOR & CHECK SWITCH 'ON' CONTINUITY
∞Ω
Replace switch.
2
Refer Fault 2 Blown fuse
0Ω
IS 100V AC AT MAIN TRANSFORMER TR 1 EIGHT PIN CONNECTOR --BETWEEN RED(2) & BLACK(6)?
0 Vac
Replace TR 1 transformer.
100 Vac
IS 15VAC AT SMALL TRANSFORMER, CONNECTOR CN4 , WHITE WIRES 13 & 14 TO MAIN PCB?
0 Vac
Replace small transformer
15Vac
ARE ALLCONNECTORS FIRMLY FITTED? ARE THE MAIN PCB EARTHS CONNECTED?
NO
Fit firmly, connect earths.
YES
CONTINUITY CHECK. SET TIMER SWITCH 'ON'. CHECK AT OPERATION PCB, BETWEEN PINS 30 & 31.
∞Ω
Replace operation PCB.
0Ω
CHECK OPERATION LAMP (LED). SET METER TO DIODE RANGE, POSITIVE LEAD TO PIN 3(BK) NEGATIVE LEAD TO PIN4 (GY) OF OPERATION PCB SIX-PIN CONNECTOR - SOME CODUCTIVITY: REVERSE LEADS - NO CONDUCTIVITY.
0 Conductivity
Faulty LED Replace operation PCB
Some reverse conductivity
+ 1.6 Conductivity normal
Replace operation PCB.

FAULT No. 2



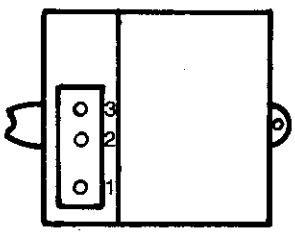
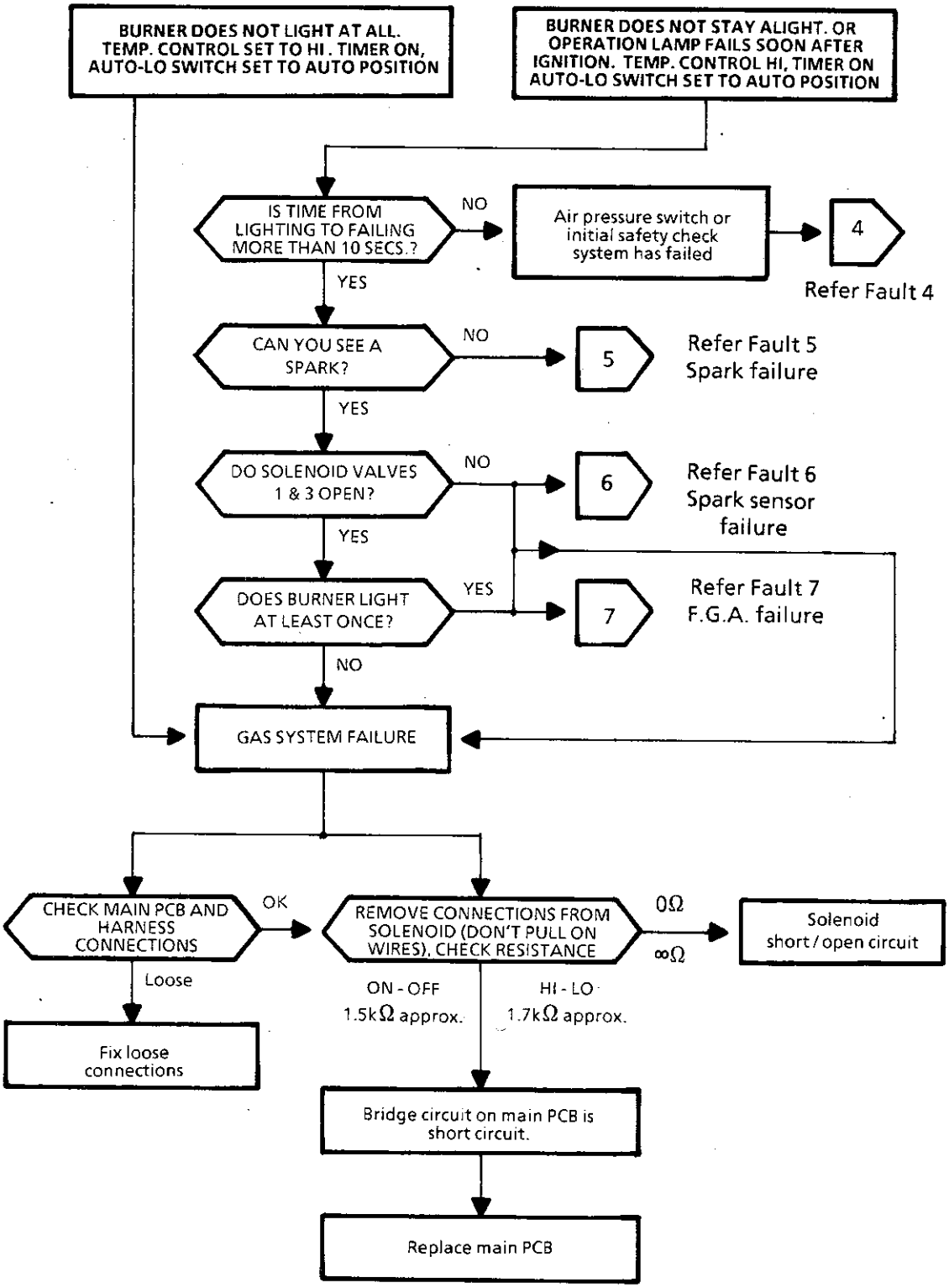
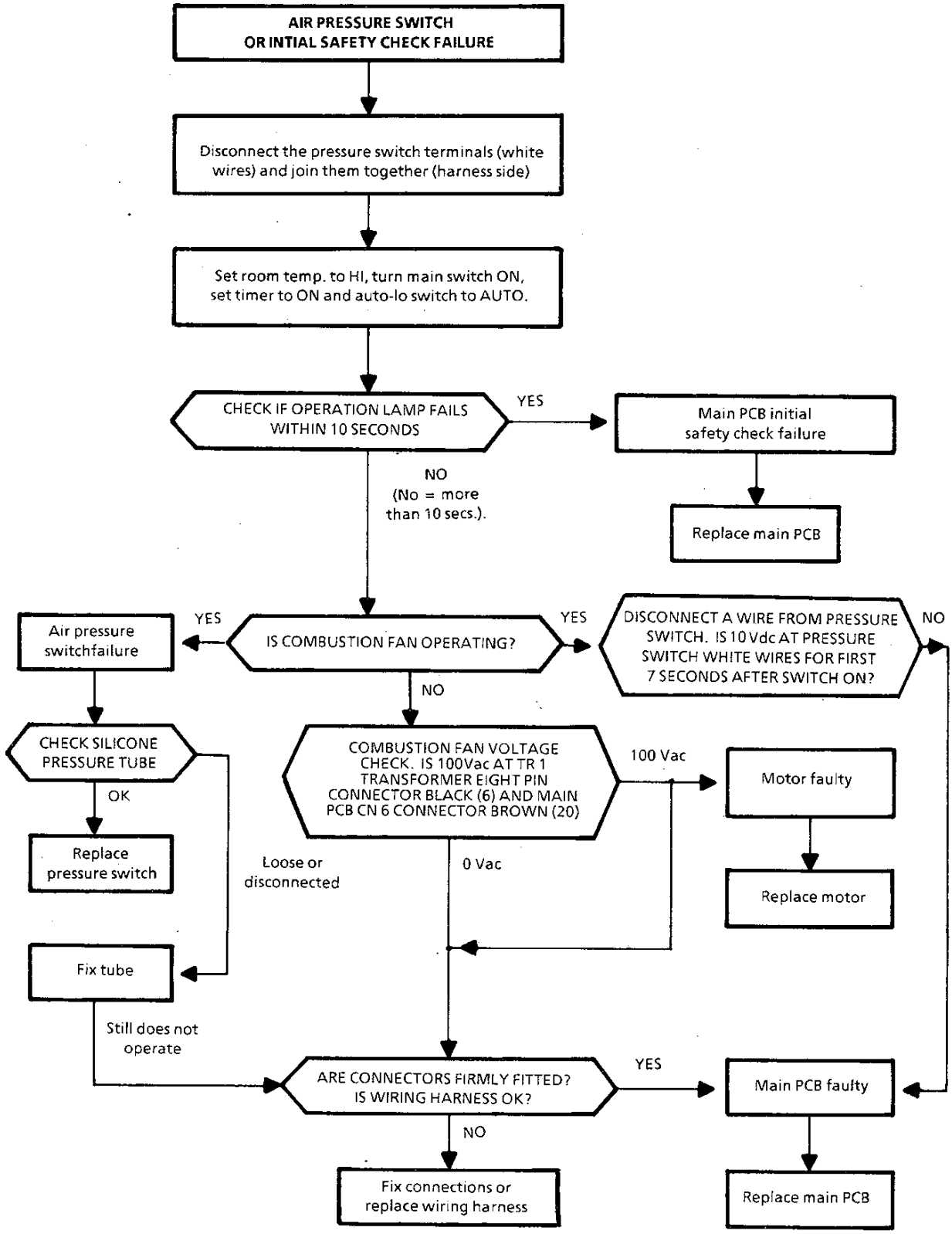


