

Rinnai

SERVICE MANUAL

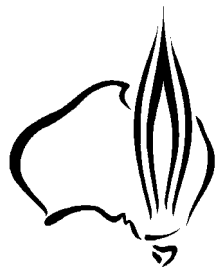
RCE-470TR

RCE-570TR

RCE-670TR

FAN CONVECTOR





The Australian
Gas Association

All Rinnai products are certified by the Australian Gas Association as compliant to relevant Australian Standards.



**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

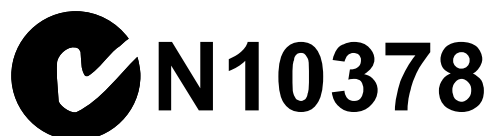
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ISO 9001 Reg 415

Rinnai New Zealand has been certified to ISO 9001 Quality Assurance by Telarc.



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.

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Key to Warning Symbols



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



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



Read Fault Diagnosis and Wiring Diagram carefully to avoid incorrect wiring

Please follow instructions carefully to ensure safe and appropriate service.
After completing the service and confirming that there no 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 Customer Technical Services. 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.

SM RCE-470TR / RCE-570TR / RCE-670TR
Issue N^o2

Table of Contents

Glossary of Terms	v
1. Introduction	1
2. Specifications	2
3. Dimensions	3
4. Combustion Specification	4
5. Combustion Control	5
6. Schematic Diagram	9
7. Cut - Away Diagram	10
8. Operation Principles	11
9. Operational Flow Chart	14
10. Error Code Messages and Maintenance Data	15
11. Diagnostic Points	17
12. Fault Finding Procedure	18
13. Gas Conversion / Gas Pressure Setting	19
14. Wiring Diagram	20
15. Dismantling for Servicing	21
16. Block Diagram	31
17. Time Charts	32
18. Parts List	44
19. Exploded Diagrams	47
SERVICE CONTACT POINTS	51

Glossary of Terms

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
∅	-	diameter
Δ °C	-	temperature rise above ambient
POV	-	modulating valve
TH	-	thermistor

1. Introduction

Development Background

Rinnai have developed a Portable Convector Space Heater with a capacity that exceeds existing models and meets recent aims to improve health. We recommend that the heater is regularly serviced by qualified service technician.

Features

PUSH BUTTON IGNITION	Only one touch of the STANDBY/ON switch is required to operate the heater.
CHILD LOCK	When the Child Lock is activated all controls other than the STANDBY/ON switch will be locked. Deactivating the lock releases the controls. If the lock is activated when the appliance is in STANDBY, all functions will be locked.
MEMORY	The micro-computer records selected preset temperatures, the times programmed into Timers as well as operating the Economy/Auto-Off and Pre-heat modes, to maintain comfort levels.
PRE-HEAT	This function will automatically operate the appliance before the programmed start time of the Timer, in order to heat a room to the pre-set temperature by the programmed time.
FILTER INDICATOR	When the fan filters become covered with dust, the filter indicator will flash. The filters should be vacuumed at regular intervals to avoid unnecessary strain on the appliance.
REMOTE CONTROL	For the convenience of operating the heater between STANDBY or ON, as well as adjusting the temperature up or down while at a short distance from the heater.
DUAL WEEKDAY / WEEKEND TIMER	The dual WEEKDAY/WEEKEND Timer allows you to program the appliance to come on for two separate periods each day, one period in the morning and one period in the evening, on separate WEEKDAY and WEEKEND timers. The built in Pre-heat Mode brings the room temperature to the temperature you have selected, by the time programmed into the Timer. The Dual Timer feature means that you can “Set and Forget” you heater. It will turn itself ON or to STANDBY at the times you have programmed until you cancel the Timer program.
ECONOMY / AUTO-OFF FUNCTION	The Economy / Auto-Off functions are energy saving features designed to control the room temperature and are automatically selected in all modes.

2. Specifications

Model identification			AVENGER 25TR RCE670TR	BLAZE 21TR RCE570TR	CAPELLA 18TR RCE470TR
Model code					
Star rating			5.8	5.8	5.8
AGA Approval No.			6376	6376	6376
Gas input (MJ/h)	NG	High	25.0	21.0	18
		Low	8.5	8.5	8.5
	LPG	High	24.0	21.0	18
		Low	8.5	8.5	8.5
Gas output (kW)	NG	High	6.2	5.4	4.6
		Low	2.1	2.1	2.1
	LPG	High	6.0	5.4	4.6
		Low	2.1	2.1	2.1
Dimensions (mm)		Width	610		
		Height	570		
		Depth	247 (Bottom)		
Weight		Kg	16	16	15.5
Burner			Ceramic plate surface combustion		
Noise level range		dB (A)	46 ~ 35	41 ~ 33	40 ~ 31
Thermal Efficiency		(%)	90.4		
Min. Room Size Installation		(m³)	62.5	52.5	45
Electrical Consumption		(Watts)	34	33	33
Ignition System			High voltage continuous discharge ignition		
Remote controls			On/Off Temp. Control.		
Timers			2 modes x Weekday, Weekend, Preheat		
Clock			Yes		
Economy mode			Max. 1 deg.C down 30 min. after reached set temperature Further 1 deg. decrease after another 30 mins.		
Function lock			Yes		
Temperature control			Thermostat control between 16 and 26° C		
Warm air outlet			Louvre at bottom of heater		
Operation	Range		Low operation; 16 26 deg. C high operation.		
	Switch		Operation, Timer, Set Room Temperature, Over ride		
	Display		LCD Display		
Fan control			Automatically modulating between 5 speeds		
Safety devices			Thermal Fuses Overheat Switch Tilt Switch Flame and Oxygen sensing thermocouples Electrical fuse		
Gas control			Electronic solenoids and modulating gas flow control		
Connections	Electric		AC 240V 50Hz		
	Gas		AGA Approved Gas Hose with 3/8" connection		

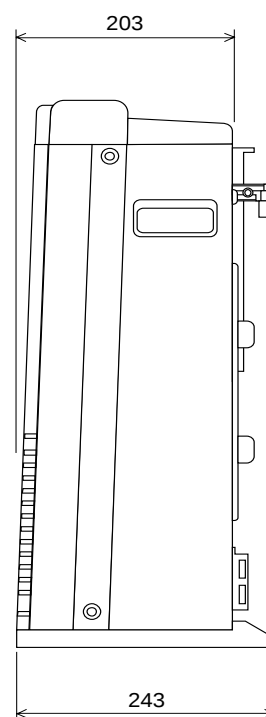
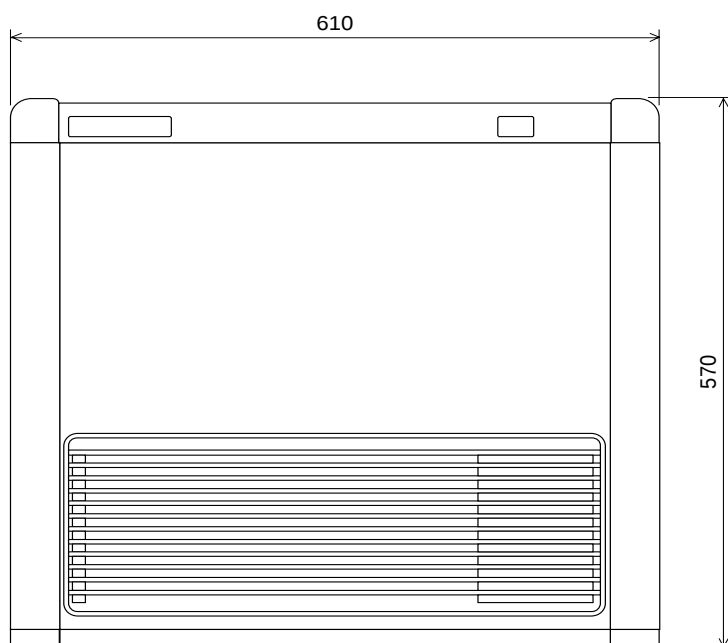
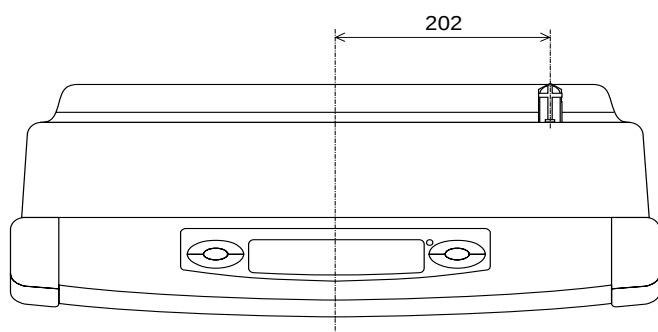
3. Dimensions

Note: All dimensions are in millimetres

RCE-470TR

RCE-570TR

RCE-670TR



4. Combustion Specification

Model	Gas Type	Main Injector	Pilot Injector	Pressure kPa	
				Low	Hi
RCE-670TR-1A	Natural Gas	ø 2.45	ø 0.25 L21	0.13 / 1.13	0.8 / 1.13
RCE-670TR-1T	Propane Gas	ø 1.55	ø 0.2 L18	0.25 / 2.75	1.58 / 2.75
RCE-570TR-1A	Natural Gas	ø 2.45	ø 0.25 L21	0.13 / 1.13	0.6 / 1.13
RCE-570TR-1T	Propane Gas	ø 1.55	ø 0.2 L18	0.25 / 2.75	1.27 / 2.75
RCE-470TR-1A	Natural Gas	ø 2.45	ø 0.25 L21	0.13 / 1.13	0.43 / 1.13
RCE-470TR-1T	Propane Gas	ø 1.55	ø 0.2 L18	0.25 / 2.75	0.94 / 2.75

Description			Description		
Drawing No.	Part	Gas	Drawing No.	Part	Gas
RC-152-19-A	Main Injector A	Propane	RC-670-31-A	Pilot Inj	Propane
RC-152-19-B	Main Injector B	Natural	RC-670-31-B	Pilot Inj	Natural

Restrictor	PCB			Main Burner Assy	Data Plate		Input
	Identification	Gas Type	Level to 1/2		Model	Drawing No.	(MJ)
RC-670-88-02	b8	13	64 62	B6S1-1X01	RCE-670TR	CP-72467-3	25 MJ/h
RC-670-88-02	b8	L1	64 62	B6S1-1X01	RCE-670TR	CP-72467-4	24 MJ/h
RC-670-88-02	b7	13	64 62	B6S1-1X01	RCE-570TR	CP-72467-5	21 MJ/h
RC-670-88-02	b7	L1	64 62	B6S1-1X01	RCE-570TR	CP-72467-6	21 MJ/h
RC-670-88-02	b6	13	64 62	B6S1-1X01	RCE-470TR	CP-72467-5	18 MJ/h
RC-670-88-02	b6	L1	64 62	B6S1-1X01	RCE-470TR	CP-72467-6	18 MJ/h

Description		
Drawing No.	Part	Gas
RC-670-88X02	Inj. Restrictor	Propane

5. Combustion Control

“Combustion Control by Convection Fan” System

This system controls the volume of combustion air (primary air) based on the ability of the convection fan to provide air for combustion as well as heated convection air. This provides for more stable combustion.

Changes in the volume of gas for combustion, or the flame characteristics are measure by the thermocouple as the burner flame changes in temperature. The convection fan is controlled by the PCB and set at an appropriate speed (rpm) related to the temperature as measured by the Thermocouple.

In summary:

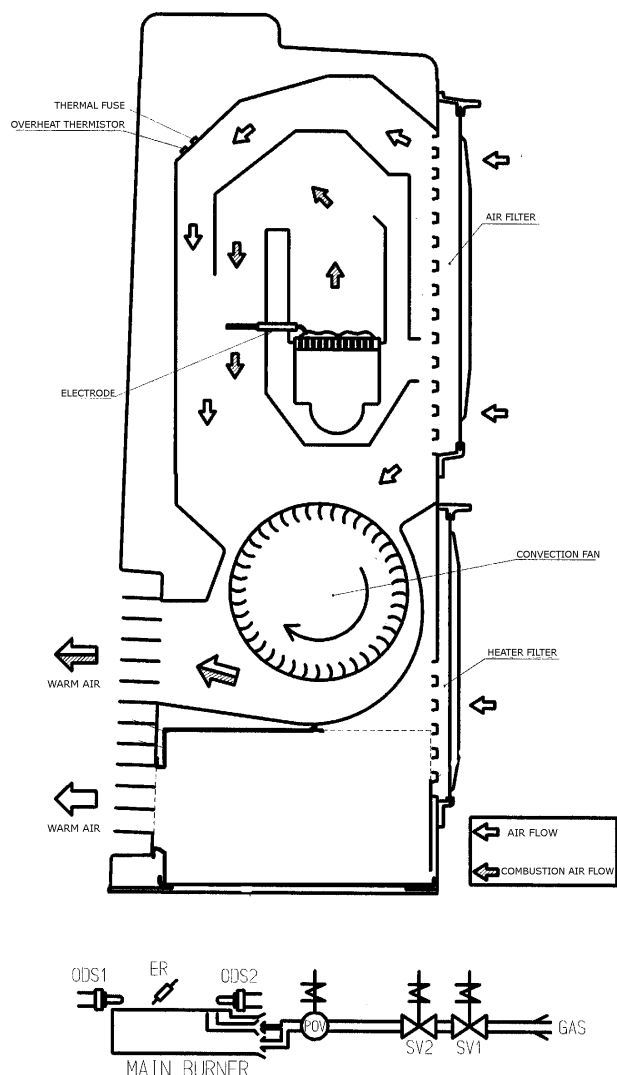
Gas Flow Increases $\Rightarrow$ Thermocouple temperature rises $\Rightarrow$ PCB instructs increase in $\Rightarrow$ speed
Speed increase is checked by the PCB.

During normal “high” combustion, the output of the thermocouple and speed for the convection fan are shown on Table 1 which gives the speed for the convection fan.

If the air filter becomes blocked with dust, reducing the amount of air available for combustion, the temperature of the combustion side of the burner tile begins to increase, which in turn increases the voltage output of the TC. This then increases the voltage output of the TC. This then increases the speed of the fan.

If left in this state (and dust continues to collect and block the appliance) the speed increases to its limit. The output voltage continues to increase (the fan can go no faster) and the flashback point would be reached. Before this point is reached, combustion is automatically stopped by the hi-cut function. (Refer to Table 2).

Before automatically shutting down, when the TC output reaches values shown on Table 2, the filter begins to flash, reminding the customer of the need to clean the filter.

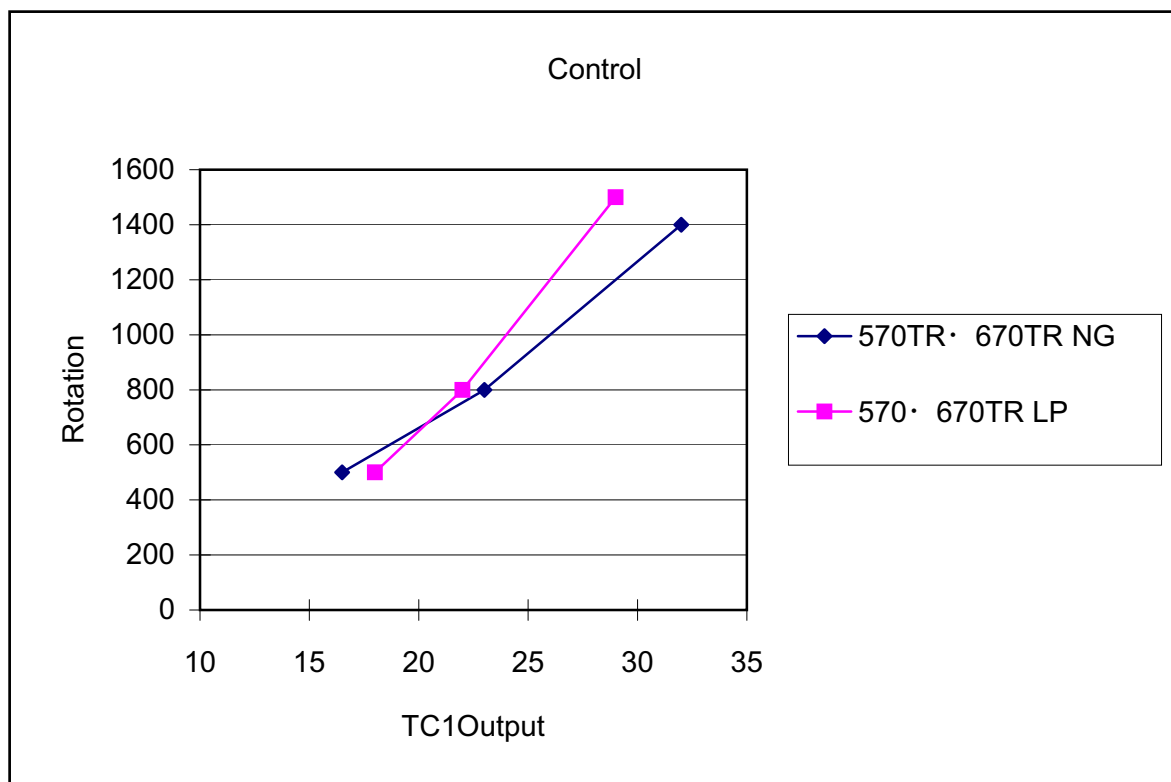


RCE-670TR

Thermocouple Output and Convection Fan Speed RCE-670TR - TABLE 1				Thermocouple Output and Convection Fan Speed RCE-670TR - TABLE 1			
NG				PROPANE			
Speed	TC1 (mV)	TC2 (mV)	Rotation (rpm)	Speed	TC1 (mV)	TC2 (mV)	Rotation (rpm)
1st	19.2	20.2	620	1st	19.2	21.3	590
2nd	21.3	21.1	720	2nd	20.9	23.9	720
3rd	23.0	21.2	805	3rd	22.4	25.5	850
4th	24.0	21.3	870	4th	23.5	26.6	960
5th	26.8	21.5	1060	5th	25.4	27.5	1145

Thermocouple high limit & filter block warning RCE-670TR - TABLE 2, NG						Thermocouple high limit & filter block warning RCE-670TR - TABLE 2, PROPANE					
Speed	High Limit		Low	Filter Block		Speed	High Limit		Low	Filter Block	
	rotation	TC1 (rpm)		rotation	TC1 (mV)		rotation	TC1 (rpm)		rotation	TC1 (mV)
1st	1000	24.5	14.0	900	24.0	1st	1000	22.5	14.0	900	21.5
2nd	1200	28.0	17.0	1050	27.5	2nd	1200	23.5	16.0	1100	22.5
3rd	1340	29.5	19.0	1150	29.0	3rd	1400	25.5	17.0	1150	24.5
4th	1400	31.0	21.0	1300	30.5	4th	1550	26.0	18.0	1300	25.0
5th	1700	32.0	23.0	1450	31.5	5th	1760	30.0	20.0	1500	28.0

1. Input will be shifted down from 5th to 4th after filter block warning given.
2. Input will be shifted up from 1st to 2nd after filter block warning given.



