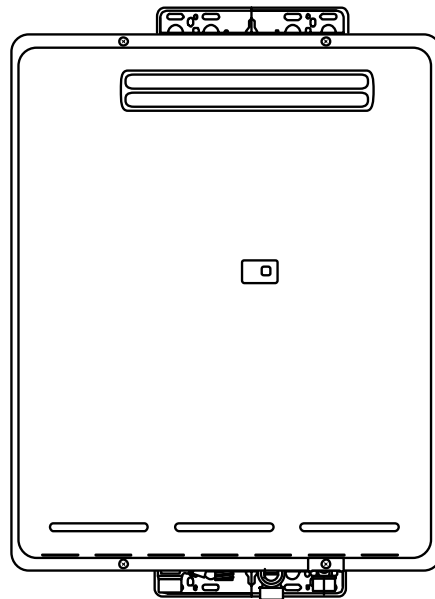


# Rinnai

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## INFINITY 32e and HD70e

### SERVICE MANUAL



**Infinity High Capacity Continuous Flow Gas Hot Water System**

The Rinnai Infinity 32e and Heavy Duty 70e water heater, when correctly installed, comply with the requirements of the United Kingdom Water Regulations / Byelaws (Scotland). These Products can be found listed in the Water Fittings and Materials Directory.



The Rinnai Infinity 32e water heater is CE Marked for UK and Ireland as allowed by Technigas of Belgium.  
Certificate number E0715/5344  
ID number 0461BO0715  
Date of Issue 14 July 2003

### **Quality System Standard**

ISO 9001 - 1994

The Design, Development, and Manufacture of Gas Water Heating Appliances done under Rinnai's Quality Management System is certified under the Quality Management System Standard ISO 9001.

Registration Number JQ0003D

Registered since: February 1994

Certified by Japan Gas Appliances Inspection Association.

*Produced by Rinnai Technical Services Department*

August 2004 - Issue 1.

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Rinnai U.K. reserves the right to make modifications and change specifications without notice.*



# **WARNING**



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

**ALL WIRING INSIDE THIS APPLIANCE MAY BE AT 230 VOLTS POTENTIAL  
ALL SERVICE WORK MUST BE CARRIED OUT BY AN AUTHORISED PERSON.  
DO NOT TEST FOR GAS ESCAPES WITH AN OPEN FLAME**

This manual has been published by Rinnai U.K. 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 supply improved appliances as well as information, and specifications may be subject to alteration at any time.

Issue N<sup>o</sup>1

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# Glossary of Terms and Symbols

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dB(A)	-	sound pressure level in decibels, “A” range
DC	-	direct current
AC	-	alternating current
WFCD	-	water flow control device
FB	-	feedback information
FF	-	feedforward information
Hz	-	Hertz
IC	-	integrated circuit
kcal/h	-	kilocalorie per hour
kW	-	kilowatts
LED	-	light emitting diode
L/min	-	Litres per minute
mA	-	milliamps
mbar	-	millibars of pressure
mm	-	millimetres
bar	-	gauge pressure
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
TE	-	thermal efficiency
TH	-	thermistor
T <sub>IN</sub>	-	temperature of incoming water
T <sub>OUT</sub>	-	temperature of outgoing water

# 1. Introduction

---

The Rinnai V-Series hot water units represents the latest technology in continuous flow, temperature controlled hot water.