Fig. A IGNITION UNIT

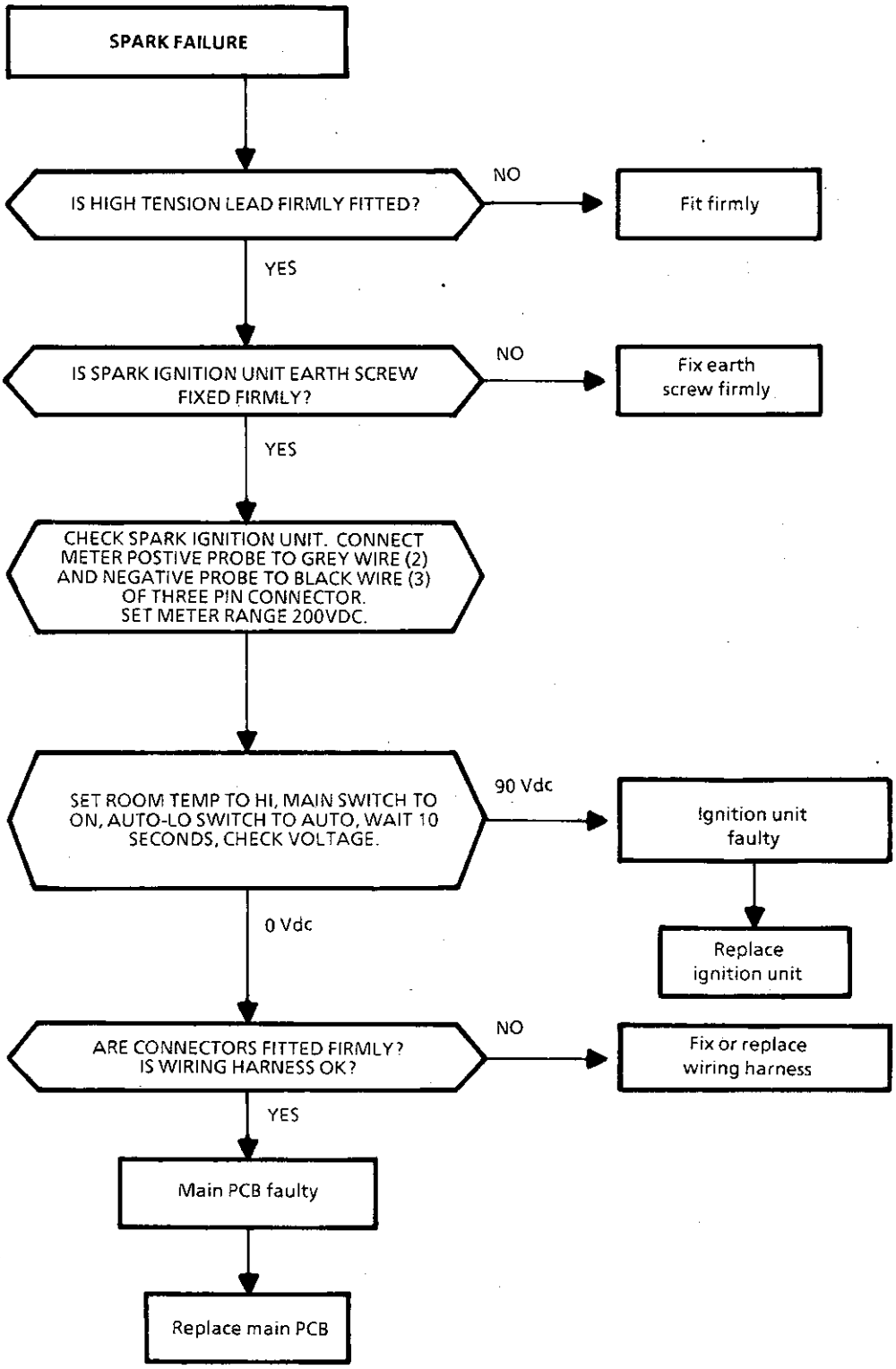
FAULT No. 3


BURNER DOES NOT LIGHT AT ALL. TEMP. CONTROL SET TO HI . TIMER ON, AUTO-LO SWITCH SET TO AUTO POSITION
BURNER DOES NOT STAY ALIGHT. OR OPERATION LAMP FAILS SOON AFTER IGNITION. TEMP. CONTROL HI, TIMER ON AUTO-LO SWITCH SET TO AUTO POSITION
IS TIME FROM LIGHTING TO FAILING MORE THAN 10 SECS.?
NO
Air pressure switch or initial safety check system has failed
4
Refer Fault 4
YES
CAN YOU SEE A SPARK?
NO
5
Refer Fault 5 Spark failure
YES
DO SOLENOID VALVES 1 & 3 OPEN?
NO
6
Refer Fault 6 Spark sensor failure
YES
DOES BURNER LIGHT AT LEAST ONCE?
YES
7
Refer Fault 7 F.G.A. failure
NO
GAS SYSTEM FAILURE
CHECK MAIN PCB AND HARNESS CONNECTIONS
OK
REMOVE CONNECTIONS FROM SOLENOID (DON'T PULL ON WIRES). CHECK RESISTANCE
0Ω
∞Ω
Solenoid short / open circuit
Loose
Fix loose connections
ON - OFF
1.5kΩ approx.
HI - LO
1.7kΩ approx.
Bridge circuit on main PCB is short circuit.
Replace main PCB

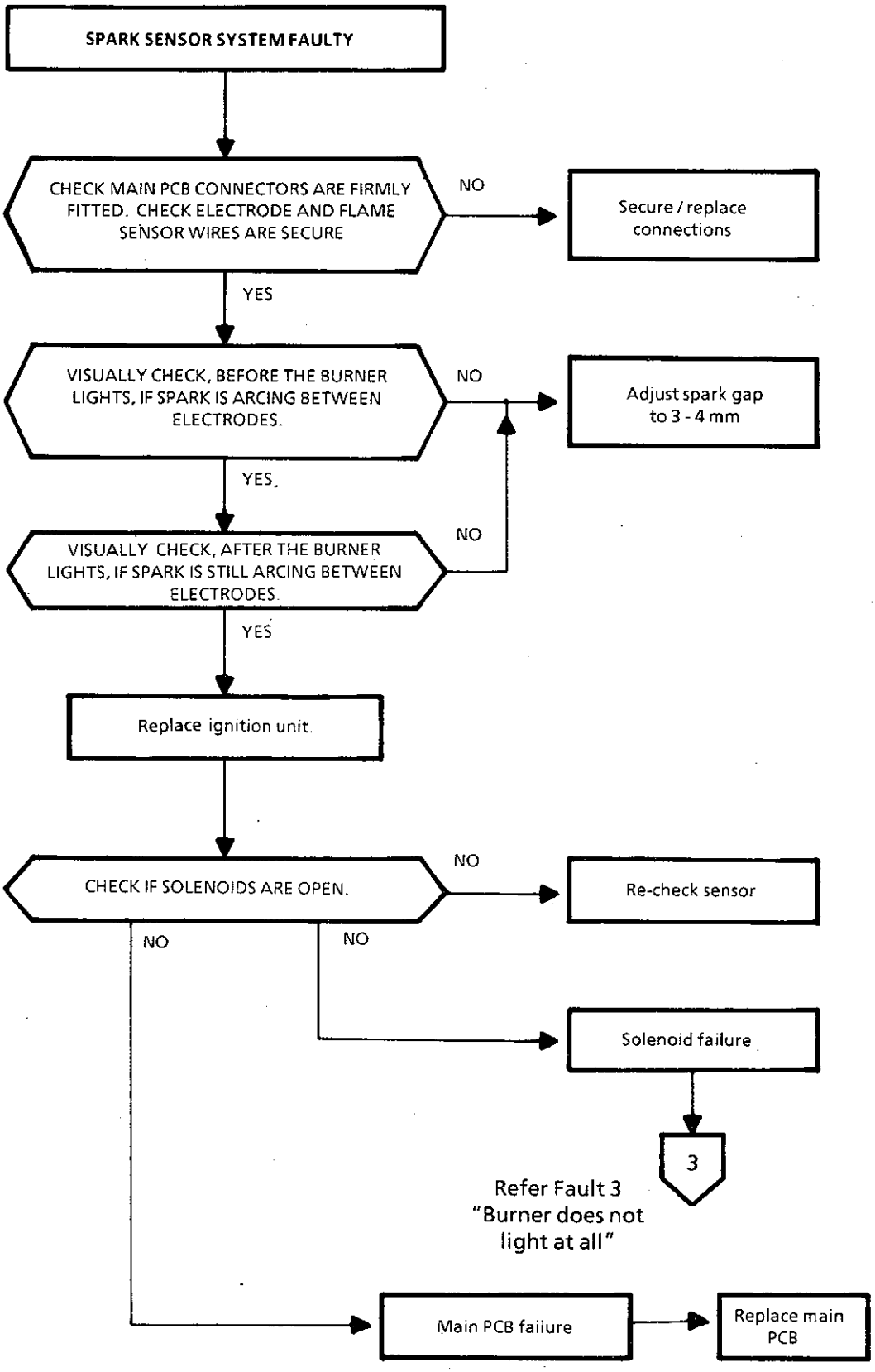
FAULT No. 4


AIR PRESSURE SWITCH
OR INTIAL SAFETY CHECK FAILURE
Disconnect the pressure switch terminals (white wires) and join them together (harness side)
Set room temp. to HI, turn main switch ON, set timer to ON and auto-lo switch to AUTO.
CHECK IF OPERATION LAMP FAILS WITHIN 10 SECONDS
YES
Main PCB initial safety check failure
Replace main PCB
NO
(No = more than 10 secs.).
Air pressure switchfailure
YES
IS COMBUSTION FAN OPERATING?
YES
DISCONNECT A WIRE FROM PRESSURE SWITCH. IS 10 Vdc AT PRESSURE SWITCH WHITE WIRES FOR FIRST 7 SECONDS AFTER SWITCH ON?
NO
NO
CHECK SILICONE PRESSURE TUBE
OK
Replace pressure switch
COMBUSTION FAN VOLTAGE CHECK. IS 100Vac AT TR 1 TRANSFORMER EIGHT PIN CONNECTOR BLACK (6) AND MAIN PCB CN 6 CONNECTOR BROWN (20)
100 Vac
Motor faulty
Replace motor
Loose or disconnected
0 Vac
Fix tube
Still does not operate
ARE CONNECTORS FIRMLY FITTED? IS WIRING HARNESS OK?
YES
Main PCB faulty
NO
Fix connections or replace wiring harness
Replace main PCB