RCE-570TR

Thermocouple Output and Convection Fan Speed RCE-570TR - TABLE 1				Thermocouple Output and Convection Fan Speed RCE-570TR - TABLE 1			
NG				PROPANE			
Speed	TC1 (mV)	TC2 (mV)	Rotation (rpm)	Speed	TC1 (mV)	TC2 (mV)	Rotation (rpm)
1st	19.1	20.4	620	1st	19.3	21.3	590
2nd	21.3	21.5	725	2nd	21.0	24.0	725
3rd	23.0	22.2	805	3rd	22.4	25.6	850
4th	24.1	22.4	880	4th	23.5	26.7	970
5th	25.6	22.6	985	5th	24.5	27.6	1065

Thermocouple high limit & filter block warning RCE-570TR - TABLE 2, NG						Thermocouple high limit & filter block warning RCE-570TR - TABLE 2, PROPANE					
Speed	High Limit		Low	Filter Block		Speed	High Limit		Low	Filter Block	
	rotation	TC1 (rpm)	TC1 (mV)	rotation	TC1 (mV)		rotation	TC1 (rpm)	TC1 (mV)	rotation	TC1 (mV)
1st	1000	24.5	14.0	900	24.0	1st	1000	30.0	19.0	900	21.5
2nd	1200	28.0	17.0	1050	27.5	2nd	1200	26.0	18.0	1100	22.5
3rd	1340	29.5	19.0	1150	29.0	3rd	1400	25.5	17.0	1150	24.5
4th	1440	31.0	21.0	1300	30.5	4th	1550	23.5	16.0	1300	25.0
5th	1600	31.5	21.8	1350	31.0	5th	1620	22.5	14.0	1390	26.0

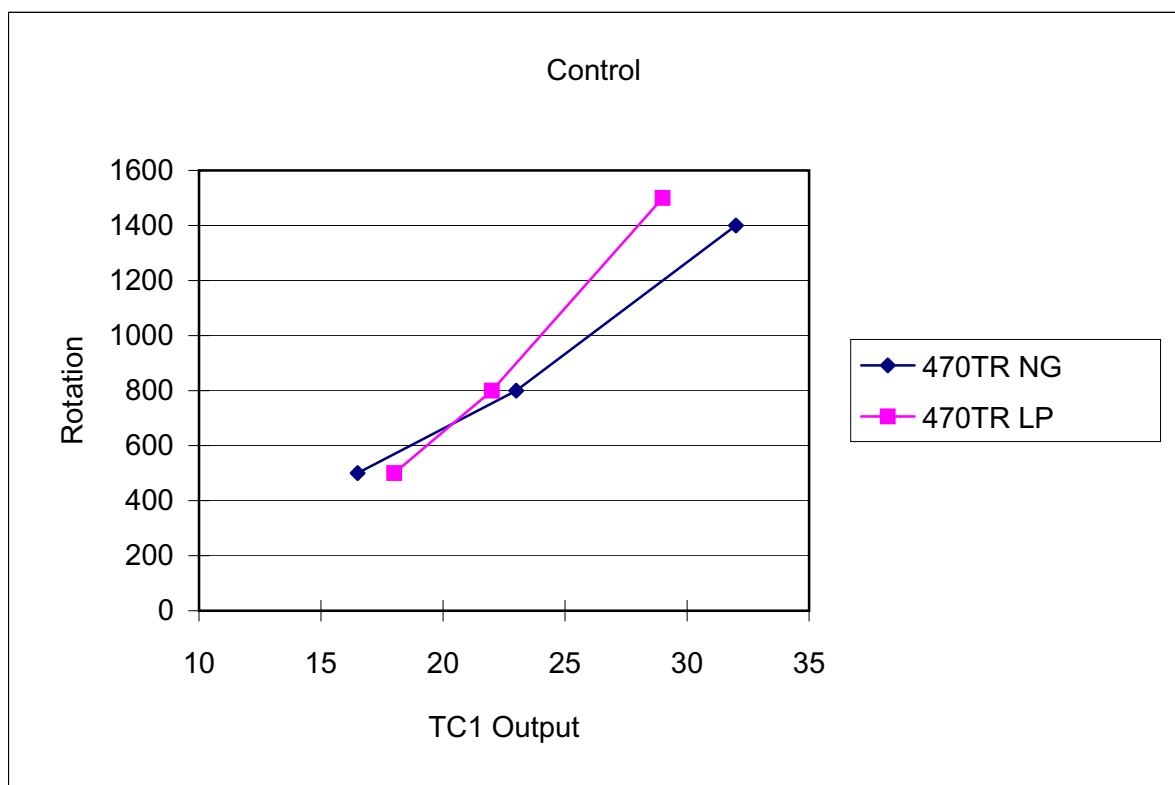
1. Input will be shifted down from 5th to 4th after filter block warning given.
2. Input will be shifted up from 1st to 2nd after filter block warning given.

RCE-470TR

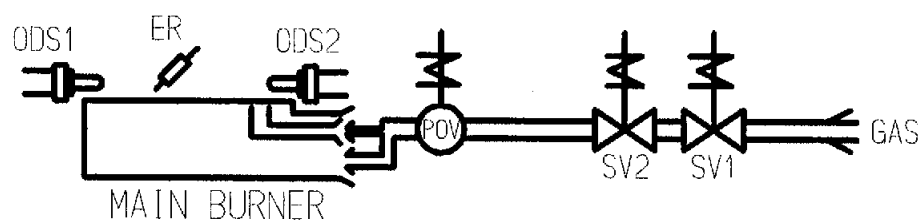
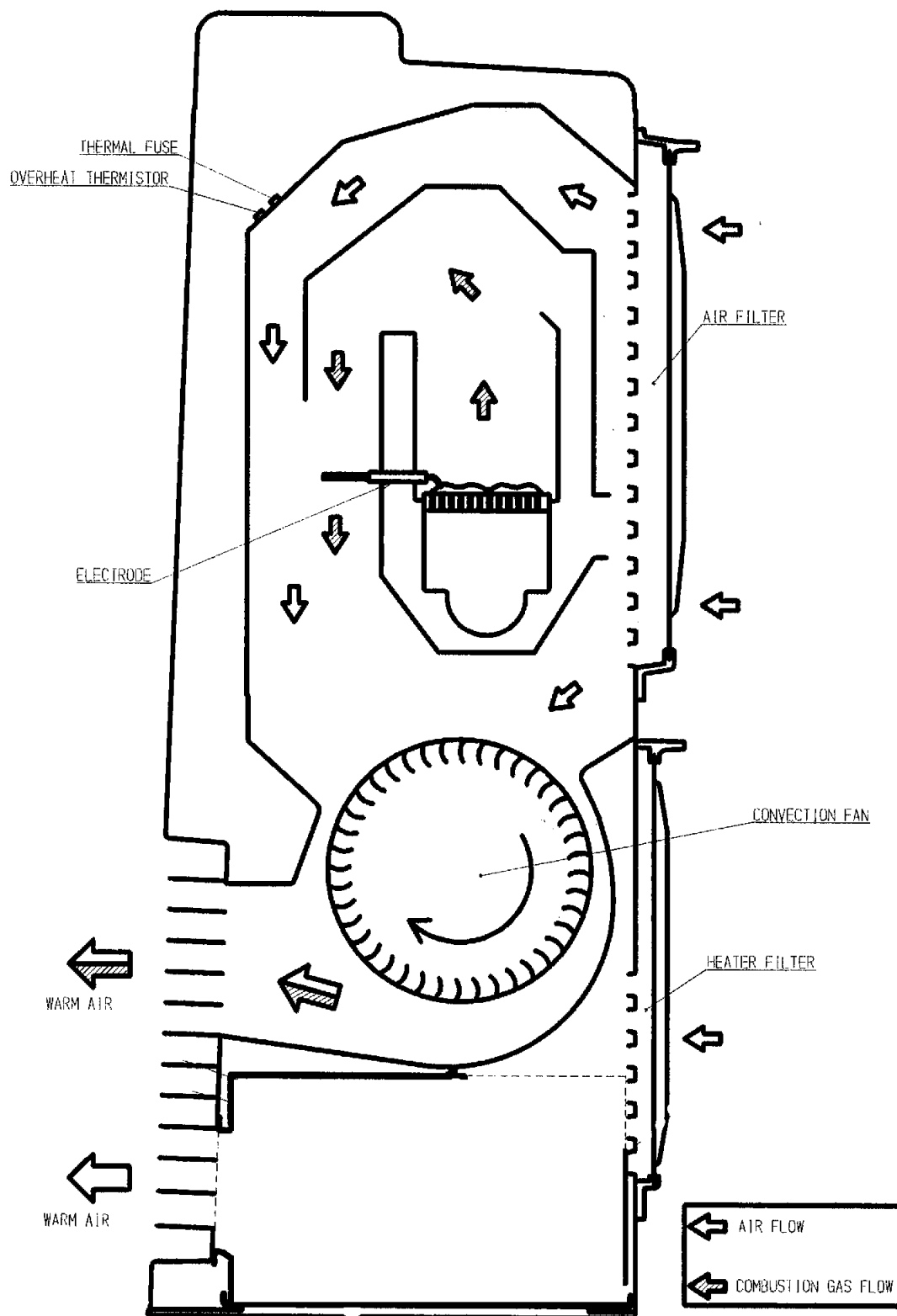
Thermocouple Output & Convection Fan Speed RCE-470TR - TABLE 1				Thermocouple Output & Convection Fan Speed RCE-470TR - TABLE 1			
NG				PROPANE			
Speed	TC1(mV)	TC2(mV)	Rotation (rpm)	Speed	TC1(mV)	TC2(mV)	Rotation (rpm)
1st	19.2	20.2	620	1st	18.8	20.9	560
2nd	21.3	21.1	720	2nd	20.6	23.8	690
3rd	23.0	21.2	805	3rd	22.2	25.5	830
4th	23.7	22.3	855	4th	23.3	26.7	940
5th	24.1	22.6	885	5th	23.5	26.9	960

Thermocouple high limit and filter block warning RCE-470TR - TABLE 2						Thermocouple high limit and filter block warning RCE-470TR - TABLE 2					
NG						PROPANE					
Speed	High Limit		Low	Filter Block		Speed	High Limit		Low	Filter Block	
	rotation (r/min)	TC1 (mV)		rotation (r/min)	TC1 (mV)		rotation (r/min)	TC1 (mV)		rotation (r/min)	TC1 (mV)
1st	1000	24.5	14.0	900	24.0	1st	1000	22.5	14.0	900	21.5
2nd	1200	28.0	17.0	1050	27.5	2nd	1200	23.5	16.0	1100	22.5
3rd	1340	29.5	19.0	1150	29.0	3rd	1400	25.5	17.0	1150	24.5
4th	1410	30.7	20.8	1270	30.2	4th	1550	26.0	18.0	1300	25.0
5th	1150	31.0	21.0	1300	30.5	5th	1600	30.0	18.4	1380	25.5

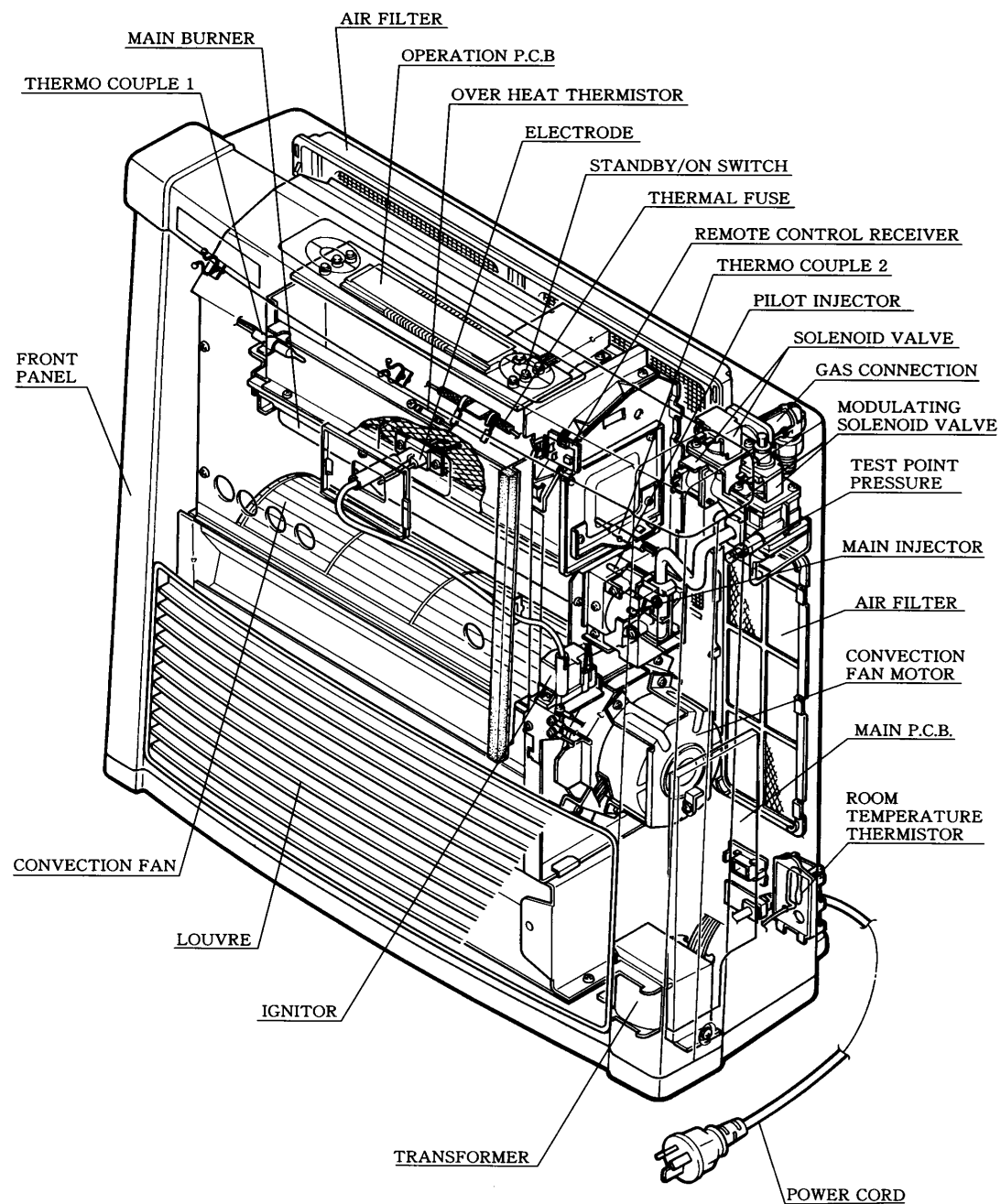
1. Input will be shifted down from 5th to 4th after filter block warning given.
2. Input will be shifted up from 1st to 2nd after filter block warning given.



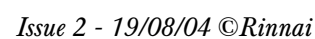
6. Schematic Diagram



7. Cut - Away Diagram



Control Panel Layout



HEATER MODES AND FUNCTIONS

Normal Heater Operation

(refer to customer installation manual - section How to operate the heater page 10)

The heating "MODE" for the AVENGER 25TR and BLAZE 21TR is "GAS", the Economy and Auto-Off functions will be automatically selected.