## Features

- The Infinity 32 and HD70e NEVER RUNS OUT of hot water. Whilst electricity, water and gas supplies are connected, hot water is available whenever hot water taps are open.
- Built into the main micro-processor is the facility to LIMIT THE MAXIMUM TEMPERATURE of the hot water supplied. The water temperature may be limited to various maximum temperatures. This is particularly useful when the hot water unit is installed where young children or the infirm may be using the hot water. The Infinity 32e is delivered with a maximum preset temperature of 55 degree C and 65° C for the Heavy Duty 70e. If required, the temperature limits can be changed by a service technician. For further information, please contact Rinnai UK.
- The Infinity is a power flued appliance. It is COMPACT, saving both floor and wall space.
- The temperature of outgoing hot water is CONSTANTLY MONITORED by a BUILT-IN SENSOR. If the temperature of the outgoing hot water rises to more than 3° C above the selected temperature shown on the Digital Monitor (or the pre-set limit when Remote Controls are not fitted), the burner will automatically go out. The burner will ignite again once the outgoing hot water temperature falls below the temperature shown on the Digital Monitor (or the pre-set limit).
- The burner lights automatically when the hot water tap is opened, and goes out when the tap is closed. IGNITION IS ELECTRONIC, therefore there is not pilot light. When the hot water tap is off, no gas is used.
- 'Deluxe' or 'Standard' Remote Controllers are available as an optional extra. Depending on the models chosen, these offer the following additional features :
  - Bath fill function
  - Voice Prompting
  - Localised Temperature Control for up to one kitchen and two bathroom controllers
  - Clock
- Temperatures selected at the controllers are retained in the SYSTEM MEMORY.
- Operating NOISE LEVEL IS VERY LOW.
- ERROR MESSAGES ARE DISPLAYED on the Remote Controllers, assisting with service.

## 2. Specifications

Type of appliance	Temperature controlled continuous flow gas hot water system
Operation	With / without remote controls, mounted in kitchen, bathroom etc.
Exhaust system	Forced Flue
Rinnai model number	<b>Infinity 32e</b> <b>Heavy Duty 70e</b>
Installation	Externally mounted
Dimensions	Width – 470mm Height – 600mm Depth – 220mm
Weight	29 kilograms
Maximum / Minimum Gas consumption	Natural gas : 69 - 5.6 kW Propane gas : 69 - 5.6 kW
Connections	Gas connection – 3/4 inch BSP Cold water connection – 3/4 inch BSP Hot water connection – 3/4 inch BSP
Ignition system	Direct electronic ignition
Electrical consumption	Normal – 83 W Standby – 12 W ( With 1 Remote control ) With Anti-frost protection – 100 W
Hot water capacity (Raised 25°C)	32 to 2.7 L/min
Thermal efficiency	81%
Temperature range (with remote)	Kitchen controller (MC) : 37 - 55°C Bathroom controller (BC) : 37 - 50°C
Default temperature control (without remote)	40°C, 43°C, 50°C, 55°C, 60°C, 65°C, 75°C, 85°C ( Set by combination of Dip switches on PCB )
Water flow control	Electronic Water flow sensor, flow control & heat exch. By-pass flow control.
Minimum operating water pressure(Note 2)	1.8 bar
Nominal operating water pressure	2.0 bar - 10.0 bar
Minimum operating water flow	2.7 L/min
Maximum operating water flow	32 L/min
Power supply	Appliance – AC 230 Volts 50Hz Remote control – DC 12 Volts ( Digital )
Noise Level	49 dB(A)
Safety device	Flame failure – Flame rod
	Boil dry – Water flow sensor
	Remaining flame (OHS) – 97°C bi-metal switch
	Over temperature – 95°C lockout thermistor
	Fusible link – 129°C Thermal Fuse
	Pressure relief valve – Opens 20.6 bar. Closes 14.7 bar
	Combustion fan rpm check – Integrated circuit system
	Over current – Glass fuse ( 3 Amp.)
Remote control optional	Kitchen control – MC-91-1A or MC-70-2A
	Bathroom control – MC-91-1A or BC-70-2A
	Second bathroom control – MC-91-1A or BC-70-2A
Remote Controller Cable ( optional )	Two core sheathed (double insulated), flex with min. cross-sectional area of 0.5mm <sup>2</sup>
Manifold Electronic Control System(optional)	MSA-S

*Note 1:* The default factory setting is 55° C for Infinity 32e and 65° C for HD 70e. The unit can be ordered from Rinnai UK to be pre-set to any of the other temperatures listed. The unit can be pre-set to any of the temperatures listed by a suitably qualified person.

Controllers are available with default temperatures up to 75° C. When fitted with controllers, only temperatures not exceeding the default temperatures can be selected. When fitted without controllers, the unit will deliver water at the default temperature. Controllers are not available with 85° C setting.

*Note 2:* Unit will operate at lower pressures but the maximum rated flow of 32L/min. will not be achieved.