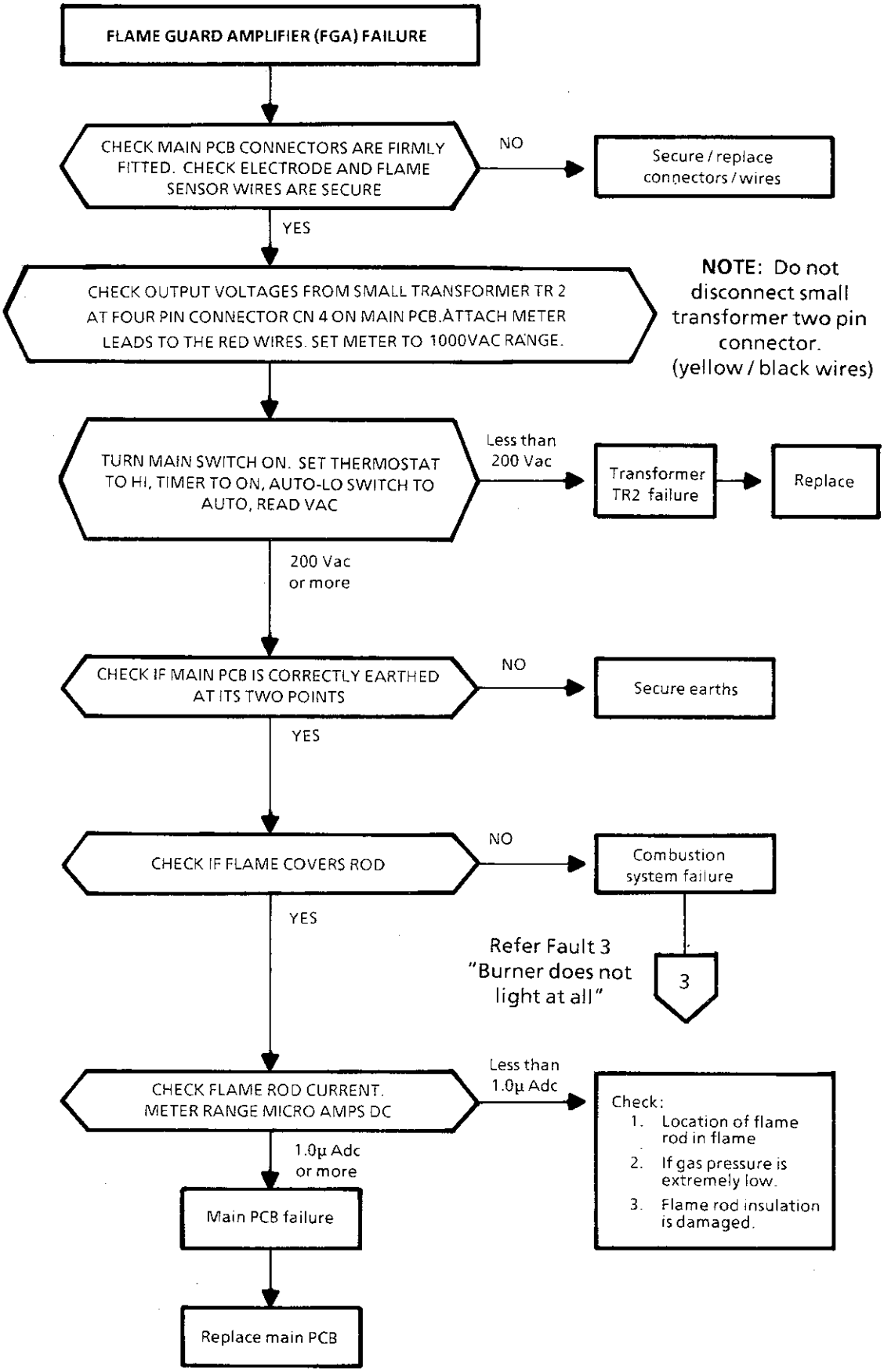
FAULT No. 5


SPARK FAILURE
IS HIGH TENSION LEAD FIRMLY FITTED?
NO
Fit firmly
YES
IS SPARK IGNITION UNIT EARTH SCREW FIXED FIRMLY?
NO
Fix earth screw firmly
YES
CHECK SPARK IGNITION UNIT. CONNECT METER POSTIVE PROBE TO GREY WIRE (2) AND NEGATIVE PROBE TO BLACK WIRE (3) OF THREE PIN CONNECTOR. SET METER RANGE 200VDC.
SET ROOM TEMP TO HI, MAIN SWITCH TO ON, AUTO-LO SWITCH TO AUTO, WAIT 10 SECONDS, CHECK VOLTAGE.
90 Vdc
Ignition unit faulty
Replace ignition unit
0 Vdc
ARE CONNECTORS FITTED FIRMLY? IS WIRING HARNESS OK?
NO
Fix or replace wiring harness
YES
Main PCB faulty
Replace main PCB

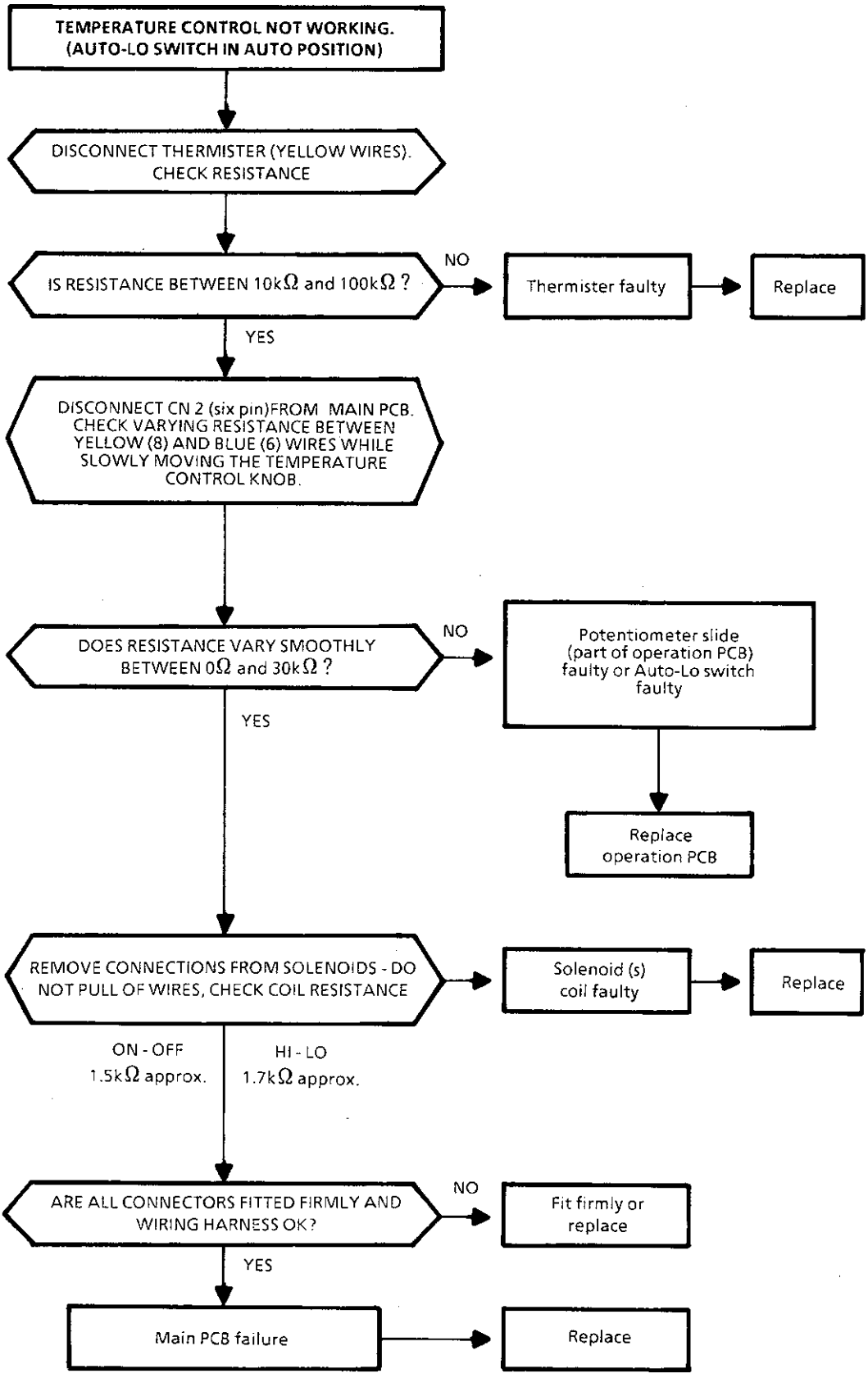
FAULT No. 6


SPARK SENSOR SYSTEM FAULTY
CHECK MAIN PCB CONNECTORS ARE FIRMLY FITTED. CHECK ELECTRODE AND FLAME SENSOR WIRES ARE SECURE
NO
Secure / replace connections
YES
VISUALLY CHECK, BEFORE THE BURNER LIGHTS, IF SPARK IS ARCING BETWEEN ELECTRODES.
NO
Adjust spark gap to 3 - 4 mm
YES
VISUALLY CHECK, AFTER THE BURNER LIGHTS, IF SPARK IS STILL ARCING BETWEEN ELECTRODES.
NO
YES
Replace ignition unit.
CHECK IF SOLENOIDS ARE OPEN.
NO
Re-check sensor
NO
NO
Solenoid failure
3
Refer Fault 3 "Burner does not light at all"
Main PCB failure
Replace main PCB