HEATER MODES

GAS

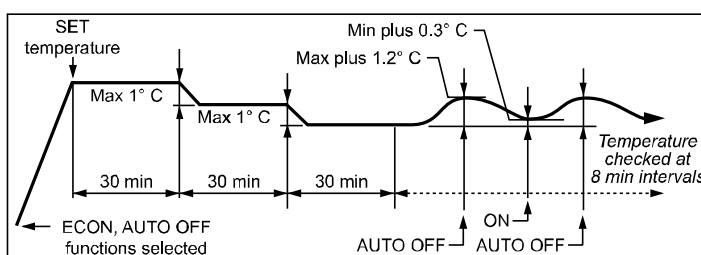
When operating in "GAS" mode, after ignition the appliance will heat the room using Gas convection.

HEATER FUNCTIONS

Economy

As a room is warmed, the walls and ceilings are also warmed, making one feel a little warmer than when ceilings and walls were cold, even though the room temperature is the same. The Economy function prevents discomfort from overheating and saves energy.

Once the set temperature has been obtained for 30 minutes the appliance will automatically lower the set temperature by 1° C, after another 30 minutes the set temperature will be lower by a further 1° C. From the second temperature decrease onwards the appliance's Auto-Off function will automatically stop combustion.

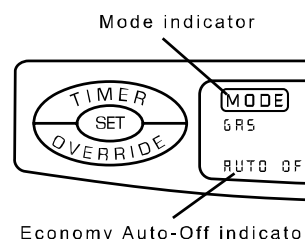


Auto-Off

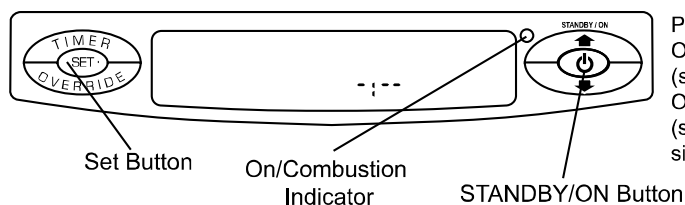
From the second temperature decrease onwards, the heater will warm the room to a point 1.2° C above the lower set limit, once reached the heating elements are be turned off automatically. When the room temperature falls to 0.3° C above the lower set limit, the heating elements are automatically turned back on to warm the room back to the 1.2° C limit, the on / off cycle is repeated until the heater is turned off manually or by a timer.

When the Auto-Off functions is in operation the "AUTO OFF" indicator will be shown under the "MODE" indicator.

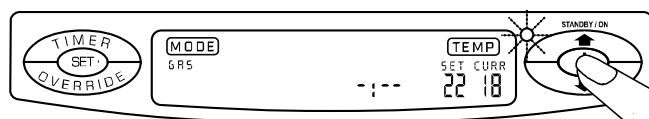
The Economy and Auto-Off functions will not operate when the "SET" temperature is either "L" or "H". A characteristic of the Economy and Auto-Off function is that the current room temperature "CURR" may be lower than the "SET" room temperature, however this is normal.



SELECTING THE FUNCTIONS



Press the "STANDBY/ON" button once. The On/Combustion indicator will illuminate Green (steady). Ignition will take 5 ~ 10 seconds, the On/Combustion indicator will change to Red (steady) after proper ignition has been achieved to signify the correct burner operation.

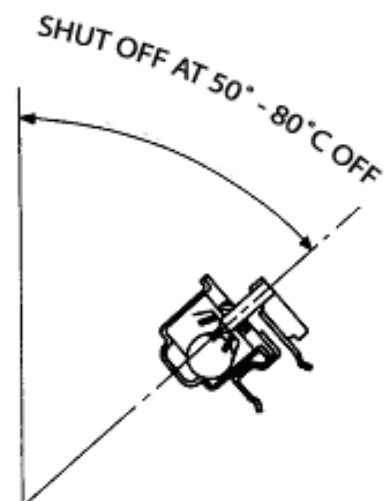
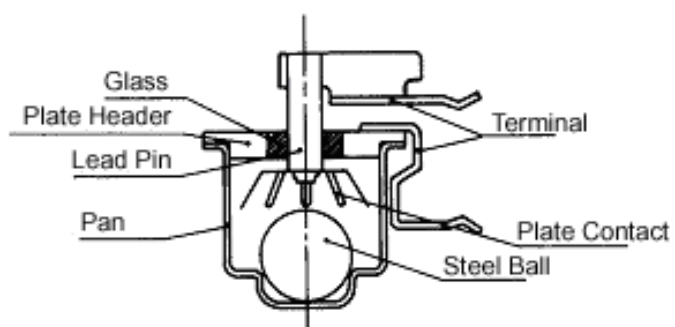


The heater "MODE" will be "GAS", the Economy and Auto-Off functions are also automatically selected and will be used to control the heater. The On/Combustion indicator will be illuminated Red (steady) during operation.

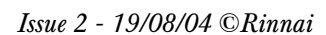
The Economy and Auto-Off functions will not operate when the "SET" temperature is either "L" or "H". When using the Economy and Auto-Off function the current room temperature "CURR" may be lower than the "SET" room temperature, however this is normal.

Tilt Switch

Type	Operating Angle
Steel Ball Tilt Switch	Angle: 50° C - 80° C



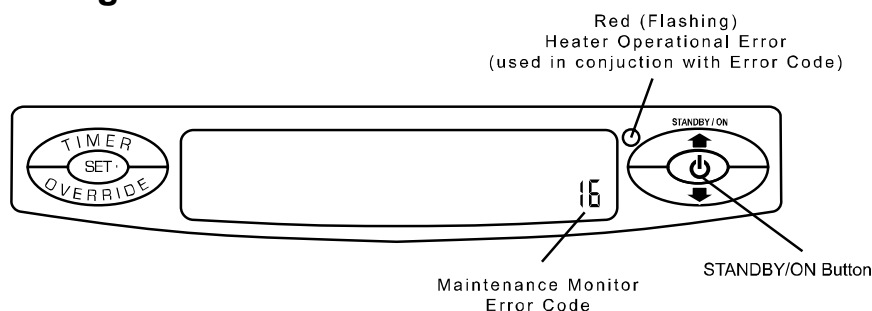
Convector RCE-470TR / RCE-570TR / RCE-670TR - 14 -



10. Error Code Messages and Maintenance Data

Your appliance has the ability to check its own operation continuously. If a fault occurs an Error Code will flash on the digital display of the control panel. This assists with diagnosing the fault and may enable you to overcome a problem without a service call. Please quote the Error Code displayed when enquiring about service.

Error Code Messages



Error Code	Probable Cause	Comments
00	Power failure while ON/STANDBY switch ON	Switch the Heater to STANDBY and then ON again
03	Tilt switch is activated	Ensure unit is level & upright **
10	Oxygen shortage	Check & clean Filters, (TC2)
11	Ignition failure	* Check gas supply is turned on, switch the heater to STANDBY and then ON again. Service call if repeated
12	Incomplete combustion	Service call
13	Combustion control faulty	Service call
14	Overheat	Service call
16	Room Overheat	Lower room temperature to less than 40° C
18	Thermocouple Temperature Error	Thermocouple failed to read the prescribed temperatures during the 1st eighty seconds of operation. Check gas cylinder (LPG models only) and check air filters.
30	Temperature sensor faulty	Overheat Thermistor Disconnection
31	Room temperature sensor faulty	
32	Room temperature sensor faulty	
33	Overheat temperature sensor faulty	
34	Overheat temperature sensor faulty	
35	Temperature sensor faulty	Overheat Thermistor Short
62	Faulty fan motor	
70	ON/STANDBY button faulty	
71	Faulty solenoids	
72	Flame detection circuit faulty	
73	Communication error	Switch the Heater to STANDBY and then ON again

* Make sure that the gas supply is on, also it is quite possible that there are pockets of air in the supply hose or in the heater itself and these will need to be purged, if heater fails to ignite on initial attempt try 3 to 4 more times, however if the heater ignition continues to be unsuccessful arrange service call.

The 5 most recent error messages and the estimated time and combustion frequency are stored.

** Customer instruction advice service call.

Memory Function for Maintenance Data

The 5 most recent error messages and the estimated time of combustion and combustion frequency are stored.

How to recall data

While the unit is OFF, press the “override” and “√” (“DOWN”) buttons simultaneously for at least 3 seconds to bring up the error history on the display. The error history will display the following in a 3 second cycle : the 5 most recent error messages (the most recent is No. 1 and No. 5 being the oldest), estimated time of combustion, and combustion frequency.

Example:

Item	Digital Display	Comments
Error History	1 : 12	No. 1 (Latest Error) Incomplete Combustion
	2 : 00	No. 2 Power Failure
	3 : 11	No. 3 Ignition Failure
	4 : 11	No. 4 Ignition Failure
	5 : --	No. 5 No error
Combustion Time	H 1	11121 hours Not displayed if below 1 hour
	1121	
Combustion Frequency	L	13 times
	13	

11. Diagnostic Points

Transformer Terminal Voltages/Coil Resistances

Components	Wire Colour	Value
Transformer	Grey – Black	AC 216 ~ 264 V 24 ~ 27 Ω
	White – Black	AC 90 ~ 110 V 15 ~ 19 Ω
	Blue – Blue	AC 32 ~ 40 V 0.8 ~ 1.2 Ω
	Brown – Brown	AC 18 ~ 22 V 1.1 ~ 1.5 Ω
	Purple – Purple	AC 14 ~ 18 V 0.9 ~ 1.3 Ω
Convactor Motor	White – Black	DC 9 ~ 20 V
	Blue – Brown	DC 12 V
	Blue – Red	DC ~ 21V 33 ~ 72 Hz
Modulation Valve	Red – White	DC 2 ~ 10 V 72 ~ 85 Ω
Solenoid Valve	Brown – Brown	DC 75 ~ 100 V 1.5 ~ 2.5 k Ω SV ₁ SV ₂
Igniter	Black – Black	AC 90 ~ 110 V
Room Temperature Thermistor	Black – Black	10° C 58 ~ 73 k Ω 20° C 33 ~ 44 k Ω 40° C 9 ~ 19 k Ω
Over Heat Thermistor	White – White	20° C 70 ~ 85 k Ω 40° C 25 ~ 40 k Ω 70° C 8 ~ 15 k Ω
Thermocouple	Blue - Yellow	NG DC 16 m V LP DC 16 m V

12. Fault Finding Procedure

Problem Cause	No Display	Burner doesn't ignite	Filter indicator shown in display	Combustion stops during operation	Smell of gas	Takes too long to warm the room	Remote control doesn't work	Remedy
Not Plugged In	●	●						Plug In
Power Cut	●	●		●			●	Re-ignite manually after power is restored
(Initial Installation) Air in gas pipe		●						Purge air (Installer)
Air in the hose		●						Repeat ignition procedure
Room too large						●		Check with retailer
Dust on air filters			●					Clean the air filters (WEEKLY)
Louvre obstructed				●		●		Remove obstruction
Air filter blocked				●		●		Clean the air filters (WEEKLY)
Gas Escape					●			Service Call (Contact Rinnai)
On Timer is set		●						Cancel On Timer (Select override)
Child Lock set		●						Cancel Child Lock
Gas turned off at meter		●						Turn gas on
Battery flat (remote control)							●	Replace battery

SERVICE

Rinnai recommend that this appliance be serviced every 2 years.

If the power supply cord, gas supply hose or any other component of the heater is damaged, they must be replaced by Rinnai or a suitably qualified person.

Any service or repair work should only be carried out by an authorized person.

Rinnai Australia has service and spare parts departments.

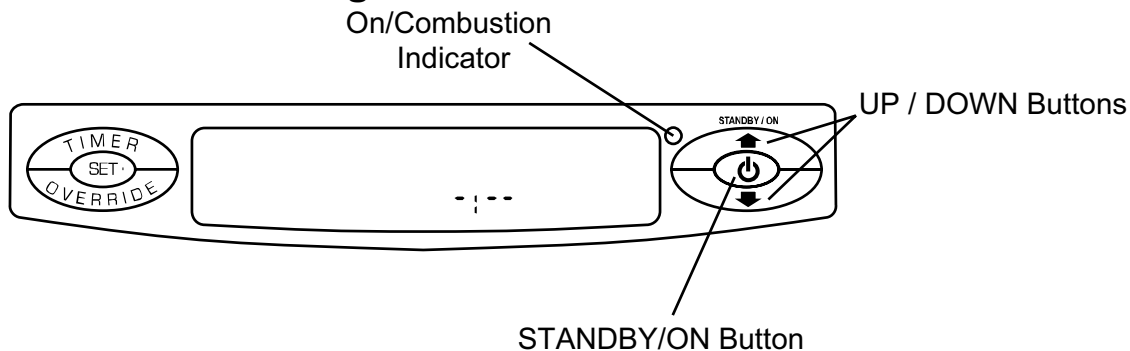
Fault Finding Procedure

If you are unsure about the way your heater is operating, contact Rinnai Australia, or your local agent.

13. Gas Conversion / Gas Pressure Setting



Gas Pressure Setting Procedure:



Gas Type Selection

Switch the unit off. When the operation has completely stopped, press the “SW1” switch at the top of the PCB panel to initiate gas type selection mode. A code signifying the current gas type will be displayed on the LCD display. (One of 13 [NG], L1 [LPG]). Refer to diagram on page 16 for switch location.

Select the correct gas type code to appear on the LCD display using the “UP” and “DOWN” buttons. The gas type code will be memorized in the system memory when the “SET” button on the control panel is pressed, and confirmed by a display of 64 in the LCD panel.

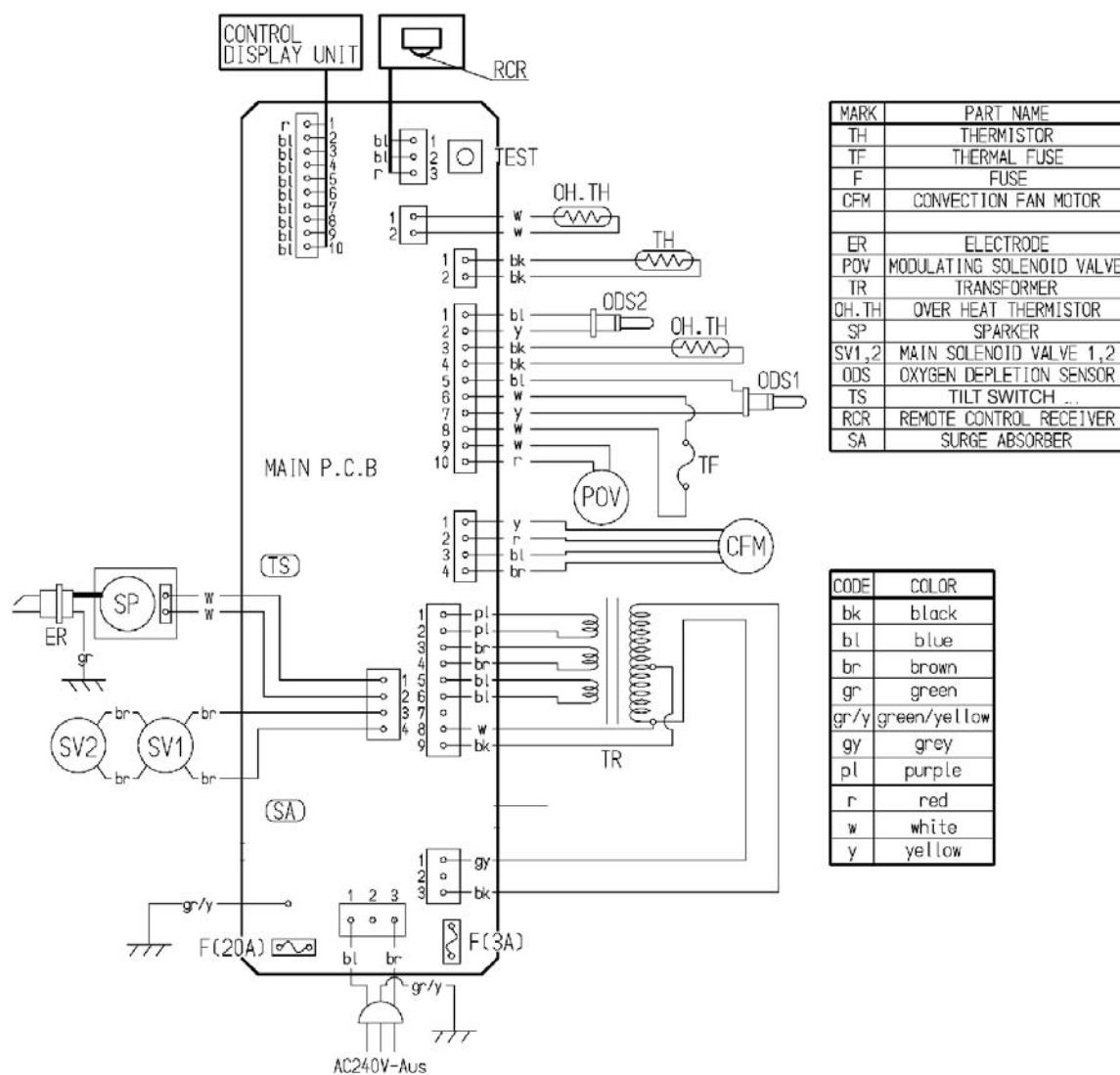
Press the “SW1” switch at the top of the PCB twice and the unit returns to normal OFF mode. After changing the gas type, the pressure must be reset.

To Set Pressure

1. Remove test point screw and attach Manometer.
2. Press the “STANDBY/ON” button to ignite the appliance, ensuring that the set temperature is higher than the current temperature.
3. Press the “SW1” switch at the top of the PCB panel, the appliance will now operate in test mode. A number (1 00 ~ 5 00) will appear on the LCD display, indicating each combustion condition.
4. Press the “SW1” switch again to operate the unit in the Low Pressure Setting mode, (PL--) will appear on the LCD display. (Note: Wait 30 seconds for burner to fully modulate to low).
5. Adjust the low pressure to specification as shown in the combustion specification on page 3, also check the data plate on the appliance. Using the “DOWN” (to reduce gas pressure) and “UP” (to increase gas pressure) buttons.
6. Press the “SET” button on the control panel. The low pressure data will be memorized when the LCD display changes to (1 00)
7. Press the “SW1” switch at the top of the PCB twice to operate the unit in High Pressure Setting mode, (PH--) will appear on the LCD display. (Note: Wait 30 seconds for burner to fully modulate to high).
8. Adjust the high pressure to specification as shown in the combustion specification on page 3, also check the data plate on the appliance. Using the “DOWN” (to reduce gas pressure) and “UP” (to increase gas pressure) buttons.
9. Press the “SET” button on the control panel. The high pressure setting data will be memorized when the LCD display changes to (5 00). (In both steps 5 and 8, pressing the “SW1” switch and button instead of the “SET” button will cancel the pressure setting).
10. Press the “STANDBY/ON” button to cease operation. (The unit will not revert to its normal state unless the “STANDBY/ON” button is pressed).
11. Press the “STANDBY/ON” button, this completes pressure setting procedure, locking in all selections. (The unit will not return to normal operation and the settings will not be saved unless the “STANDBY/ON” button is pressed).
12. Press the “STANDBY/ON” button to turn the heater off.
13. Remove manometer and replace test point screw.
14. Check for leaks from test point screw.

14. Wiring Diagram

WIRING DIAGRAM



15. Dismantling for Servicing



NOTE: Before proceeding with any dismantling, be sure to follow the **CAUTION** instructions before each explanation.

e.g.- Isolate gas supply
- Disconnect electrical supply from wall socket

ITEM	PAGE
1. Removal of Front Panel	22
2. Removal of Convection Fan	22
3. Removal of Convection Fan Motor	23
4. Removal of Top Panel	23
5. Removal of Combustion Box	24
6. Removal of Burner	26
7. Removal of Control Board	27
8. Removal of Injector Holder	29
9. Removal of Injector	29
10. Removal of Gas Control	29
11. Removal of Electrode	30
12. Removal of PCB	30
13. Removal of Transformer	30

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

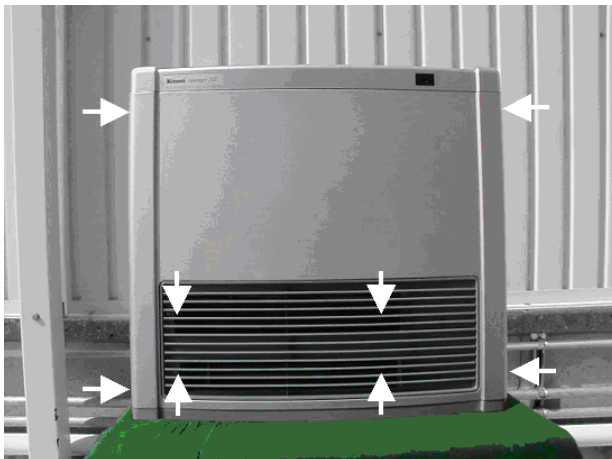


CAUTION

240 Volt exposure. Isolate the electrical supply to the appliance and reconfirm with the neon screwdriver or multimeter.

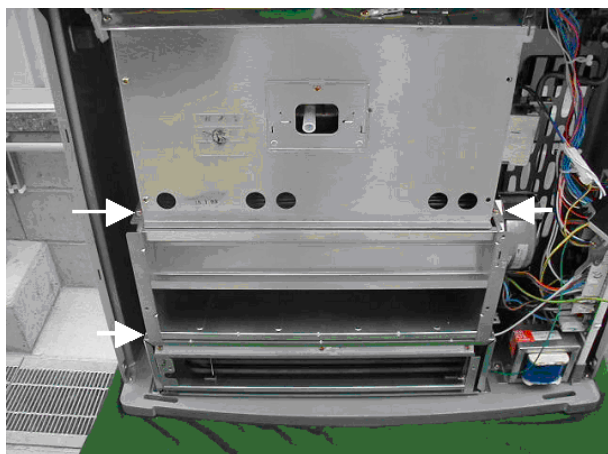
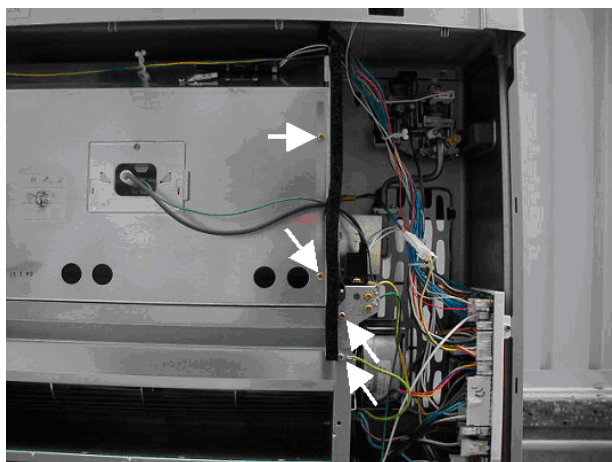
1) Removal of **Front Panel**

- a. Remove screws from the hot air outlet grille (4 screws)
- b. Remove screws from the front panel. (4 screws).



2) Removal of **Convection Fan**

- a. Remove hood separation panel. (2 screws).
- b. Unplug ignition earth wire.
- c. Remove sparker mounting plate (1 screw).
- d. Remove earth fixing screw.
- e. Remove fixing screws of the combustion box. (2 screws).
- f. Remove fixing screw in left corner.
- g. Remove (2 top fixing screws) under air filter.
- h. Unplug motor from loom and PCB.



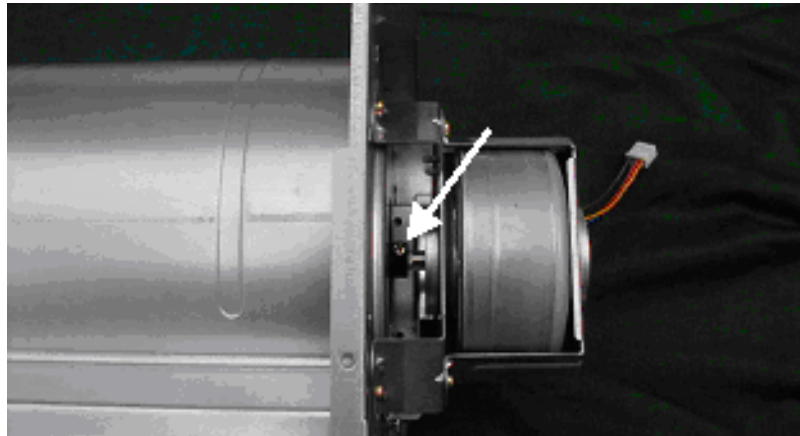
CAUTION



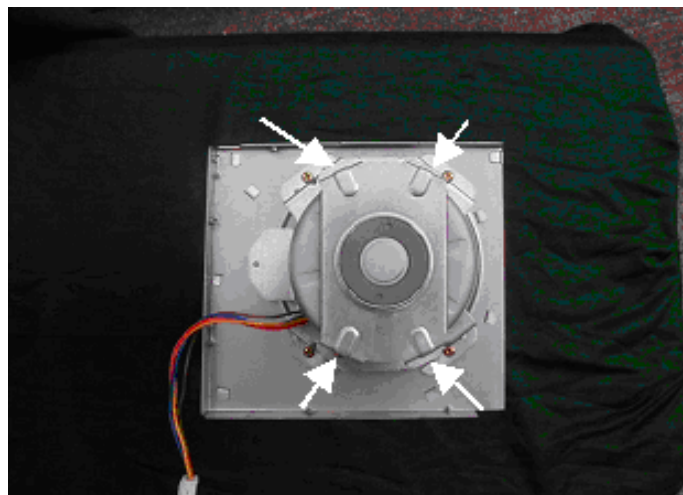
240 Volt exposure. Isolate the electrical supply to the appliance and reconfirm with the neon screwdriver or multimeter.

3) Removal of **Convection Fan Motor**

- a. Remove fixing screw between fan and motor.



- b. Remove fixing screws of motor mounting bracket (4 screws).



4) Removal of **Top Panel**

- a. Remove back mounting screws. (3 screws).



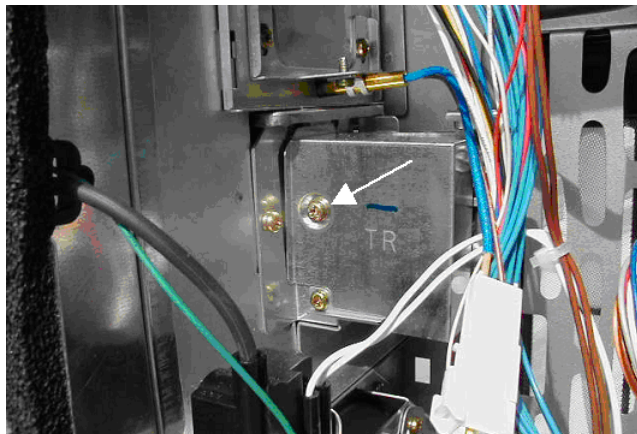


CAUTION

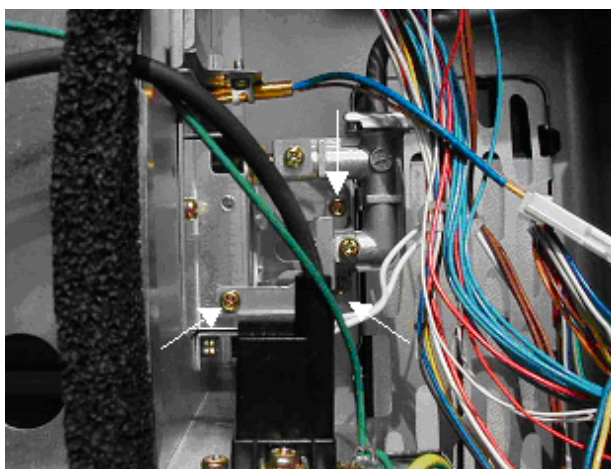
240 Volt exposure. Isolate the electrical supply to the appliance and reconfirm with the neon screwdriver or multimeter.

5) Removal of **Combustion Box**

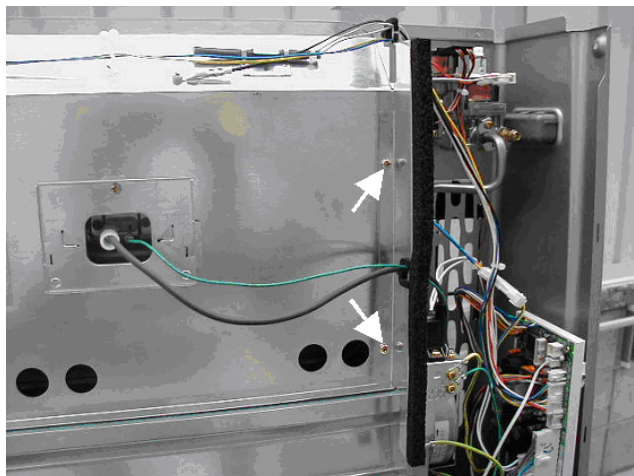
- a. Remove mounting screw of injector cover plate.



- b. Remove injector holder mounting screws (3 screws).



- c. Remove mounting screws of hood separator (2 screws).

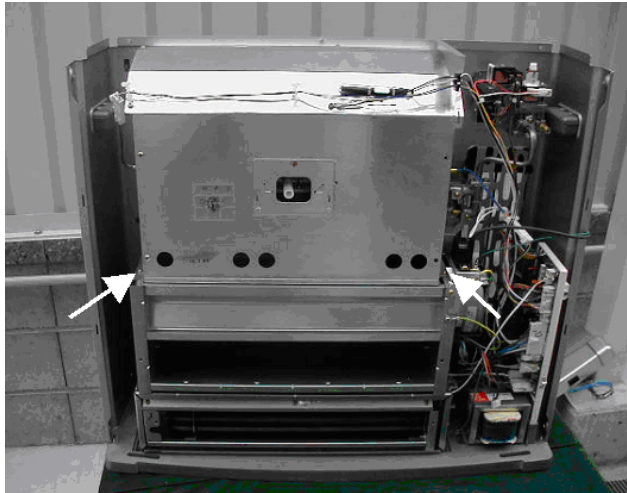


CAUTION



240 Volt exposure. Isolate the electrical supply to the appliance and reconfirm with the neon screwdriver or multimeter.

- Remove mounting screws in both sides. (2 screws).



- Remove burner supply tube retaining bracket (1 screw).
- Remove injector block.
- Unplug thermocouple leads, fusible link and overheat thermistor.
- Remove air filter. (1 screw)



- Remove back panel mounting screws.(2 screws).

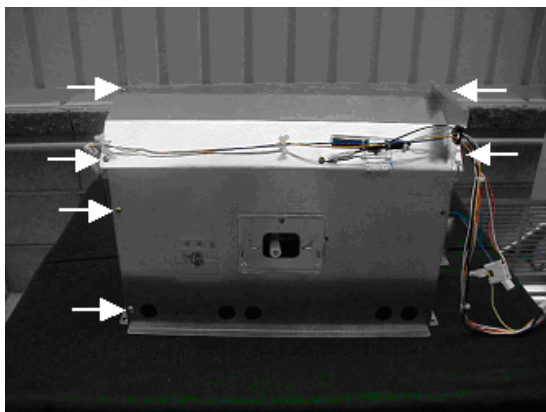




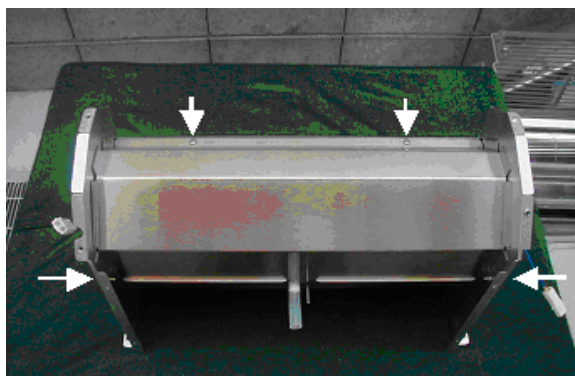
CAUTION

240 Volt exposure. Isolate the electrical supply to the appliance and reconfirm with the neon screwdriver or multimeter.

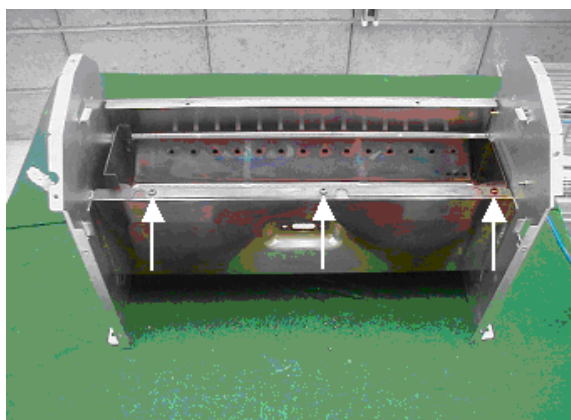
- 6) Removal of **Burner**
- Remove upper separator panel. (2 screws).
 - Remove electrode cover plate.
 - Remove hood. (4 screws).



- d. Remove diverter. (4 screws).



- e. Remove mounting screws of combustion box. (3 screws).