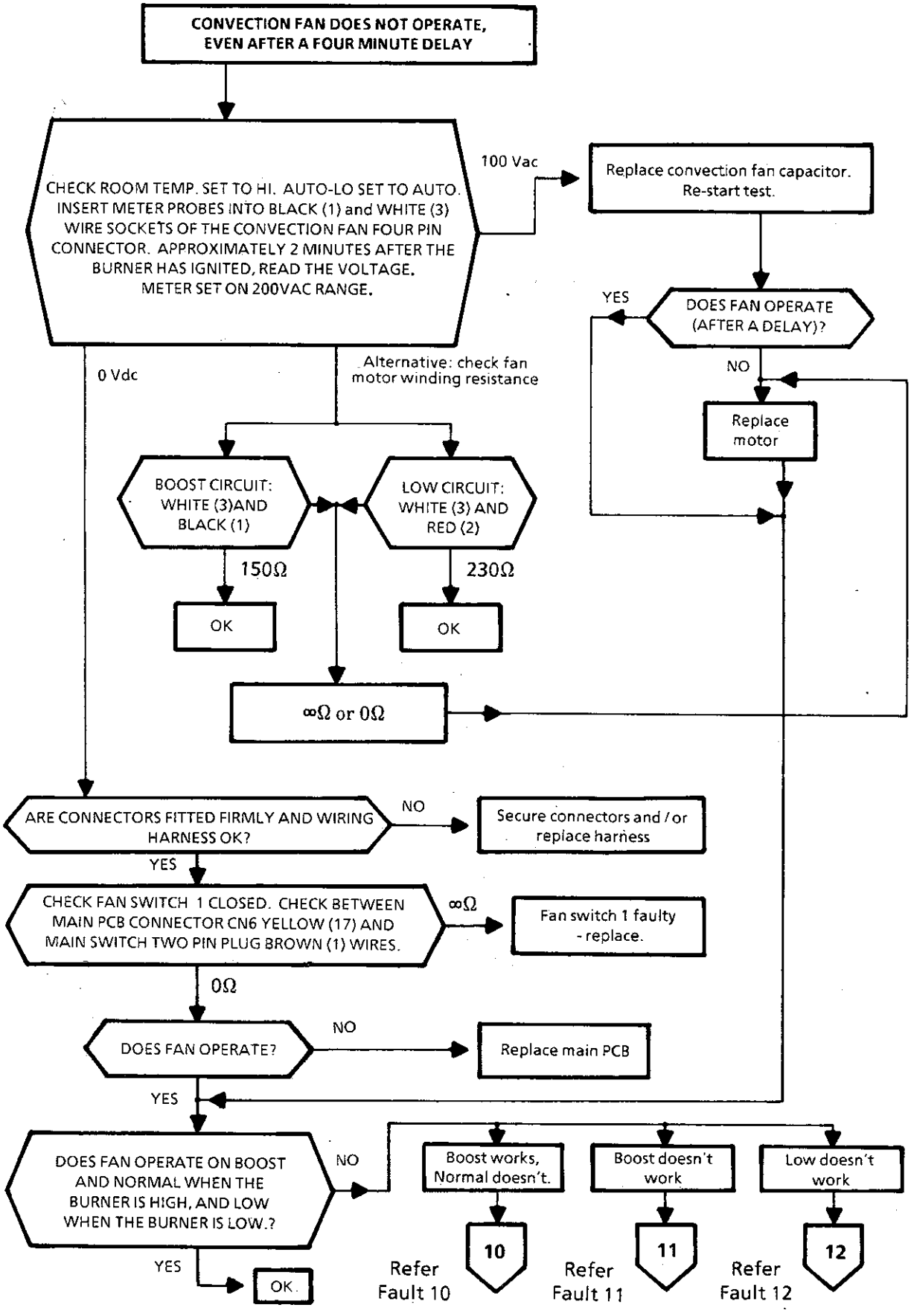
FAULT No. 7


FLAME GUARD AMPLIFIER (FGA) FAILURE
CHECK MAIN PCB CONNECTORS ARE FIRMLY FITTED. CHECK ELECTRODE AND FLAME SENSOR WIRES ARE SECURE
NO
Secure / replace connectors / wires
YES
CHECK OUTPUT VOLTAGES FROM SMALL TRANSFORMER TR 2 AT FOUR PIN CONNECTOR CN 4 ON MAIN PCB.ATTACH METER LEADS TO THE RED WIRES. SET METER TO 1000VAC RANGE.
NOTE: Do not disconnect small transformer two pin connector. (yellow / black wires)
TURN MAIN SWITCH ON. SET THERMOSTAT TO HI, TIMER TO ON, AUTO-LO SWITCH TO AUTO, READ VAC
Less than 200 Vac
Transformer TR2 failure
Replace
200 Vac or more
CHECK IF MAIN PCB IS CORRECTLY EARTHED AT ITS TWO POINTS
NO
Secure earths
YES
CHECK IF FLAME COVERS ROD
NO
Combustion system failure
YES
Refer Fault 3 "Burner does not light at all"
3
CHECK FLAME ROD CURRENT. METER RANGE MICRO AMPS DC
Less than 1.0µ Adc
Check:
1. Location of flame rod in flame
2. If gas pressure is extremely low.
3. Flame rod insulation is damaged.
1.0µ Adc or more
Main PCB failure
Replace main PCB

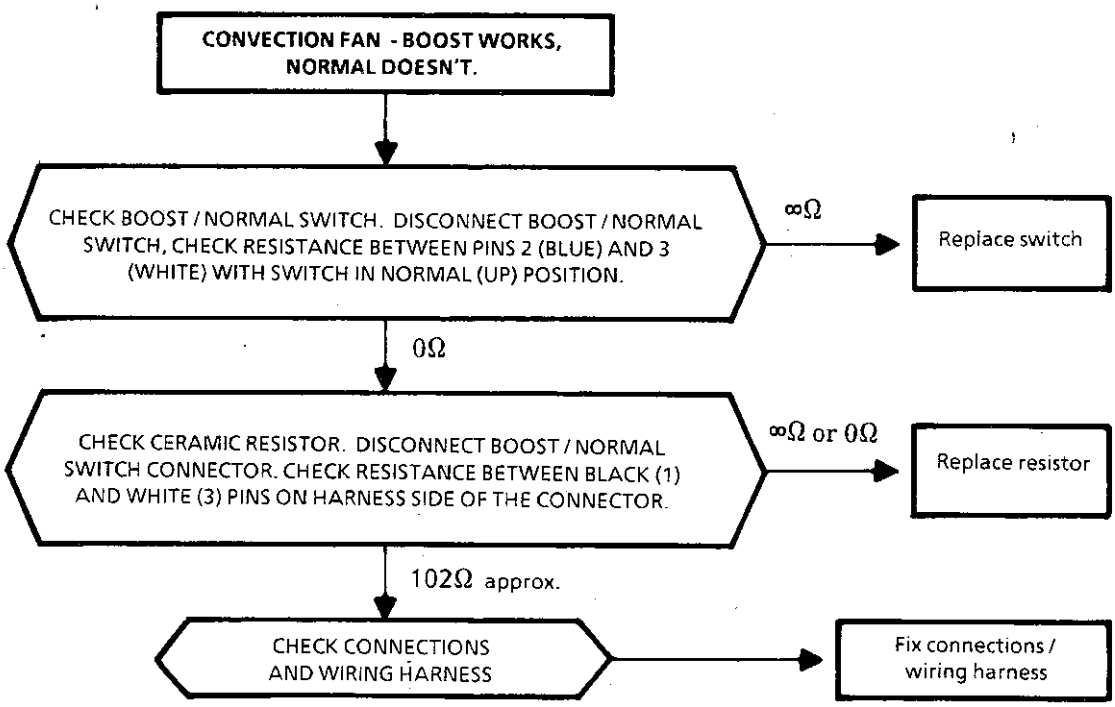
FAULT No. 8


TEMPERATURE CONTROL NOT WORKING. (AUTO-LO SWITCH IN AUTO POSITION)
DISCONNECT THERMISTER (YELLOW WIRES). CHECK RESISTANCE
IS RESISTANCE BETWEEN 10kΩ and 100kΩ ?
NO
Thermister faulty
Replace
YES
DISCONNECT CN 2 (six pin)FROM MAIN PCB. CHECK VARYING RESISTANCE BETWEEN YELLOW (8) AND BLUE (6) WIRES WHILE SLOWLY MOVING THE TEMPERATURE CONTROL KNOB.
DOES RESISTANCE VARY SMOOTHLY BETWEEN 0Ω and 30kΩ ?
NO
Potentiometer slide (part of operation PCB) faulty or Auto-Lo switch faulty
YES
Replace operation PCB
REMOVE CONNECTIONS FROM SOLENOIDS - DO NOT PULL OF WIRES, CHECK COIL RESISTANCE
Solenoid (s) coil faulty
Replace
ON - OFF 1.5kΩ approx.
HI - LO 1.7kΩ approx.
ARE ALL CONNECTORS FITTED FIRMLY AND WIRING HARNESS OK?
NO
Fit firmly or replace
YES
Main PCB failure
Replace

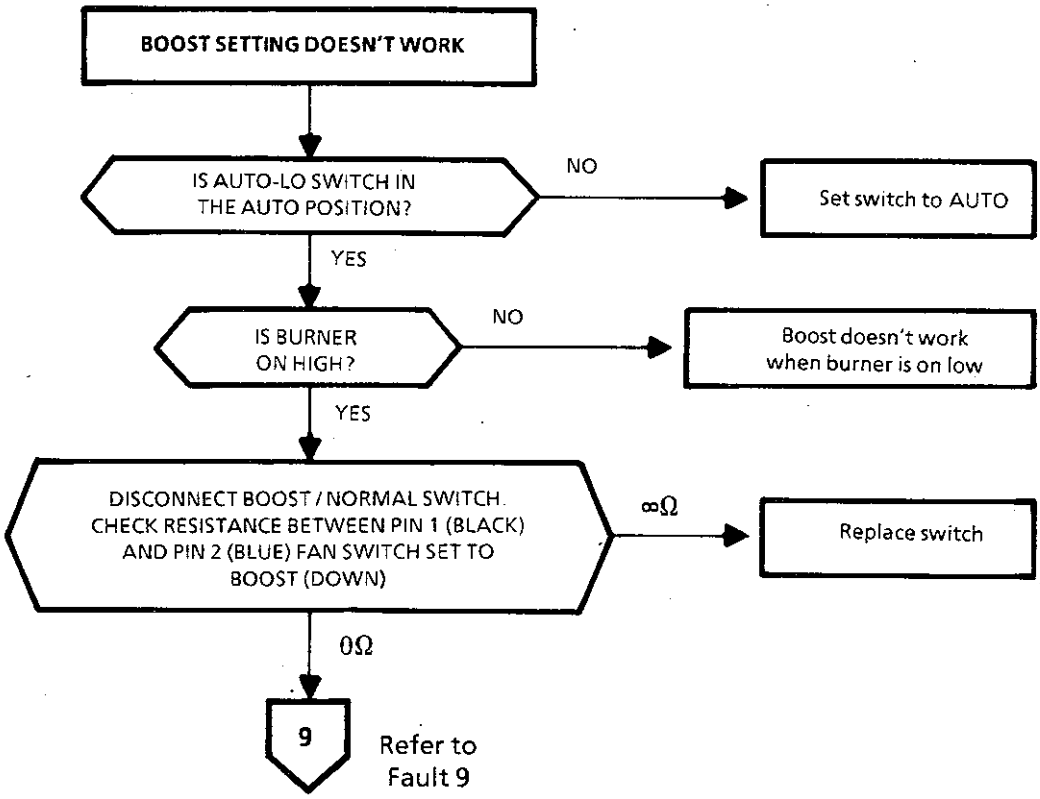
FAULT No. 9


CONVECTION FAN DOES NOT OPERATE, EVEN AFTER A FOUR MINUTE DELAY
CHECK ROOM TEMP. SET TO HI. AUTO-LO SET TO AUTO. INSERT METER PROBES INTO BLACK (1) and WHITE (3) WIRE SOCKETS OF THE CONVECTION FAN FOUR PIN CONNECTOR. APPROXIMATELY 2 MINUTES AFTER THE BURNER HAS IGNITED, READ THE VOLTAGE. METER SET ON 200VAC RANGE.
100 Vac
Replace convection fan capacitor. Re-start test.
YES
DOES FAN OPERATE (AFTER A DELAY)?
NO
Replace motor
0 Vdc
Alternative: check fan motor winding resistance
BOOST CIRCUIT: WHITE (3)AND BLACK (1)
LOW CIRCUIT: WHITE (3) AND RED (2)
150Ω
230Ω
OK
OK
∞Ω or 0Ω
ARE CONNECTORS FITTED FIRMLY AND WIRING HARNESS OK?
NO
Secure connectors and / or replace harness
YES
CHECK FAN SWITCH 1 CLOSED. CHECK BETWEEN MAIN PCB CONNECTOR CN6 YELLOW (17) AND MAIN SWITCH TWO PIN PLUG BROWN (1) WIRES.
∞Ω
Fan switch 1 faulty - replace.
0Ω
DOES FAN OPERATE?
NO
Replace main PCB
YES
DOES FAN OPERATE ON BOOST AND NORMAL WHEN THE BURNER IS HIGH, AND LOW WHEN THE BURNER IS LOW.?
NO
Boost works, Normal doesn't.
Boost doesn't work
Low doesn't work
YES
OK
Refer Fault 10
10
Refer Fault 11
11
Refer Fault 12
12