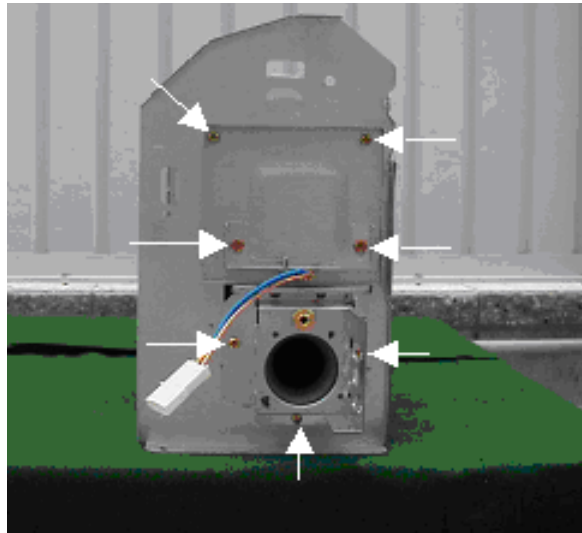




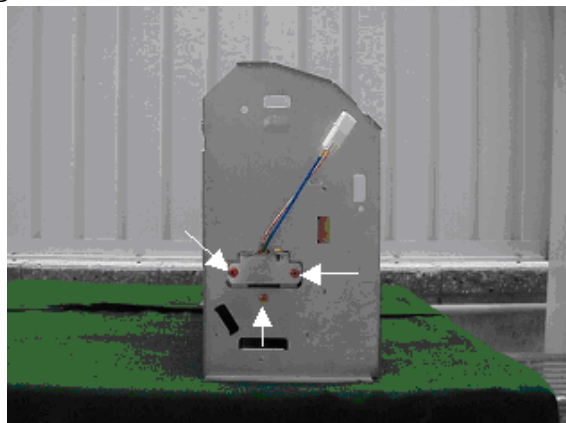
CAUTION

240 Volt exposure. Isolate the electrical supply to the appliance and reconfirm with the neon screwdriver or multimeter.

- Remove mounting screws in right hand side. (7 screws).

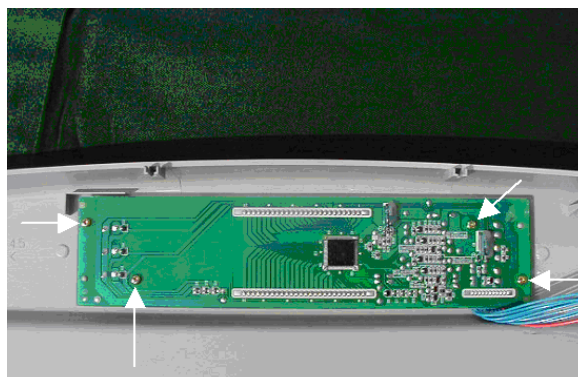


- Remove mounting screws in left hand side of thermocouple lead bracket. (3 screws).
- Remove 3 burner mounting screws top edge.
- Remove 2 screws on ignition electrode.
- Slide burner out from right hand side.



7) Removal of **Control Board**

- a. Remove control board (4 screws).





CAUTION

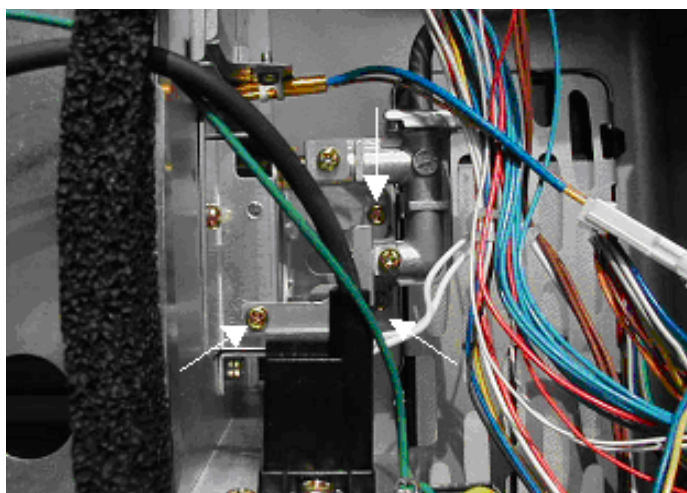
240 Volt exposure. Isolate the electrical supply to the appliance and reconfirm with the neon screwdriver or multimeter.

8) Removal of **Injector Holder**

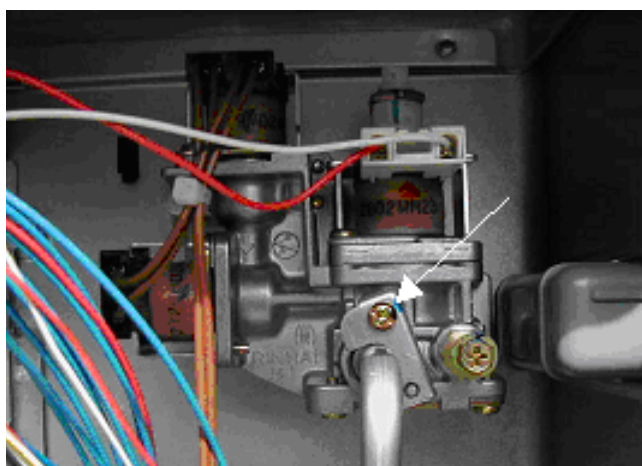
- a. Remove injector restrictor.



- b. Remove mounting screws of injector holder. (3 screws).



- c. Remove connection tube holder.



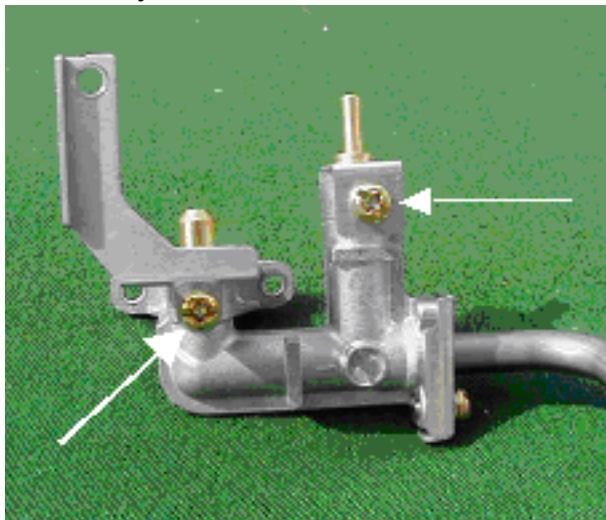
CAUTION



240 Volt exposure. Isolate the electrical supply to the appliance and reconfirm with the neon screwdriver or multimeter.

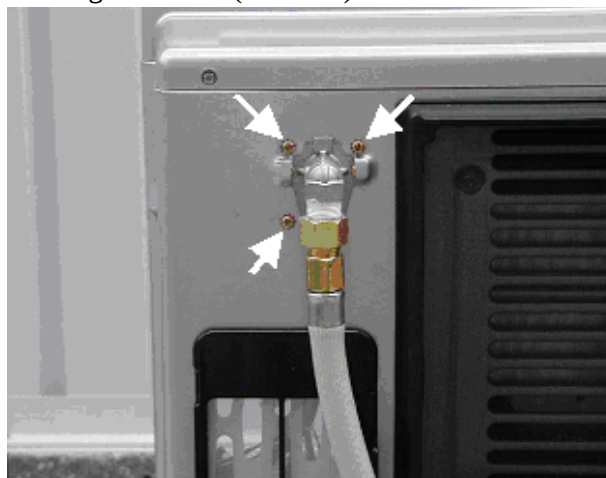
9) Removal of **Injector**

- a. Removal of mounting screw of injector holder.



10) Removal of **Gas Control**

- a. Remove gas hose.
- b. Remove mounting screws of gas control. (3 screws).



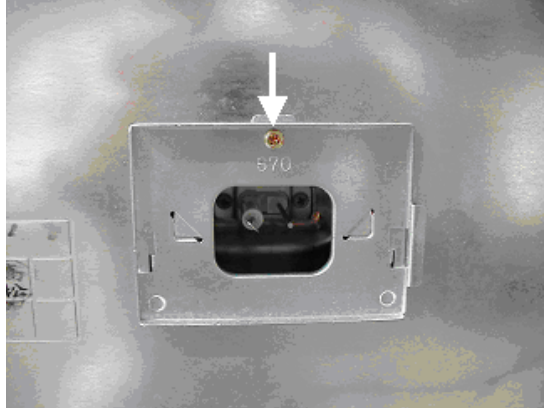
CAUTION



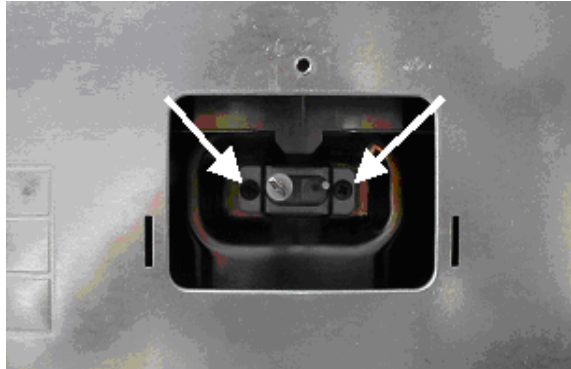
240 Volt exposure. Isolate the electrical supply to the appliance and reconfirm with the neon screwdriver or multimeter.

11) Removal of **Electrode**

- a. Remove hood. (1 screw)

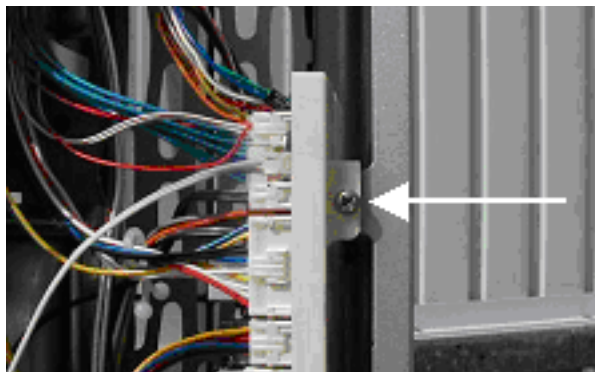


- b. Remove electrode holder. (2 screws).



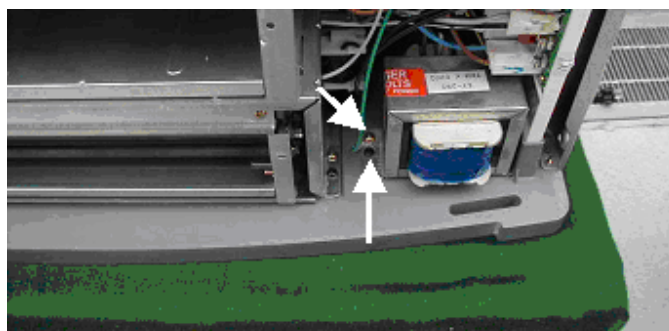
12) Removal of **PCB**

- Remove mounting screw of PCB holder.

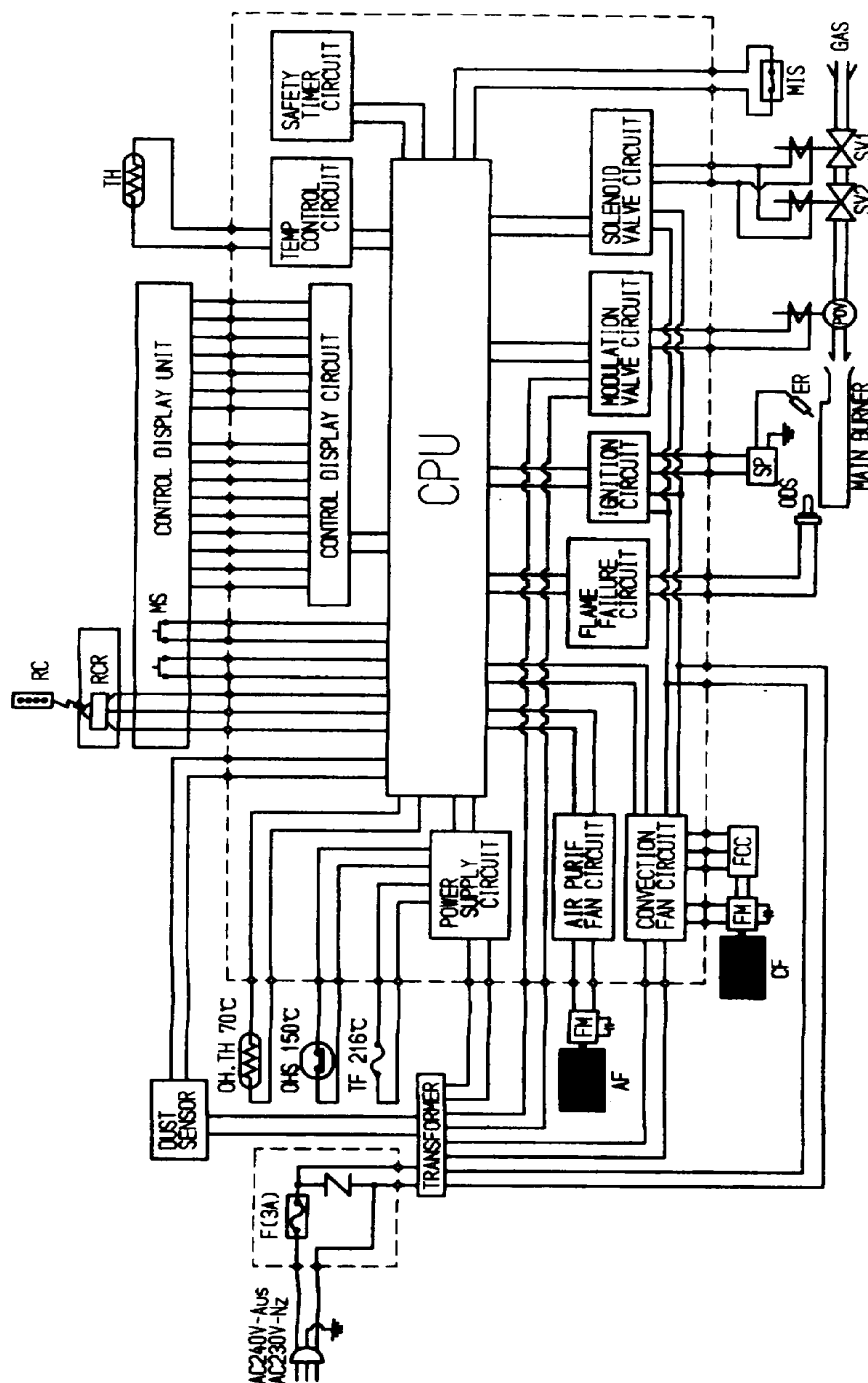


13) Removal of **Transformer**

- a. Remove earth wire.
- b. Remove transformer.

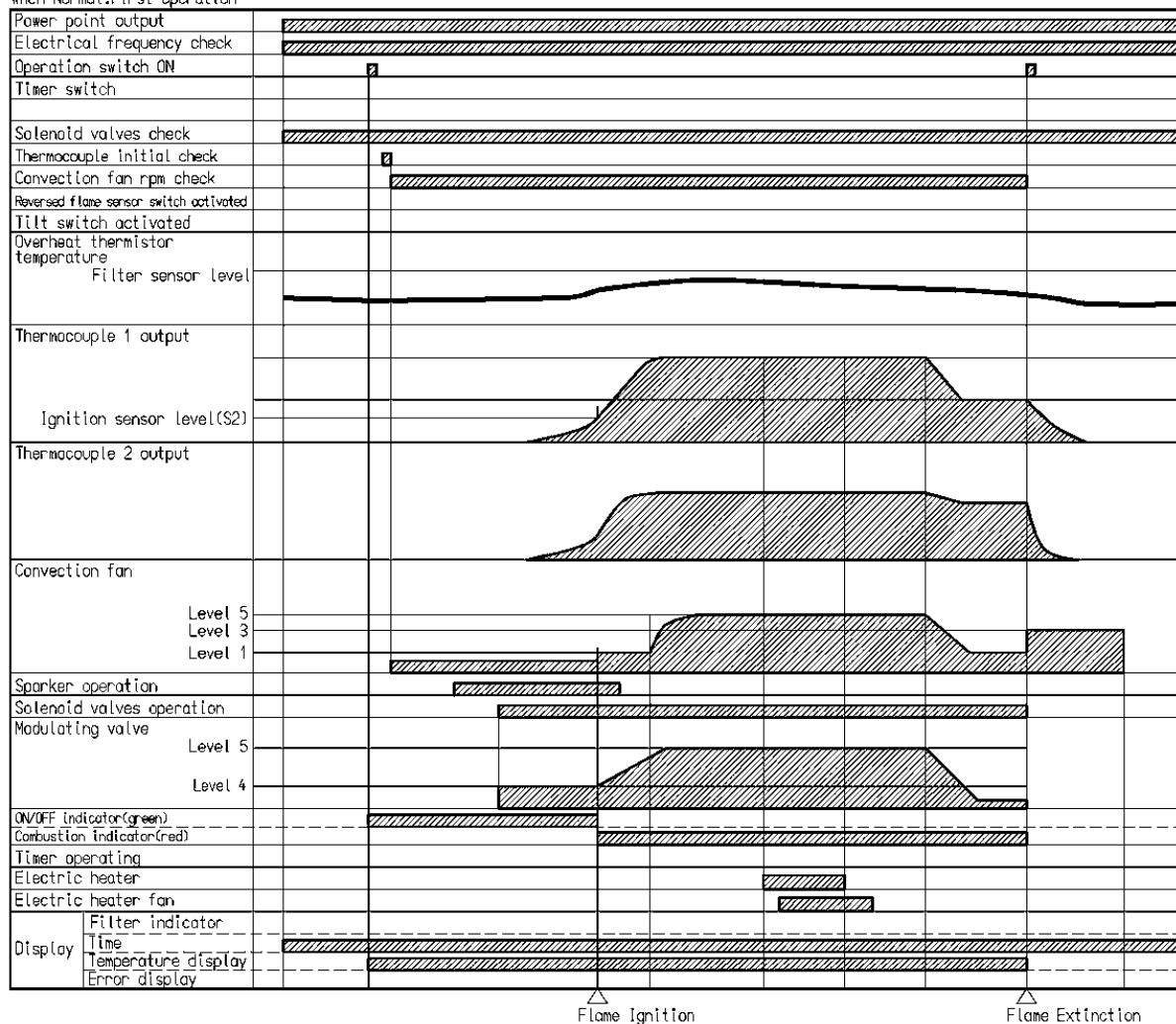


16. Block Diagram

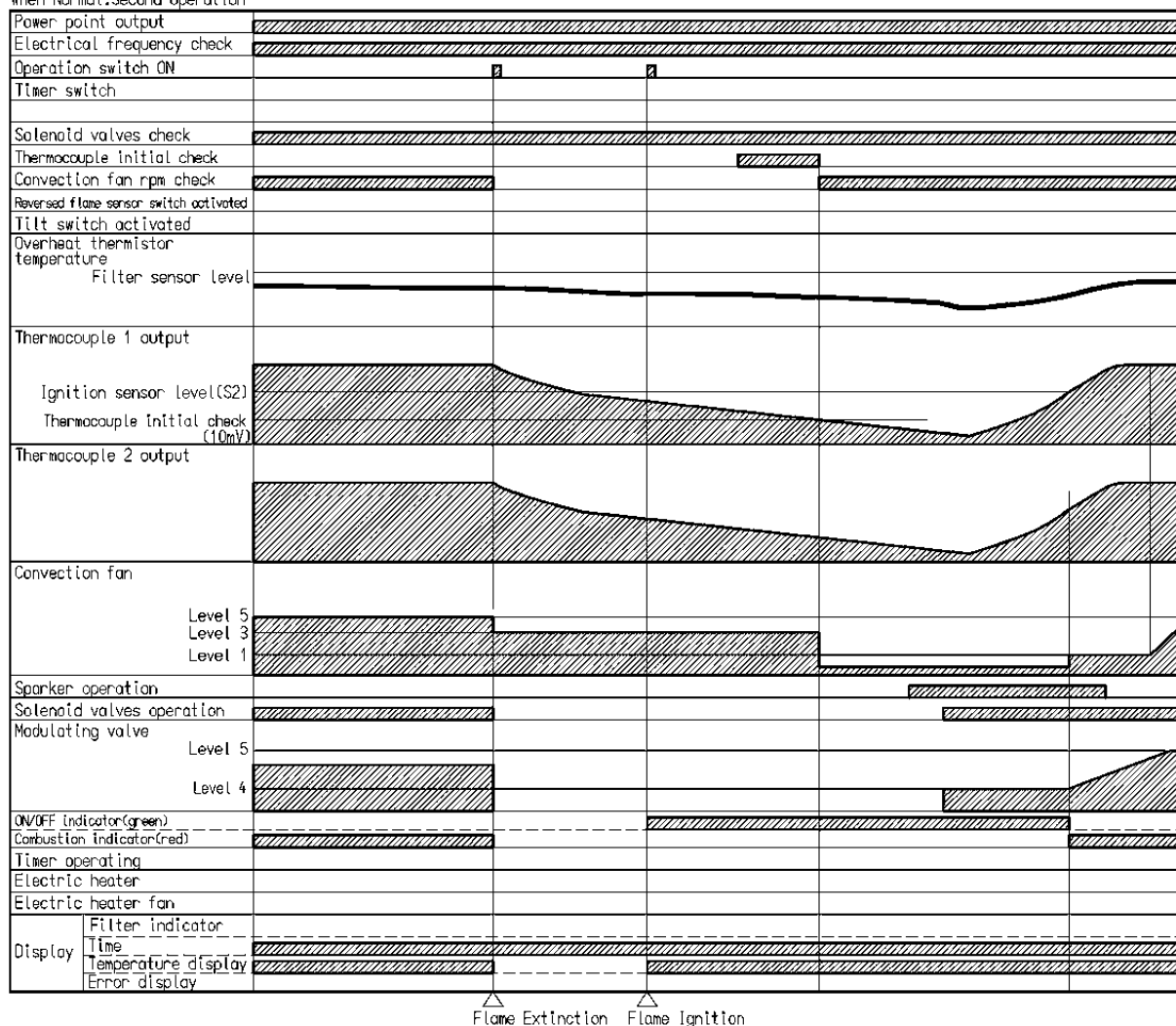


17. Time Charts

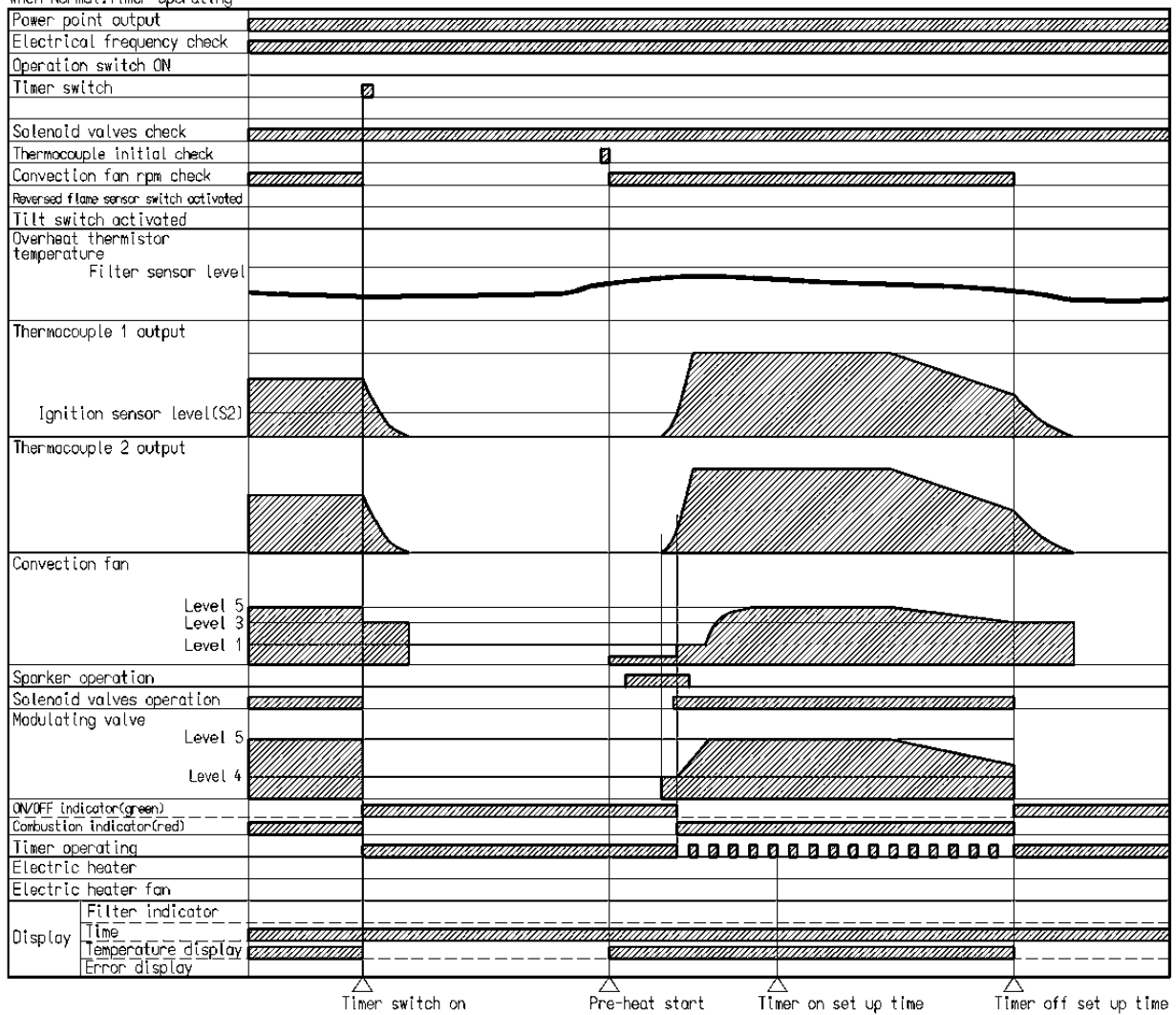
When Normal:First Operation



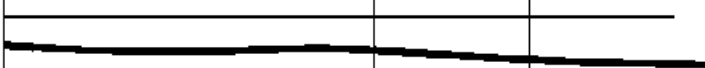
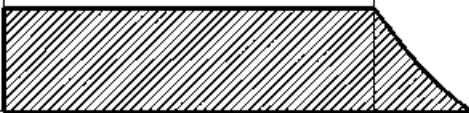
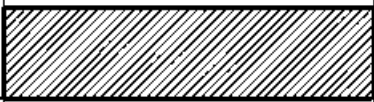
When Normal:Second Operation



When Normal: timer operating



Fault: Convection Fan rpm Failure (Below 150rpm)

Power point output	
Electrical frequency check	
Operation switch ON	
Timer switch	
Solenoid valves check	
Thermocouple initial check	
Convection fan rpm check	
Reversed flame sensor switch activated	
Tilt switch activated	
Overheat thermistor temperature	
Filter sensor level	
Thermocouple 1 output	
Each level from 1~5	
Thermocouple 2 output	
Each level from 1~5	
Convection fan	
Each level from 1~5	
150rpm	
Sparker operation	
Solenoid valves operation	
Modulating valve	
Each level from 1~5	
ON/OFF Indicator(green)	
Combustion Indicator(red)	
Timer operating	
Electric heater	
Electric heater fan	
Display	
Filter indicator	
Time	
Temperature display	
Error display	
	62 Flashes

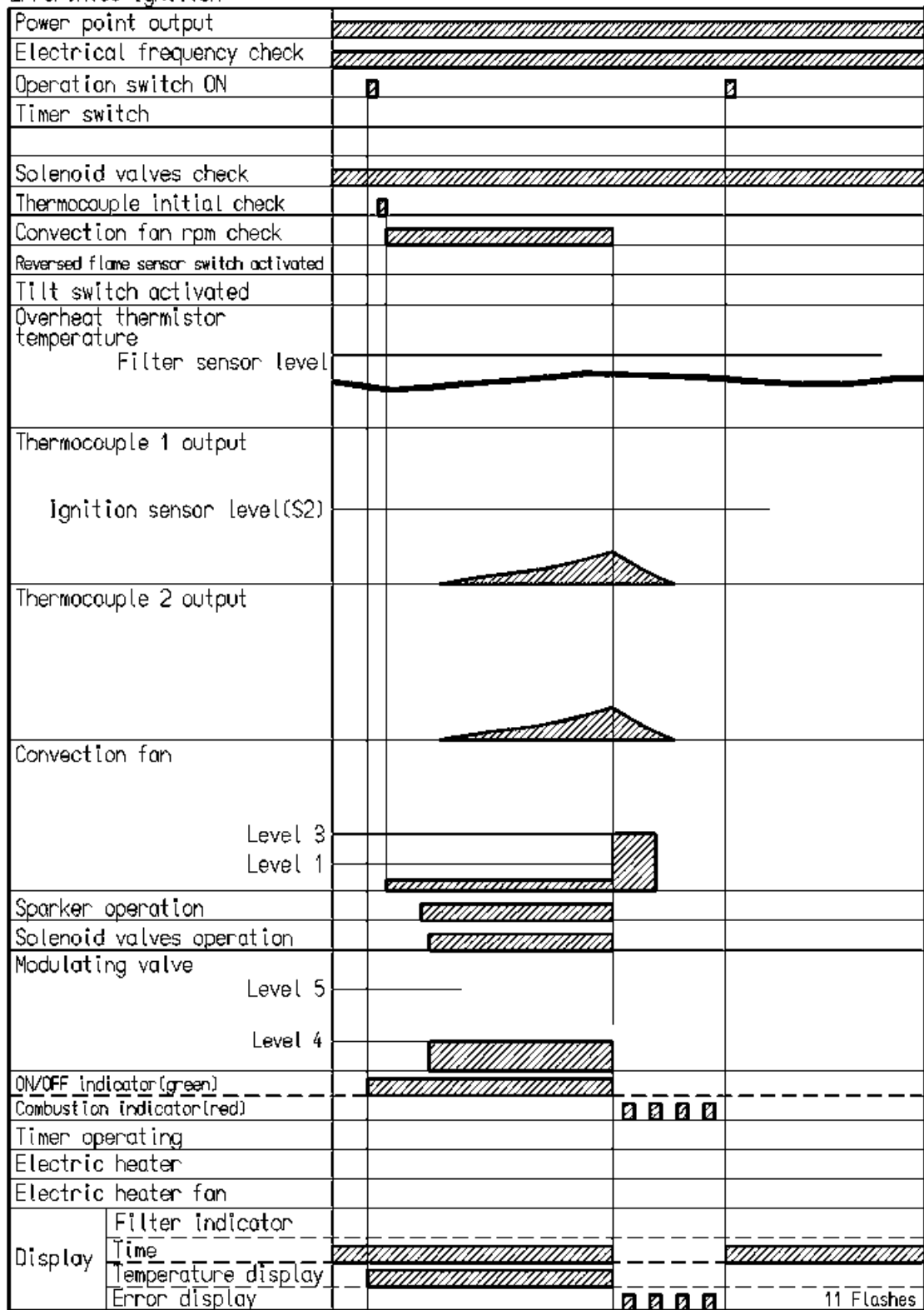
Fault: Convection Fan rpm Failure (Above 1800rpm)

Power point output					
Electrical frequency check					
Operation switch ON					0
Timer switch					
Solenoid valves check					
Thermocouple initial check					
Convection fan rpm check					
Reversed flame sensor switch activated					
Tilt switch activated					
Overheat thermistor temperature					
Filter sensor level					
Thermocouple 1 output					
Each level from 1~5					
Thermocouple 2 output					
Each level from 1~5					
Convection fan					
1800rpm					
Each level from 1~5					
Sparker operation					
Solenoid valves operation					
Modulating valve					
Each level from 1~5					
ON/OFF indicator (green)					
Combustion indicator (red)					0 0 0 0 0
Timer operating					
Electric heater					
Electric heater fan					
Display	Filter indicator				
	Time				
	Temperature display				
	Error display				0 0 0 0 0 62 Flashes

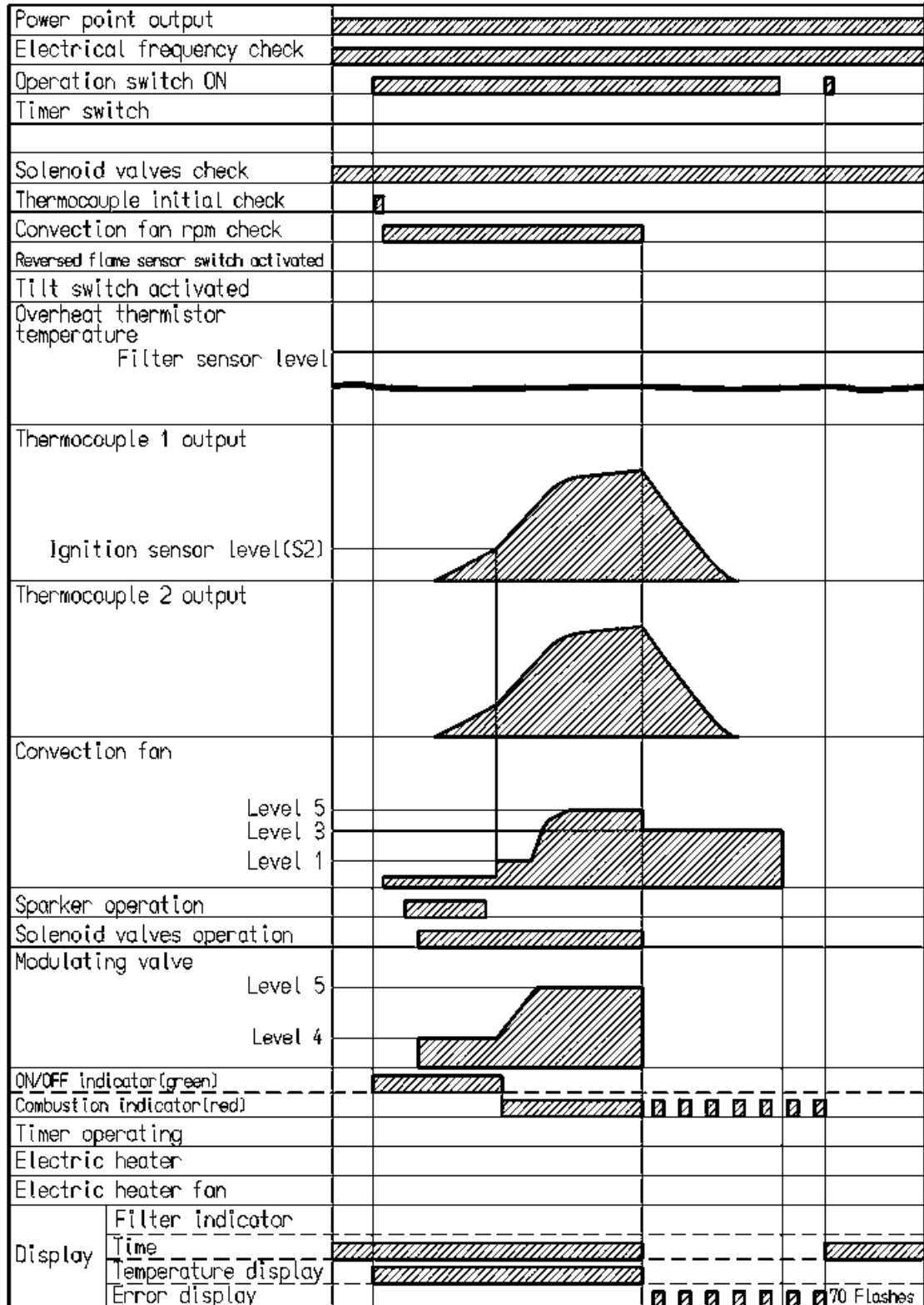
Error:Flame Failure/Oxygen Depletion

Power point output	
Electrical frequency check	
Operation switch ON	
Timer switch	
Solenoid valves check	
Thermocouple initial check	
Convection fan rpm check	
Reversed flame sensor switch activated	
Tilt switch activated	
Overheat thermistor temperature	
Filter sensor level	
Thermocouple 1 output	
Each level from 1~5	
Ignition sensor level(S2)	
Thermocouple 2 output	
Each level from 1~5	
Convection fan	
Each level from 1~5	
Level 3	
Sparker operation	
Solenoid valves operation	
Modulating valve	
Each level from 1~5	
ON/OFF indicator(green)	-----
Combustion indicator(red)	
Timer operating	
Electric heater	
Electric heater fan	
Filter indicator	-----
Time	
Temperature display	
Error display	 12 Flashes