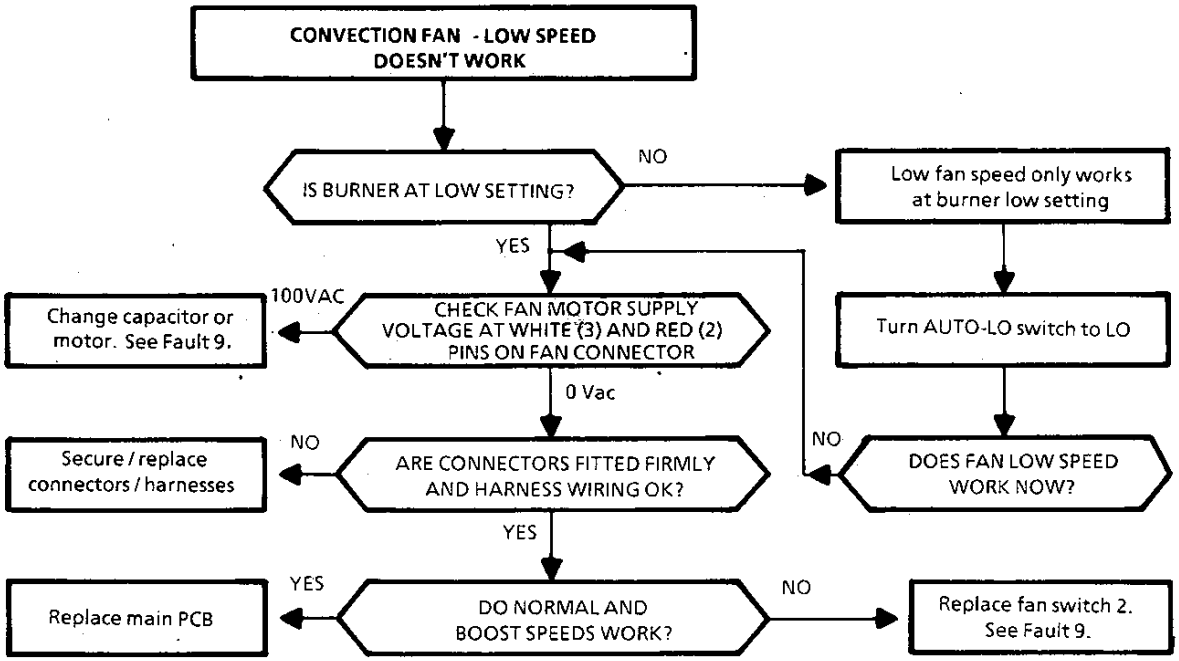
FAULT No. 10



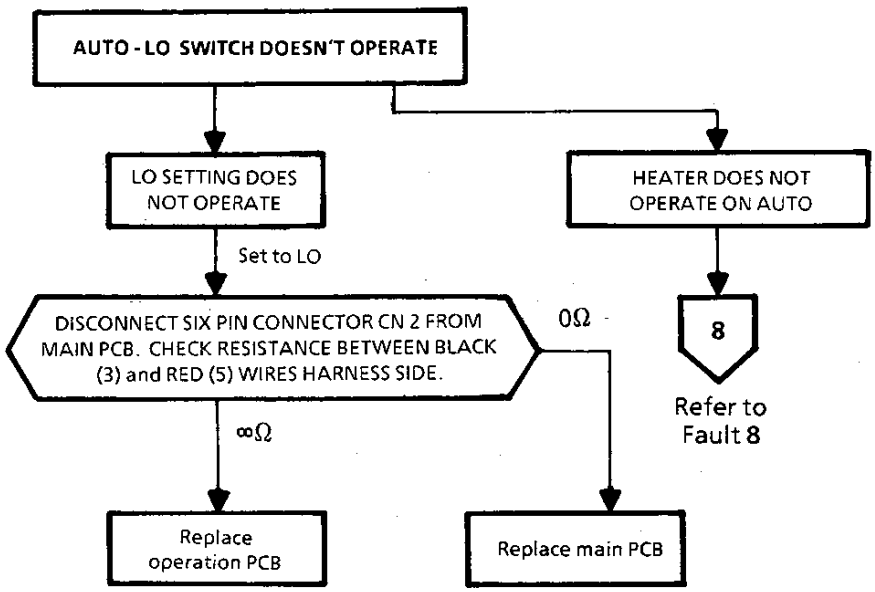
FAULT No. 11



FAULT No. 12



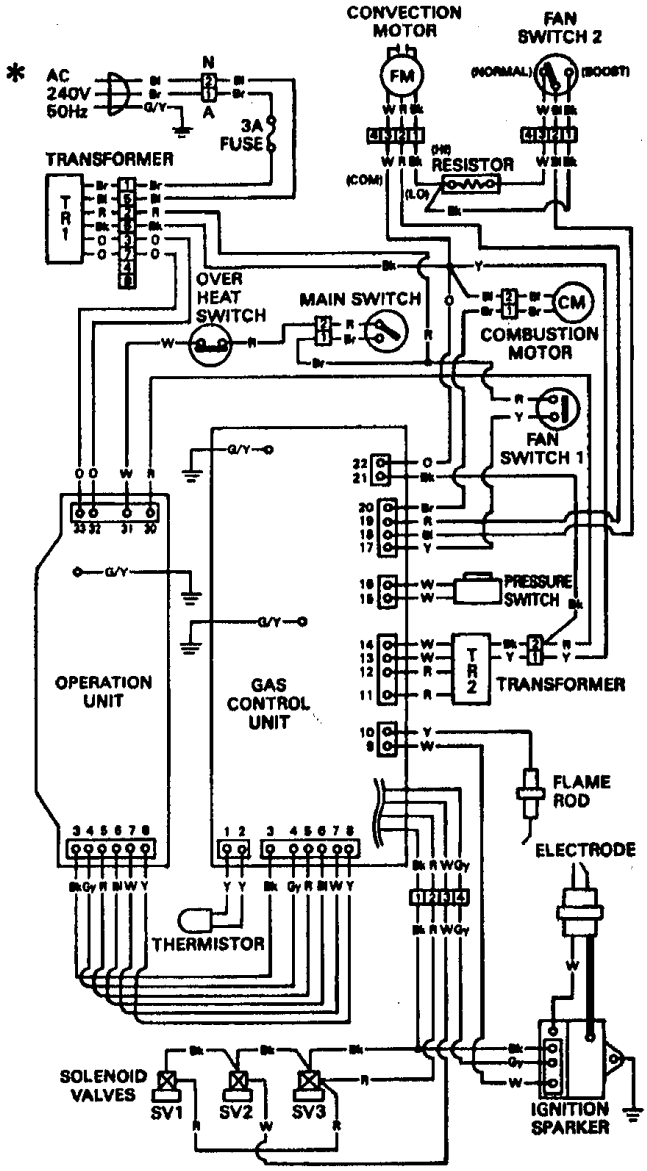
FAULT No. 13



Please check this fault finding chart before asking for a service call you may be able to overcome the problem without a service call, or the unit may be operating normally.
Service calls to a unit which is operating normally may be chargeable, even when the unit is under warranty.
If you are unsure about the way the unit is operating, contact Rinnai or your Agent.

Problem / Cause	No operation lamp	Burner does'nt light	Unusual Combustion	Combustion stops during opera	Smell of Gas	Takes too long to heat the room	Burner stays on low	Fan keeps running when unit is turned off. Fan doesn't start immediately. Fan speed varies.	Remedy
Not Plugged In	●	●							Plug In and switch on.
Power Cut/failure	●	●		●					Re-ignite when power is restored
(Initial Installation) Air in gas pipe		●							Purge air (Installer)
Gas filter blocked		●	●			●			Service Call (Contact Rinnai)
Mis-ignition		●							Check Customers instructions
Louvre obstructed				●					Clean obstruction
Burner Filter blocked			●						Clean with vacuum cleaner
Small plastic filter on RHS is blocked						●	●		Clean with vacuum cleaner
Timer is set		●							Return timer to 'ON' position
Auto-Lo switch is in "LO" position						●	●		Return switch to 'AUTO' position
Gas escape					●				Service Call (Contact Rinnai)
Auto Fan Switch operating								●	Normal operation
Room Too Large						●			Service Call (Contact Rinnai)
Gas turned OFF at metre	●	●							Turn gas on

11. Wiring Diagram



*Supply lead must only be replaced with Rinnai Part Number **90161894**

O:orange W:white R:red
Y:yellow Bl:blue Br:brown
Bk:black Gy:gray
G/Y:green & yellow

12. Gas Conversion

Note: All Service work must be carried out by an Authorised Person.

Conversion Method

Warning-Ensure power card is disconnected from power point (240V potential) and isolate gas supply

1. Remove bottom louver, 2 screws
2. Remove front panel, 4 screws, 2 top, 2 bottom
3. Delete "Natural" from inside bottom panel. Write "Propane" in felt tip pen ***Or***
   Delete "Propane" from inside bottom panel. Write "NAT" in felt tip pen.
4. Replace small gas label on gas inlet
5. Replace large gas label on back of appliance
6. Place "Propane" very small gas label over "Natural" on Data Plate ***Or***
   Place "Natural" from inside bottom panel. Write "Propane" on Data Plate.
7. Record serial number on Heater Gas Conversion Record sheet (F) **For Workshop Use Only**
8. Complete details on conversion sticker, place sticker inside left-hand side panel **For Workshop Use Only**
9. Remove Filter and Filter cover to main injector
10. Remove 1 screw from burner and move burner away from injector
11. Remove main injector
12. Fit injectors (Natural Gas 2.45 mm, Propane 1.55 mm)
13. Replace burner and screws
14. Remove Bypass screw at back of gas control. If the appliance is an Inbuilt, there is a hole in the backside of panel for excess. If appliance is a Console, side panel may have to be removed for easy excess.
15. Remove regulator lid 4 screws, take care with internal parts of regulator
16. Remove pressure adjustment screw, then replace on new regulator lid
17. Replace regulator lid, 4 screws ensuring breather hole is facing to the back of the unit, and diaphragm is sitting in position.
18. Fit Bypass screw (Natural Gas 3.50 mm, Propane 1.20 mm)
19. Connect appliance to gas and electricity
20. Set incoming pressure (Natural Gas 1.13 / 2.75 kPa, Propane 2.75 kPa)
21. Remove test point screw
22. Connect pressure gauge
23. Light appliance on full
24. Set test point pressure (Natural Gas 0.95 kPa, Propane 2.45 kPa)
25. Turn appliance off
26. Remove gauge and replace test point screw
27. Test for gas escapes
28. Disconnect appliance from services
29. Replace filter and filter cover

Replace front cover and bottom louvre

13. Dismantling for Service

240 volt potential exposure. Isolate the appliance and reconfirm with a neon screwdriver or multimeter.