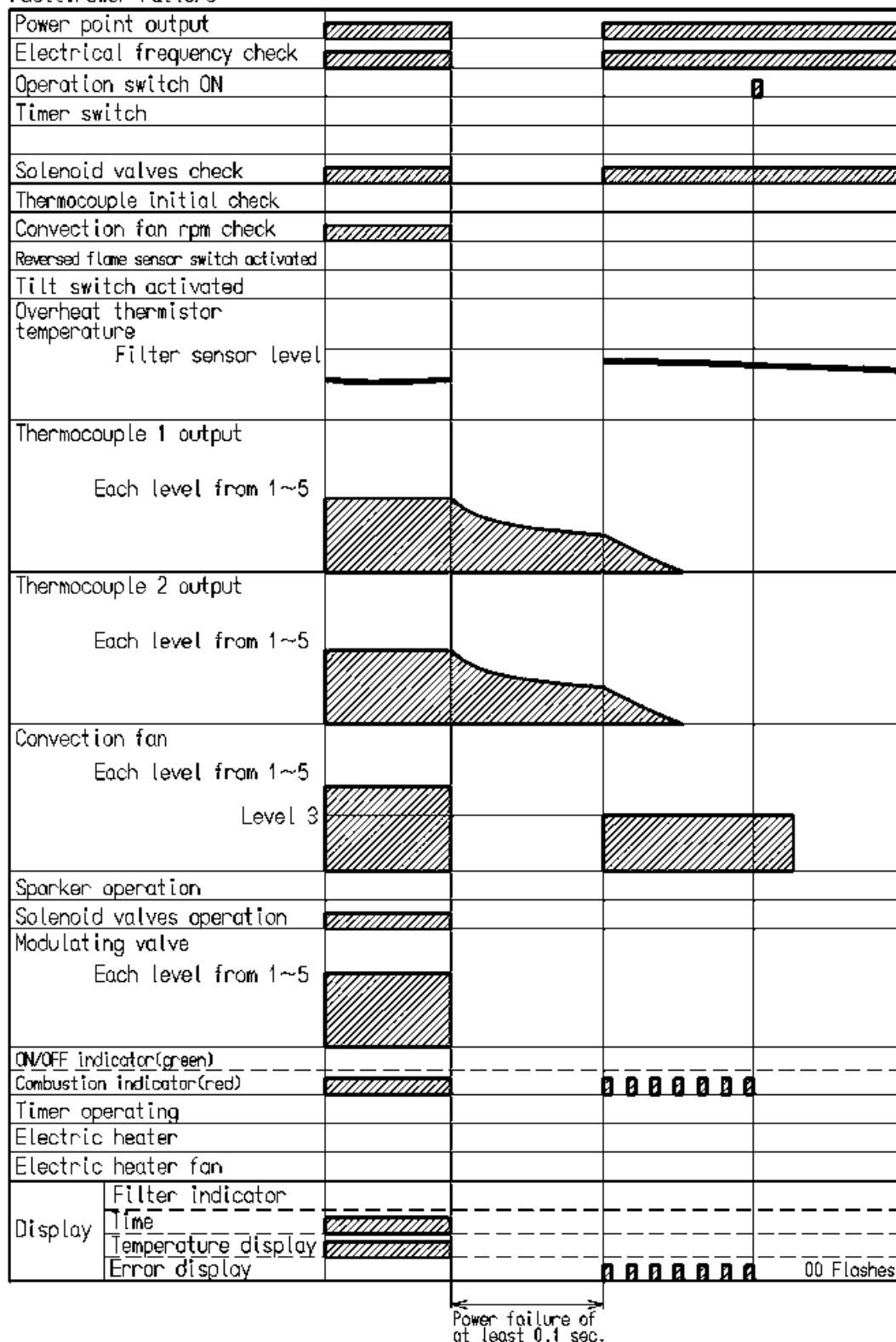
Error:Miss-Ignition



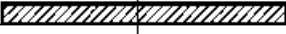
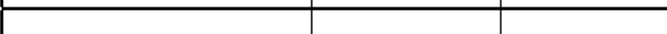
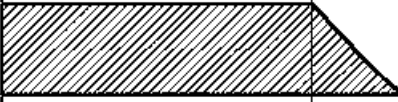
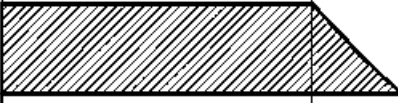
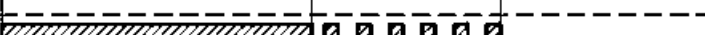
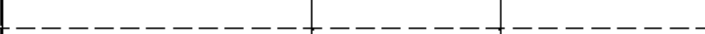
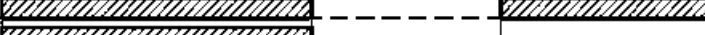
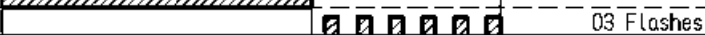
Fault:ON/OFF Switch Failure



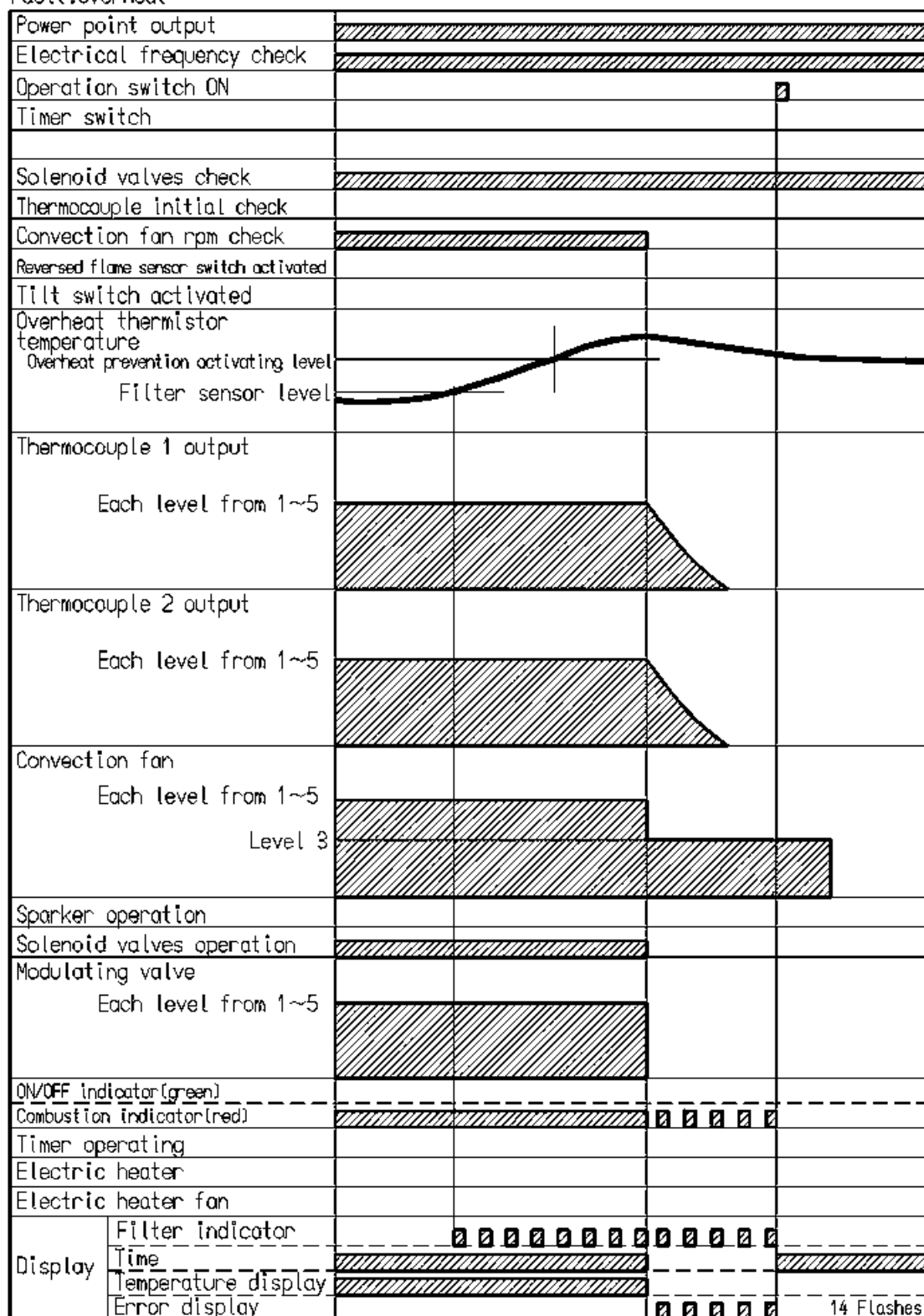
Fault:Power Failure



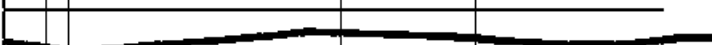
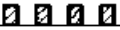
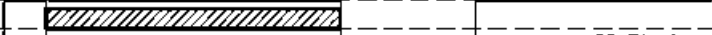
Fault:Tilt Switch Activated

Power point output	
Electrical frequency check	
Operation switch ON	
Timer switch	
Solenoid valves check	
Thermocouple initial check	
Convection fan rpm check	
Reversed flame sensor switch activated	
Tilt switch activated	
Overheat thermistor temperature	
Filter sensor level	
Thermocouple 1 output	
Each level from 1~5	
Thermocouple 2 output	
Each level from 1~5	
Convection fan	
Each level from 1~5	
Level 3	
Sparker operation	
Solenoid valves operation	
Modulating valve	
Each level from 1~5	
ON/OFF Indicator(green)	
Combustion indicator(red)	
Timer operating	
Electric heater	
Electric heater fan	
Display	
Filter Indicator	
Time	
Temperature display	
Error display	 03 Flashes

Fault:Overheat



Fault: Convection Fan rpm Failure (Below Pre-purge rpm)

Power point output				
Electrical frequency check				
Operation switch ON				
Timer switch				
Solenoid valves check				
Thermocouple initial check				
Convection fan rpm check				
Reversed flame sensor switch activated				
Tilt switch activated				
Overheat thermistor temperature				
Filter sensor level				
Thermocouple 1 output				
Thermocouple 2 output				
Convection fan				
	150rpm			
Sparker operation				
Solenoid valves operation				
Modulating valve				
ON/OFF indicator (green)				
Combustion indicator (red)				
Timer operating				
Electric heater				
Electric heater fan				
Display	Filter indicator			
	Time			
	Temperature display			
	Error display			

62 Flashes

18. Parts List

RCE-470 / 570 / 670TR				RCE-470TR QTY		RCE-570TR QTY		RCE-670TR QTY	
No.	PART NAME	RA PART No.	RJ DRAWING No.	Silver	White	Silver	White	Silver	White
001	FRONT PANEL, (670TR) Silver	90192998	RC-670-50-1X01-A					1	
002	FRONT PANEL, (670TR) White	90193285	RC-670-50-2X01-A						1
001	FRONT PANEL, (570TR) Silver	90193079	RC-670-50-1X01-B			1			
001	FRONT PANEL, (570TR) White	90192790	RC-670-50-1X01-B				1		
002	FRONT PANEL, (470TR) Silver	90195835	RC-670-50-2X01-B	1					
002	FRONT PANEL, (470TR) White	90195843	RC-670-50-2X01-B		1				
003	LOUVRE - Hot Air Outlet, Silver	90193087	RC-670-46-2-1X03	1		1		1	
004	LOUVRE - Hot Air Outlet, White	90193145	RC-670-46-2-2X03		1		1		1
005	REAR PANEL, Silver	90193095	RC-670-42-2-1X03	1		1		1	
006	REAR PANEL, White	90193152	RC-670-42-2-2X03		1		1		1
007	HOLDER, TC Check		RC-670-117X01	1	1	1	1	1	1
008	TOP PANEL, Silver	90193103	RC-670-45-1X04	1		1		1	
009	TOP PANEL, White	90192808	RC-670-45-2X04		1		1		1
010	PANEL CONTROL	90192816	RC-670-68X02	1	1	1	1	1	1
011	BADGE, (670TR) Silver	90193111	RC-670-66-1X02					1	
011	BADGE, (670TR) White								1
011	BADGE, (570TR) Silver					1			
012	BADGE, (570TR) White		RC-670-67-1X02				1		
013	BADGE, (470TR) Silver		RC-670-66-3X02	1					
014	BADGE, (470TR) White		RC-670-67-3X02		1				
015	PANEL, Sensor Rec.		RC-670-63X01	1	1	1	1	1	1
016	BASE, Silver	90193129	RC-670-41-1X05	1		1		1	
017	BASE, White	90192824	RC-670-41-2X05		1		1		1
018	HANDLE, Silver	90189960	650P-69-19	2		2		2	
019	HANDLE, White	90161951	650P-69-3X02		2		2		2
020	GRIP, Cable		CP-90125B-23	2	2	2	2	2	2
021	FILTER, Air	90192832	RC-512-32X02	1	1	1	1	1	1
023	FILTER - E, Black	90193137	RC-406-90-5X03	1		1		1	
024	FILTER - C, White	90161167	RC-406-90-3X03		1		1		1
025	SCREW	90182643	RC-224-35-2	1	1	1	1	1	1
026	COVER, Thermistor		RC-670-116	1	1	1	1	1	1
100	CHAMBER, Comb		RC-670-27X01	1	1	1	1	1	1
101	BURNER	90192857	B6S1-1X01	1	1	1	1	1	1
102	VALVE, Mod	90192865	C36U-1-2-SX01	1	1	1	1	1	1
103	O-RING	90148594	M10B-1-8	2	2	2	2	2	2
104	TUBE, Commun.		RC-670-33	1	1	1	1	1	1
105	HOLDER - B, Commun.		RC-152-220X03	2	2	2	2	2	2
106	INJECTOR - B, Main	90192873	RC-152-19-A-1.55	1	1	1	1	1	1
106	INJECTOR - A, Main	90191881	RC-152-19-B-2.45	1	1	1	1	1	1
107	INJECTOR - P	90192899	RC-670-31-A-0.2	1	1	1	1	1	1
107	INJECTOR - P	90191907	RC-670-31-B-0.25	1	1	1	1	1	1