Item *Page*

Unless otherwise stated, re-assembly is the reverse of dismantling.

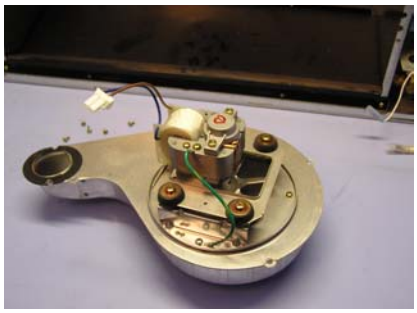
240 volt potential exposure. Isolate the appliance and reconfirm with a neon screwdriver or multimeter.

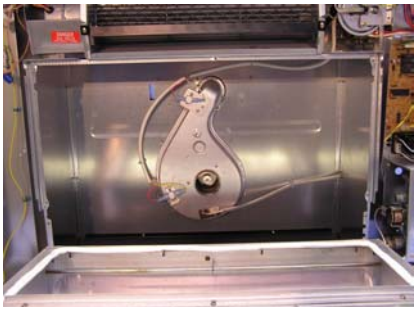
1) Bottom Grill Removal 1. Isolate the 240 V power supply to the appliance. 2. Remove grill attaching screws (2-off). 3. Grasp the bottom of the grill with both hands, swing it out just clear of its bottom locating tabs (approx. 12 mm 1/2 inch), then allow the grill to drop down. 4. The top tabs will now clear their locating slots, the grill to be withdrawn.	
2) Replacement of Bottom Grill 1. Place the bottom edge of the grill air duct over and inside the edge of the cabinet case. 2. Align the grill flush with the cabinet, raise the grill and locate its top tabs, then grasp the bottom of the grill and press up gently to locate its bottom tabs. 3. Replace two grill attaching screws.	
3) Front Cover Removal 1. Isolate the 240 V power supply to the appliance. 2. Remove bottom grill. 3. Remove two attaching screws, one from each bottom side of front cover. 4. Swing bottom of front cover out, then lift up until it clears its top locating tabs.	
4) Air Filters Removal 1. Isolate the 240 V power supply to the appliance. 2. Remove bottom grill and front cover. 3. Unclip filter from inside front cover.	

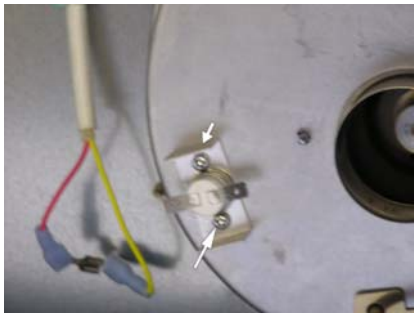
240 volt potential exposure. Isolate the appliance and reconfirm with a neon screwdriver or multimeter.

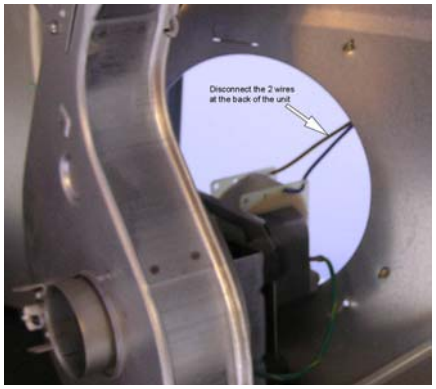
5) Heat Exchanger / Overheat and Fan Switch / Combustion Fan Removal

1. Isolate the 240 V supply to the appliance.
2. Remove bottom grill, front cover and radiants.
3. Remove combustion air filter and air duct assembly.
4. Remove main burner assembly.
5. Remove main burner gas supply line (2-screws on burner, unscrew from gas control).
6. Remove the Heat Exchanger mounting screws (5-screws), pull Heat Exchanger forward.
7. Unplug wiring from fan switch and overheat switch.
8. Disconnect Air Hose and remove (5-mounting screws) on fan housing.
9. Pull Housing towards you. Reach through fan opening on rear of case and unplug 2-pin polarised plug.





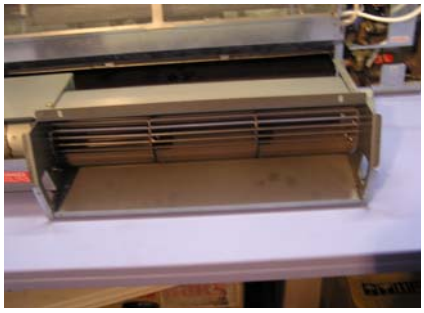




240 volt potential exposure. Isolate the appliance and reconfirm with a neon screwdriver or multimeter.

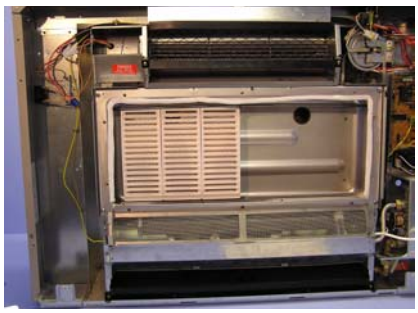
6) Fan Removal

1. Isolate the 240 V power supply to the appliance.
2. Remove bottom grill and front cover.
3. Unplug lead to fan motor.
4. Disconnect the 2-brown leads (push-on type terminals) from the capacitor.
5. Remove the cabinet support plate from the top of the fan casing (2-screws).
6. Remove (2-screws) from fan access grill.
7. Remove the 2-fan mounting screws (1-each side), then pull the fan free.



7) Radiants Removal

1. Isolate the 240 V power supply to the appliance.
2. Remove bottom grill and front cover.
3. Remove top and both side glass support strips (7-screws).
4. Remove glass, then remove radiants as required.



8) Main Burner Removal

1. Isolate the 240 V power supply to the appliance.
2. Remove bottom grill and front cover.
3. Remove combustion air filter and air duct panel assembly.

Note: On re assembly, it is most important that the bottom edge of the duct panel with its two locating tabs, is correctly engaged over the bottom front edge of the heat exchanger panel.

240 volt potential exposure. Isolate the appliance and reconfirm with a neon screwdriver or multimeter.

Main Burner Removal continued

4. Disconnect gas burner gas supply tube and remove.
5. Unclip igniter electrode from pilot assembly mounting bracket.
6. Unclip flame rod wire (left hand side electrode).
7. Remove burner mounting screw and pull main burner assembly free.

9) Gas Control Removal

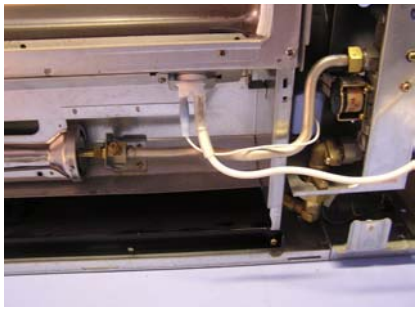
1. Isolate the 240 V power supply to the appliance.
2. Isolate the gas supply to the appliance.
3. Remove the bottom grill and front cover.

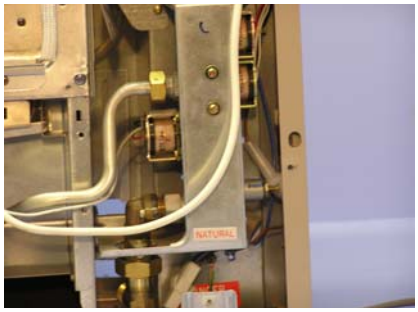
Note: On re-assembly, ensure that the appliance control knob and the gas control knob, are in the same position when re-pinned together (for example, both in the PILOT OFF position).

4. Unscrew thermocouple lead assembly from gas control.
5. Unscrew pilot burner gas supply line from the gas control.
6. Undo Barrel union gas connection.
7. Undo Gas Valve mounting bracket (3 screws).
8. Undo Burner supply tube.

Note: On re-assembly ensure that the thermostat phial is positioned so that its body runs the full length of the plastic grill.

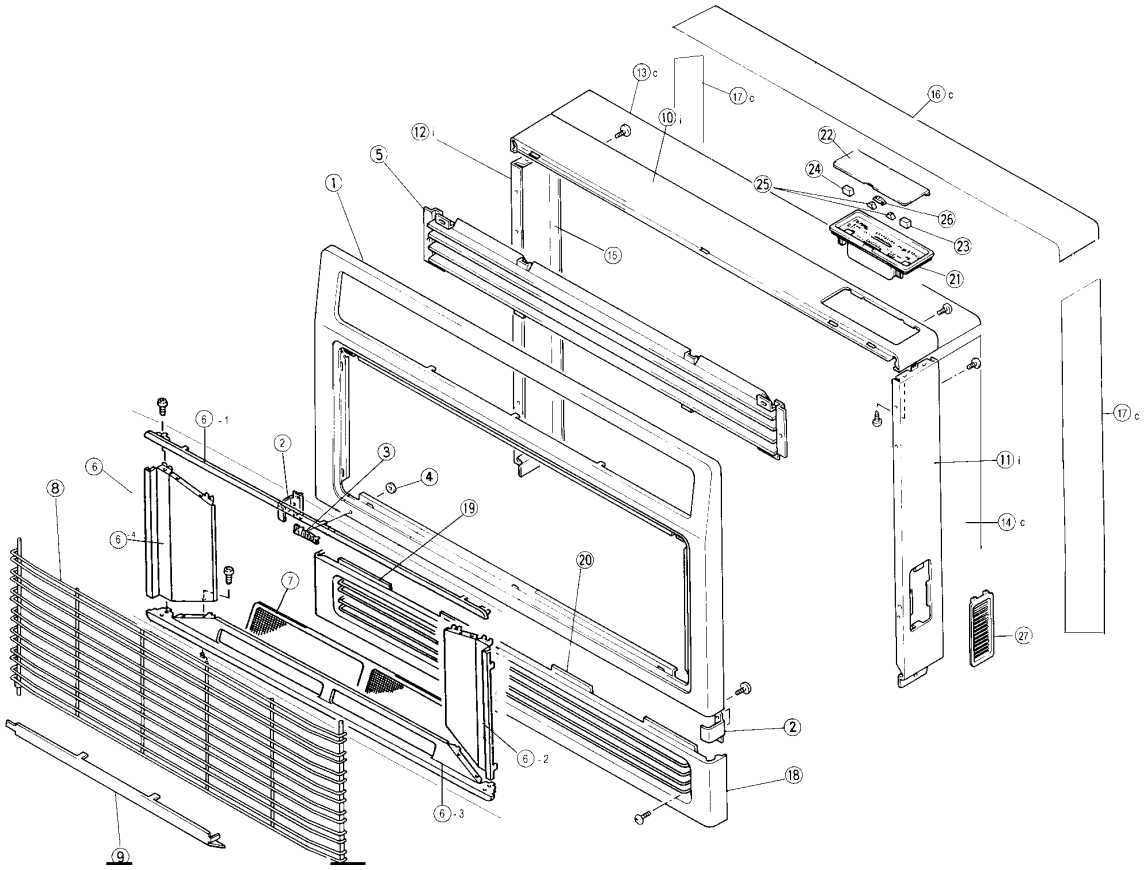
9. Remove the two attaching screws from the gas control and pull it free.