RCE-470 / 570 / 670TR

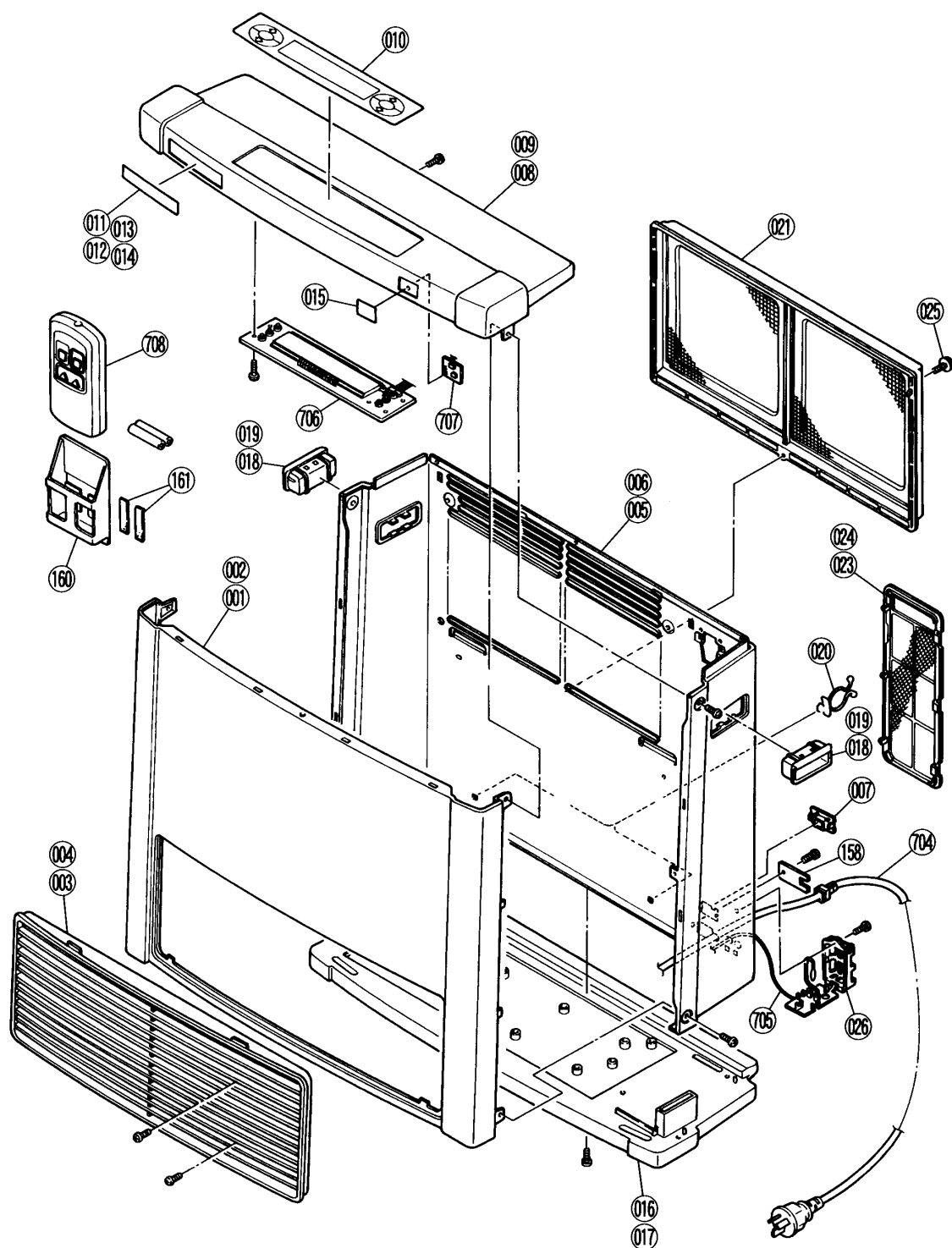
				RCE-470TR QTY		RCE-570TR QTY		RCE-670TR QTY	
No.	PART NAME	RA PART No.	RJ DRAWING No.	Silver	White	Silver	White	Silver	White
108	O-RING		M10B-1-5	2	2	2	2	2	2
109	FILTER, Injector		RC-670-69	1	1	1	1	1	1
110	POINT, Pressure		C10D-4X01	1	1	1	1	1	1
111	O-RING		M10B-13-4	1	1	1	1	1	1
112	SCREW, P.T.		C10D-5	1	1	1	1	1	1
113	HOSE		CP-30405A	1	1	1	1	1	1
114	GROMMET, Piping		CP-30154X01	1	1	1	1	1	1
115	FLANGE, L	90176652	RC-501-14X01	1	1	1	1	1	1
116	FILTER		RCK-6808N	1	1	1	1	1	1
117	SEALING	90176637	C3I1-7X01	1	1	1	1	1	1
118	HOLDER, Injector		RC-670-32	1	1	1	1	1	1
119	HOLDER, Inj. Commun.		RC-670-39	1	1	1	1	1	1
120	HOLDER, Inj. P		RC-670-38	1	1	1	1	1	1
121	RESTRICTER, Inj. TR		RC-670-88X02	1	1	1	1	1	1
122	CHAMBER, Comb	90192923	RC-670-10X03	1	1	1	1	1	1
123	ELECTRODE	90192931	RC-670-53	1	1	1	1	1	1
124	HOLDER, Electrode		RC-512-51	1	1	1	1	1	1
125	TUBE, Silicon	90192949	RC-223-84-BX03	1	1	1	1	1	1
126	HOOD		RC-670-20X03	1	1	1	1	1	1
127	EDGING		CP-90157A-55	1	1	1	1	1	1
128	HOLDER, Top Plate		RC-670-115	1	1	1	1	1	1
129	SEPERATOR, Upper		RC-670-54X01	1	1	1	1	1	1
130	CLIP, Cable		CP-90125-4	2	2	2	2	2	2
131	LID		RC-670-52	1	1	1	1	1	1
132	SHIELD, Heat		RC-670-35X01	1	1	1	1	1	1
133	PANEL, Divider		RC-670-16X01	1	1	1	1	1	1
134	SEPERATOR, Hood		RC-670-43	1	1	1	1	1	1
135	LID, Burner		RC-670-18	1	1	1	1	1	1
136	PLATE, Thermoc. 2 mount.		RC-670-30X01	1	1	1	1	1	1
137	HOLDER, Thermoc.	90176439	RC-210-89X01	2	2	2	2	2	2
138	PLATE, Thermoc. mount.		RC-670-70	1	1	1	1	1	1
139	CASING		RC-670-22X01	1	1	1	1	1	1
140	BLADE, Convect.		RC-417-21	1	1	1	1	1	1
141	HOUSING, Metal		RC-504-32	1	1	1	1	1	1
142	METAL		RC-208-16	1	1	1	1	1	1
143	MOUNTING BRACKET-A, Motor		RC-512-23X01	1	1	1	1	1	1
144	MOUNTING BRACKET-B, Motor		RC-512-24	1	1	1	1	1	1
145	CASE, Heater Upper		RC-670-95X02	1	1	1	1	1	1
148	BRACKET, Sparker Mount.		RC-235-51X03	1	1	1	1	1	1
158	BRACKET, Power Cord	90177114	RC-329-1033X01	1	1	1	1	1	1
159	COVER, Throat		RC-670-19	1	1	1	1	1	1

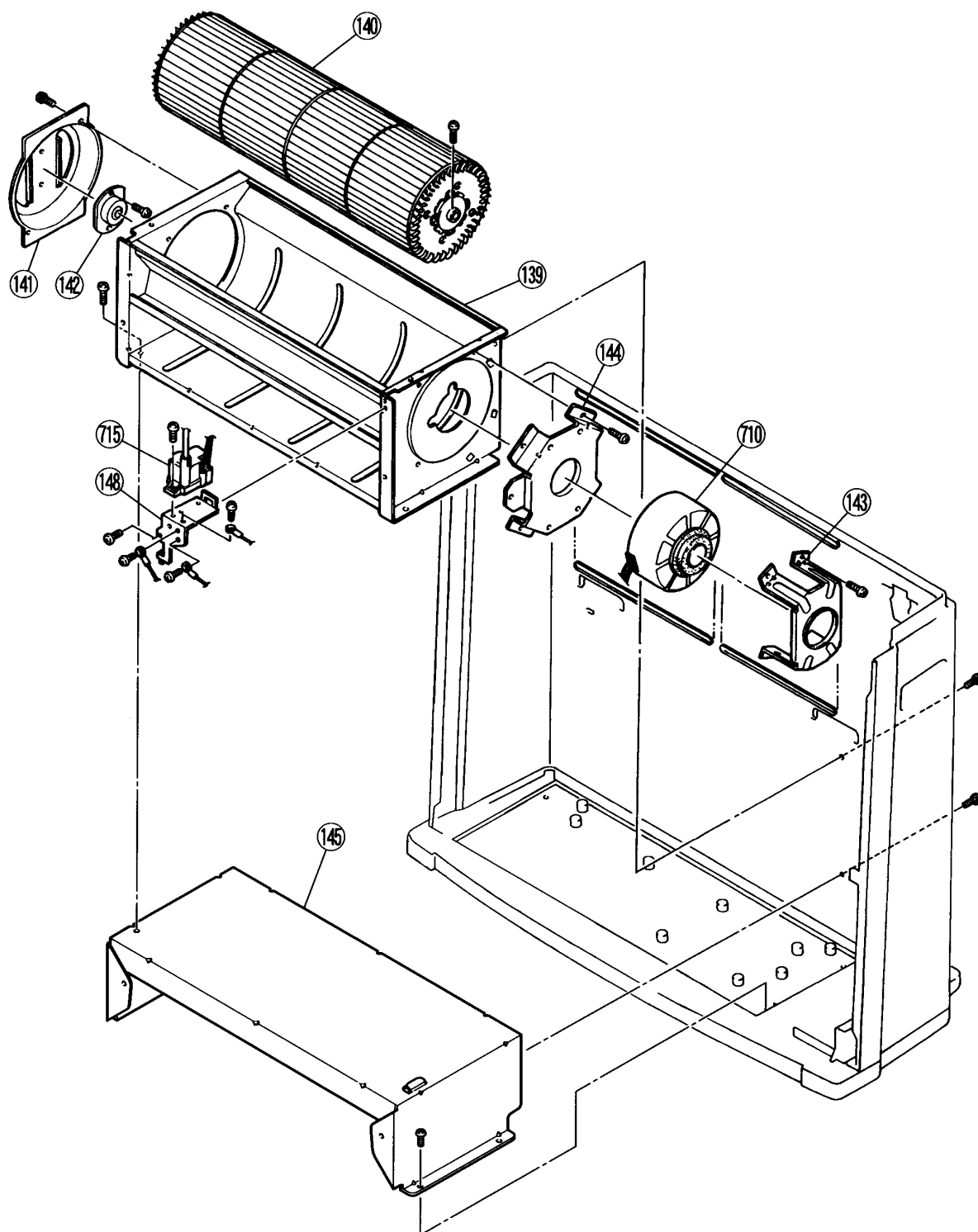
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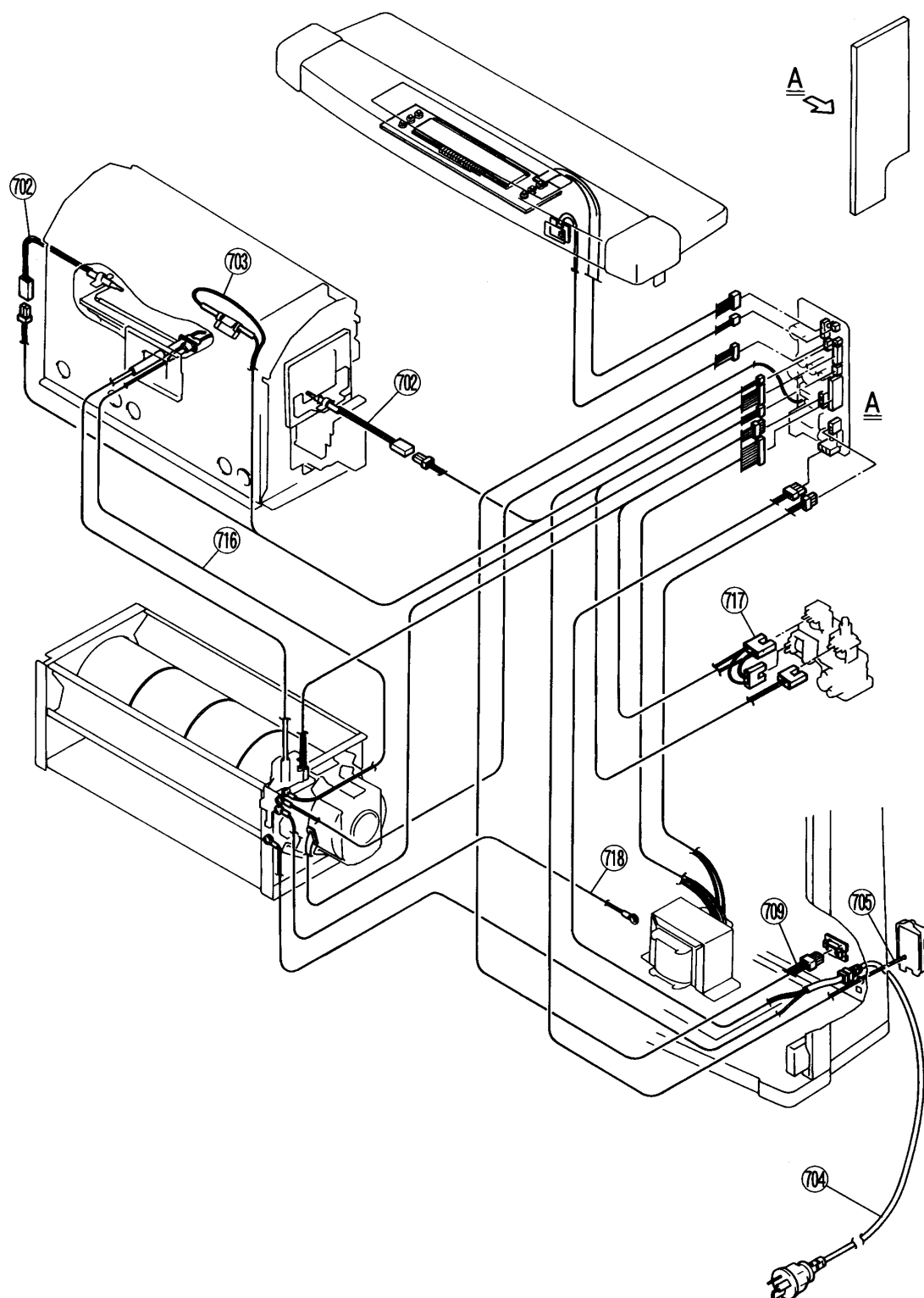
RCE-470 / 570 / 670TR

				RCE-470TR QTY		RCE-570TR QTY		RCE-670TR QTY	
No.	PART NAME	RA PART No.	RJ DRAWING No.	Silver	White	Silver	White	Silver	White
160	HOLDER, Remote Control	90192956	RC-670-89	1	1	1	1	1	1
161	TAPE, Adhesive		RC-560-224-1	2	2	2	2	2	2
700	PCB Main (470TR)	90195850	RC-670-73-5X01	1	1				
700	PCB Main (570TR)	90194093	RC-670-73-3X04			1	1		
700	PCB Main (670TR)	90194085	RC-670-73-2X04					1	1
701	TRANSFORMER, Power	90192964	ET-290	1	1	1	1	1	1
702	THERMOCOUPLE	90192972	RC-511-166-3	2	2	2	2	2	2
703	HARNESS, TF	90192980	RC-670-76	1	1	1	1	1	1
704	POWER CORD	90182916	CP-90465-2X02	1	1	1	1	1	1
705	THERMISTOR	90193004	RC-361-140-4	1	1	1	1	1	1
706	BOARD, Control	90193012	RC-670-150	1	1	1	1	1	1
707	BOARD, Signal Receiver	90193020	RC-670-62X01	1	1	1	1	1	1
708	REMOTE CONTROL	90193038	RC-670-86X02	1	1	1	1	1	1
709	LEAD, TC Check	90193046	RC-670-79	1	1	1	1	1	1
710	MOTOR, Convection Fan		RC-670-17	1	1	1	1	1	1
710a	FAN, Convection Assy	90193053	RC-670-25X01	1	1	1	1	1	1
715	SPARKER	90193061	RC-337-16-5	1	1	1	1	1	1
716	HARNESS, Earth		RC-670-91	1	1	1	1	1	1
717	HARNESS, MVIG		RC-670-77X01	1	1	1	1	1	1
718	HARNESS, Transf. Earth		RC-670-84	1	1	1	1	1	1
888	CUSTOMER INSTRUCTION		RC-670-94X01	1	1	1	1	1	1

19. Exploded Diagrams







SERVICE CONTACT POINTS

Rinnai
AUSTRALIA PTY. LTD

ACN 005 138 769 ABN 74 005 138 769

Internet: **www.rinnai.com.au**

E-mail: enquiry@rinnai.com.au

Head Office, Australia

10-11 Walker Street, Braeside, VIC 3195

Tel: (03) 9271 6625

Fax: (03) 9271 6622

Help Line: Sales & Service

Tel: 1300 555 545

Fax: 1300 555 655

Hot Water Service Line

Tel: 1800 000 340

Help Line: Spare Parts & Technical Info

Tel: 1300 366 388

Fax: 1300 300 141

Rinnai
NEW ZEALAND LTD.

Internet: **www.rinnai.co.nz**

E-mail: sales@rinnai.co.nz

Head Office, New Zealand

691 Mt. Albert Road, Royal Oak,
Auckland
P O Box 24-068

Tel: (09) 625 4285

Fax: (09) 624 3018

24 hr Service

Tel: 0800 746624 (0800 Rinnai)

RCE470TR / RCE570TR / RCE670TR
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