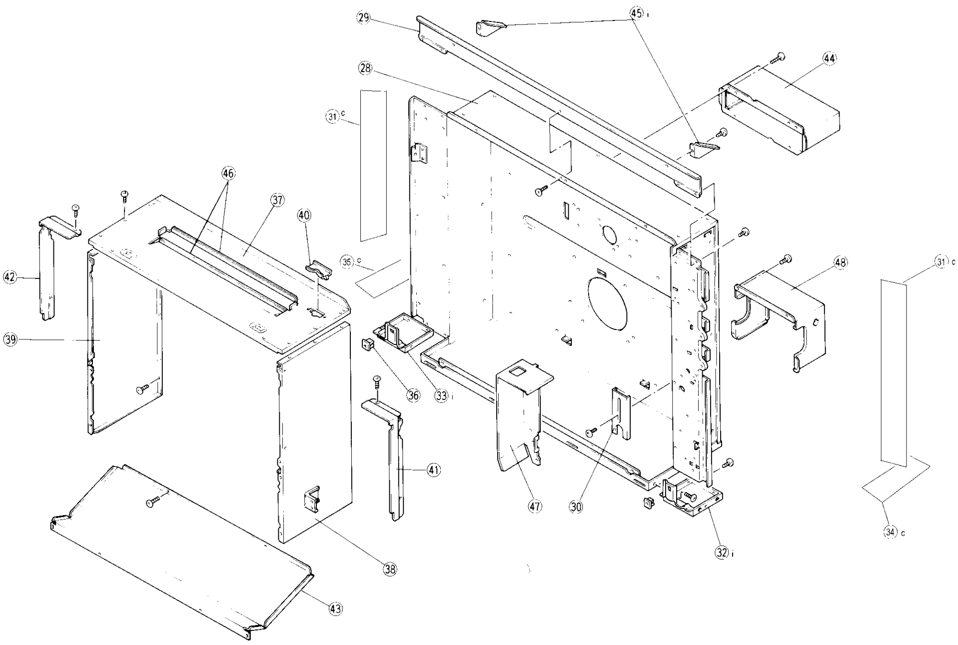




Note: Ensure that the sealing gasket is correctly located on each of the flue exhaust outlets before re-assembly of the heat exchanger to the inner casing.

14. Exploded Diagrams





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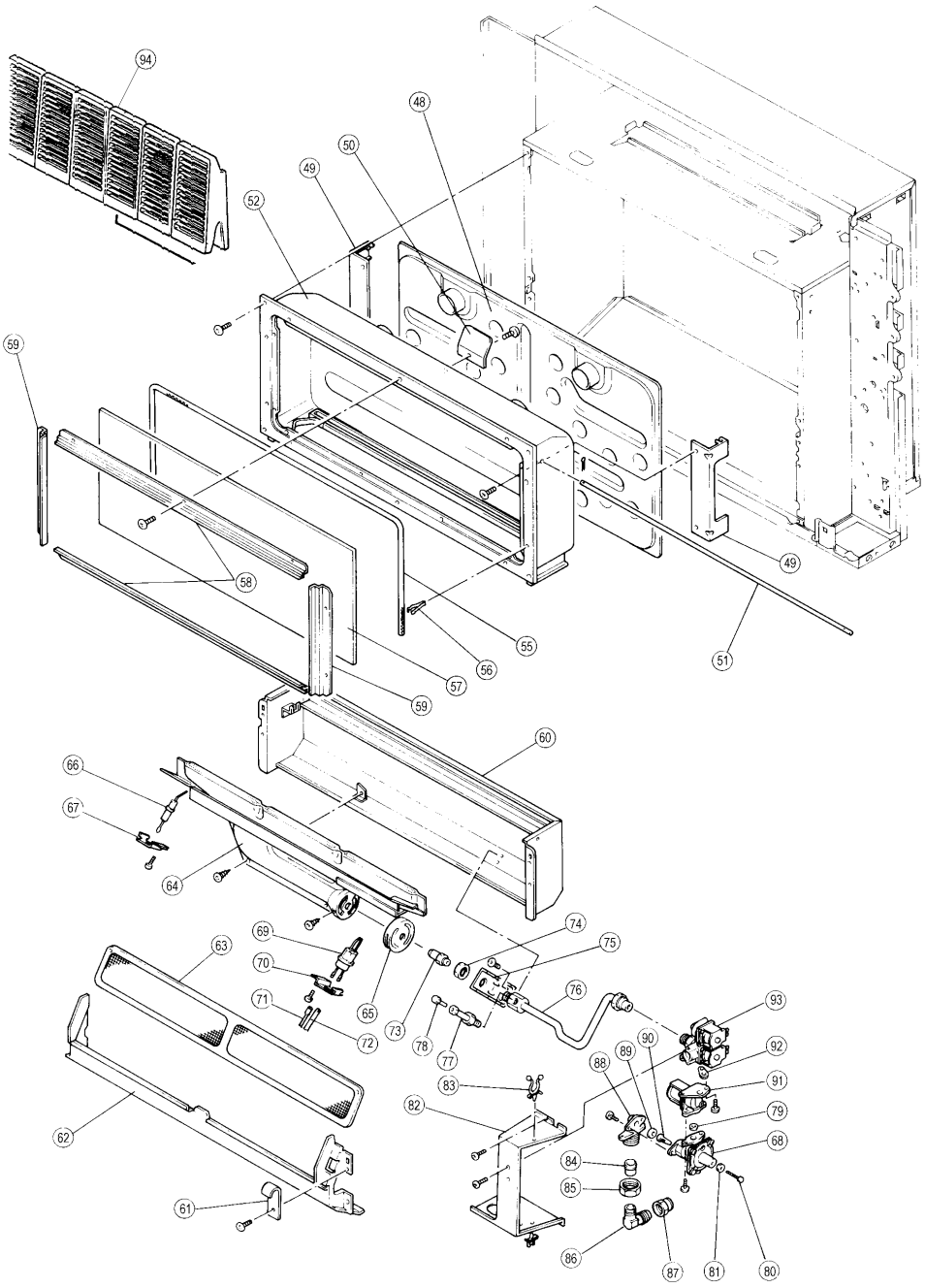
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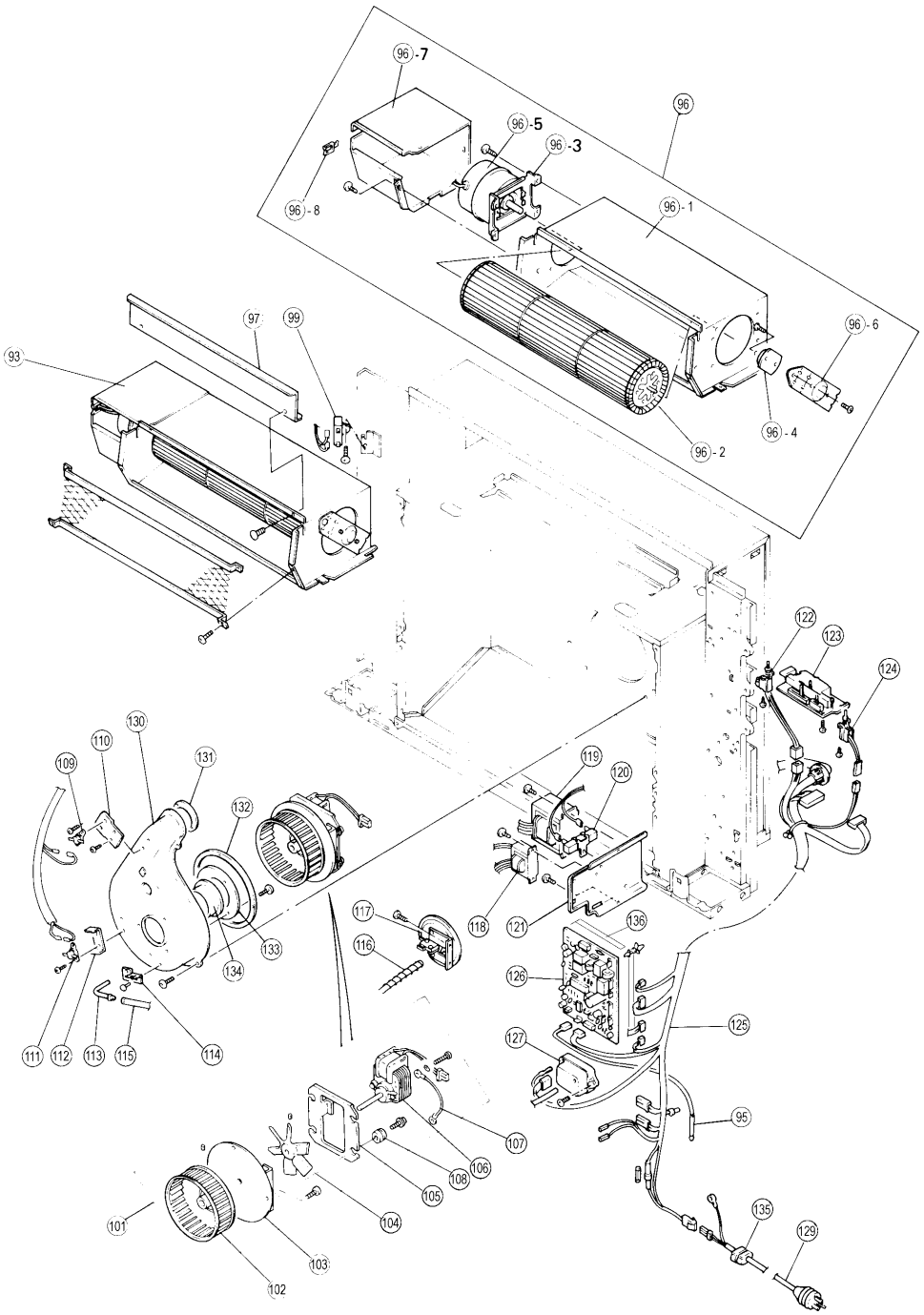
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15. Parts List

Effective Date: 6/01/2006
Supercedes: 1999

REH301FT - INBUILT & CONSOLE

No.	Part Name	RA Part No.	11 Digit Code	RJ Part No.	Qty
001	Panel Front B (Beige)	90150632	019-877-000		1
001	Panel Front B (Gun Metal)	90180837	019-0088000	REH300-39-D	1
002	Front Panel Bracket		537-675-000	REH210-35	2
003	Rinnai Badge	90178815	602-228-000	CP-70114	1
004	Bushing Nut		502-252-000	ZRHA03SO	1
005	Louvre Top (Beige)	90150582	046-152-000	REH300-158-B	1
005	Louvre Top (Gun Metal)	90181025	046-153-000	REH300-158-C	1
006-1	Reflector (Top) (Beige)	90186024	038-129-000	REH300-28-2C-1	1
006-1	Reflector (Top) (Gun Metal)	90184649	038-145-000	REH300-28-1C-1	1
006-2	Side Reflector (Beige)	90186032	038-146-000	REH300-29C-1	2
006-2	Side Reflector (Gun Metal)	90184631	038-128-000	REH300-68-4	2
006-3	Bottom Side Reflector (Beige)	90186040	038-130-000	REH300-28-1C-1	1
006-3	Bottom Side Reflector (Gun Metal)	90184656	038-147-000	REH300-137-2	1
007	Filter, Air (Beige)		017-304-000	REH300-68-4	1
007	Filter, Air (Gun Metal)	90177221	017-304-000	REH300-68-3	1
008	Guard B	90147760	056-158-000	REH280-109	1
009	Dress Guard, Heat Shield	90195900	030-830-000	REH300-137-2	1
010	Panel, Top (FTB Beige) Inbuit	90150376	001-766-000	REH300-161-1-A	1
010	Panel, Top (FTB Gun Metal) Inbuit	90180985	001-788-000	REH300-161-1-D	1
011	Panel Side R/H (FTB.Beige) Inbuilt	90150384	003-551-000	REH280-17-3A	1
011	Panel, R/H Side (FTB Gun Metal) Inbuilt	90180845	003-579-000	REH280-17-3D	1
012	Panel, L/H Side (FTB Beige) Inbuilt	90147836	003-560-000	REH280-17-2A	1
013	Panel, L/H Side (FTB Gun Metal) Inbuilt	90180852	003-561-000	REH280-17-2D	1
013	Panel, Top (FTC Beige) Console	90150400	001-728-000	REH300-161-2-A	1
014	Panel, R/H Side (FTC Beige) Console	90150418	001-789-000	REH280-18-3A	1
014	Panel, R/H Side (FTC Gun Metal) Console	90180910	003-578-000	REH280-18-3D	1
015	Panel, L/H Side (FTC Beige) Console		003-578-000	REH280-18-2A	1
015	Panel, L/H Side (FTC Gun Metal) Console	90180902	003-563-000	REH280-18-2D	1
016	Spacer Back (Top) (FTC. Beige) Console	90150434	003-563-000	REH300-133	1
016	Spacer Back (Top) (FTC.G Metal) Console	90180928	550-136-000	REH300-133-B	1
017	Spacer Back (Side) (FTC. Beige) Console	90150442	550-132-000	REH300-134	2
017	Spacer Back (Side) (FTC.G Metal) Console	90180936	550-155-000	REH300-134-B	2
018	Louvre, Bottom (Beige)	90180290	019-893-000	REH300-40E	1
018	Louvre, Bottom (Gun Metal)	90180860	019-0694000	REH300-40D	1
019	Packing B		526-145-000	REH300-21-2	2
020	Packing C		526-146-000	REH300-21-3	2
021	Control Box Assy 30FT	90177015	527-205-000	REH300-313	1
022	Lid Control	90150467	035-882-000	REH300-106	1

No.	Part Name	RA Part No.	11 Digit Code	RJ Part No.	Qty
023	Button ON/OFF or Fan	90150202	023-533-000	3220T-0916-5X02	2
025	Knob Temp	90159799	021-370-000	REH300-107	1
026	Knob Timer	90146093	021-368-000	302F-0814X01	1
027	Vent Thermistor (Beige)	90150491	233-159-000	REH300-126-A	1
027	Vent Thermistor (Black)	90178757	061-058-000		1
036	Screw		502-297-000	CP-30393	2
044	Exhaust Pipe Assy	90175761	055-556-000	REH300-130	1
046	Pipe Packing		580-809-000	REH300-21-1	2
047	P.C.B. Heat Shild Bracket			REH300-113	1
048	Motor Cover		098-0033000	REH300-90	1
050	Heat Exchanger Assembly	90192568	314-436-000	REH300-33	1
053	Rod Holding Radiant	90147091	538-228-000	REH300-51	1
054	Combustion Chamber	90150905	092-059-000	REH300-30	1
055	Seal Packing Glass	90147133	580-655-000	REH300-52	1
056	Clip		008-024-944	RCK-6184	8
057	Panel, Glass	90147109	051-081-000	REH300-53	1
058	Retainer, Glass (Top and Bottom)	90147117	538-229-000	REH300-55	2
059	Retainer, Glass (Side)	90147125	538-084-000	REH300-56	2
060	Burner Box Assy	90149097	527-204-000	REH300-60	1
061	Gas Supply Tube Bracket		037-0001000	1001F-101-3	1
062	Front Panel Assembly		019-0707000	REH300-64	1
063	Air Filter Burner	90148982	017-972-000	REH300-68-2	1
064	Burner Assembly	90148990	150-487-000	REH300-71	1
065	Shutter Aeration	90148966	140-645-000	REH300-73	1
066	Flame Rod	90150483	230-054-000	REH300-123	1
067	Flame Rod Retainer		538-232-000	REH300-124	1
068	Regulator Assy	90150517	117-136-000	C2E-5-3	1
068	Regulator Assy (LPG)			C2E-5-4	1
069	Electrode	90150509	202-087-000	REH300-141	1
070	Electrode Retainer		538-233-000	REH300-122	1
072	High Tension Cord		203-795-000	CP-90151-1	1
073	Main Injector - NG 2.45	90150244	130-428-245	CP-60013B-2.45	1
073	Main Injector - LPG 1.55	90150236	131-272-155	CP-60013B-1.55	1
074	Nut		502-005-000	8601-34	1
075	Pilot Connecting Tube Bracket		538-230-000	REH300-79	1
076	Main Gas Supply Tube	90149022	109-092-000	REH300-78	1
077	Presure Point Packing		501-305-000	CP-30105	1
078	Screw, PTP	92068907	501-060-010	C10D-3	1
079	Rubber Seal Solenoid	90123266	510-001-010	EC-0617	1

No.	Part Name	RA Part No.	11 Digit Code	Qty
074	Nut		502-005-000	1
075	Pilot Connecting Tube Bracket		538-230-000	1
076	Main Gas Supply Tube	90149022	109-092-000	1
077	Presure Point Packing		501-305-000	1
078	Screw, PTP	92068907	501-060-010	1
079	Rubber Seal Solenoid	90123266	510-001-010	1
080	Adjustment Screw		119-004-000	1
081	Nut		502-137-000	1
083	Union Sleeve Barrel	90145020	518-042-000	1
083	Union Nut			1
083	Gas Inlet Elbow	90104191	196-032-000	1
084	Valve Union Sleeve	90145020	518-042-000	1
086	Inlet Elbow	90104191	196-032-000	1
087	Nut	90145020	502-296-000	1
088	Gas Control / Brass	90166810	191-244-000	1
089	Gasket	90176637	510-519-000	1
090	Gas Filter		017-974-000	1
091	Solenoid Valve Assy	90150525	114-391-000	1
092	Gas Seal between the 2 Solenoids	90195546	510-526-000	1
093	Solenoid Double	90150533	114-349-000	1
094	Radiants	90142282		6
095	Thermistor Assy	90150491	233-159-000	1
096	Fan Convection Complete Assembly	90150640	040-257-000	1
096	Fan Convection Fan		067-013-000	1
096	Fan Convection Fan Motor Bracket	90141540	067-014-000	1
096	LS Bearing			1
096-5	Convection Fan Motor			1
096-6	Housing			1
096-7	L/H Conv. Fan Motor Heat Shield			1
096-8	Wire Clip			1
098	Guard		056-163-000	1
101	Fan Comb Assy	90156811	222-405-000	1
108	Cushion	90183195	540-051-000	4
109	OHS	90150194	234-510-000	1
111	Switch, Fan Delay	90146994	258-001-000	1
113	Pressure Check Pipe		554-176-000	1

No.	Part Name	RA Part No.	11 Digit Code	RJ Part No.	Qty
123	P.C.B. Control	90150269	215-008-000	ED-7S	1
124	Operation Switch	90150574	240-177-000	REH300-109	1
125	Harness Wiring	90150715	290-996-000	REH-300-383	1
126	Main P.C.B. Unit	90150251	210-470-000	ED-7	1
127	Sparker (old type)	90142928	201-014-000	E1K-1	1
129	Electrical Cord Assembly		206-181-000	CP-90386T	1
130	Combustion Fan Casing Assembly		019-0708000	REH300-81	1
131	Packing			302F-0711-3	1
132	Fan, combustion Bottom Seal	90157991	580-007-000	302F-0709-2X01	1
131	Fan, Combustion Top Seal	90157983	580-008-000	302F-0711-3	1
132	Fan, Combustion Bottom Seal	90157991	580-007-000	302F-0709-2	1
133	Pipe Retainer		538-235-000	REH300-88	1
134	Outlet		554-177-000	REH300-89	1
135	Cord Bushing	90177106	194-098-000	CP-90137	1
141			520-054-000	C6C1-9	1
142	Seal	90150301	580-663-000	REH300-149	1
888	Operation Manual		610-738-7000	REH300-318	1

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