## Sensors and Safety Devices

- Heat Exchanger Thermistor: Measures hot water temperature at heat exchanger outlet. If water temperature reaches a predetermined limit, gas supply is stopped.
- Hot Water Delivery Thermistor: Measures hot water temperature at the outlet valve (i.e. the ‘mixed’ temperature).
- Flame Rod: Monitors combustion characteristics inside the combustion chamber. If the flame fails, gas supply is stopped.
- Overheat Switch: Situated on the heat exchanger, gas supply is stopped when water temperature reaches 97° C for a number of seconds.
- Fusible Link: Situated on the heat exchanger, electrical power supply is stopped if the temperature exceeds 129° C.
- Water Pressure Relief Valve: Safeguards the water circuit against excessive inlet pressure. Opens at 21.0 bar, closes at 15.0 bar.
- Electrical Fuse: (3A glass fuse) prevents against over-current.  
Surge Protector: prevents against over-current.
- Boil Dry Prevention: If water flow sensor detects no flow, gas supply is stopped.
- Combustion Fan Speed Sensor: In case of combustion fan defect (no rotation of fan) gas supply is stopped.
- Temperature Cutout: If the delivered hot water temperature rises above the required delivery temperature for a number of seconds, the gas supply is stopped.

## Combustion Specifications

Gas Type	Injector Size (mm)	Nominal TPP (mbar) * *		Gas Input (kW)	
		Low	High	Low	High
Natural	1.05	1.8	7.4	5.6	69
	1.65				
Propane	0.65	3.5	17.6	5.6	69
	0.95				

\* \* The TPP is measured with the cover ‘off’ the appliance at the regulator test point with supply pressures of 20 mbar (NG) and 37 mbar (Propane).



### 3. Water Flow Rates and Pressures

---

Table 1 shows unmixed and mixed water flow rates and approximate gas consumptions for various temperature rises. The unmixed flow rates are the flow rates available at the given temperature rise directly at the outlet of the water heater. The mixed water flow rates are available at the given temperature rise by mixing hot water from the outlet of the water heater with cold water from the mains supply.

Water Flows can also be calculated by the following formula:

$$M = 60 \times ( Q / C \times \Delta T )$$

Where M = Water flow rate in litres/minute. If M is  $\leq$  to 32, the water is unmixed, the entire flow goes through the water heater. If  $M > 32$  the hot water from the unit is mixed with cold water.

Q = Heat energy available in kW = 56kW for the Infinity 32e and 70e

C = Specific heat of water = 4.2KJ/Kg °C. This does not change for the purpose of this calculation.

$\Delta T$  = Temperature rise required (°C)

Example:

What is the flow rate available with an incoming water temperature of 10°C and a required temperature of 20°C?

$$\Delta T = 20 - 10 = 10^\circ \text{C}$$

$$Q = 56$$

$$C = 4.2$$

$M = 60 \times ( 56 / (4.2 \times 10) ) = 80 \text{ l/min}$ . Since 80 is greater than 32, this flow rate is mixed. This result corresponds with the value in Table 1.

**Table 1: Approximate Water Flows and Gas Consumption - Rinnai Infinity 32e and 70e**

Temperature Rise °C	5			10			15		
	L/min	L/hr	kW	L/min	L/hr	kW	L/min	L/hr	kW
thru unit	32	1920	13.9	32	1920	27.8	32	1920	41.7
maximum	160	9600	69	80	4800	69	53	3200	69

Temperature Rise °C	20			25			30		
	L/min	L/hr	kW	L/min	L/hr	kW	L/min	L/hr	kW
thru unit	32	1920	55.6	32	1920	69	26.5	1589	69
maximum	40	2400	69	32	1920	69	26.5	1589	69

Temperature Rise °C	35			40			45		
	L/min	L/hr	kW	L/min	L/hr	kW	L/min	L/hr	kW
thru unit	22.7	1362	69	19.9	1191	69	17.7	1059	69

Temperature Rise °C	50			55			60		
	L/min	L/hr	kW	L/min	L/hr	kW	L/min	L/hr	kW
thru unit	15.9	953	69	14.4	867	69	13.2	794	69

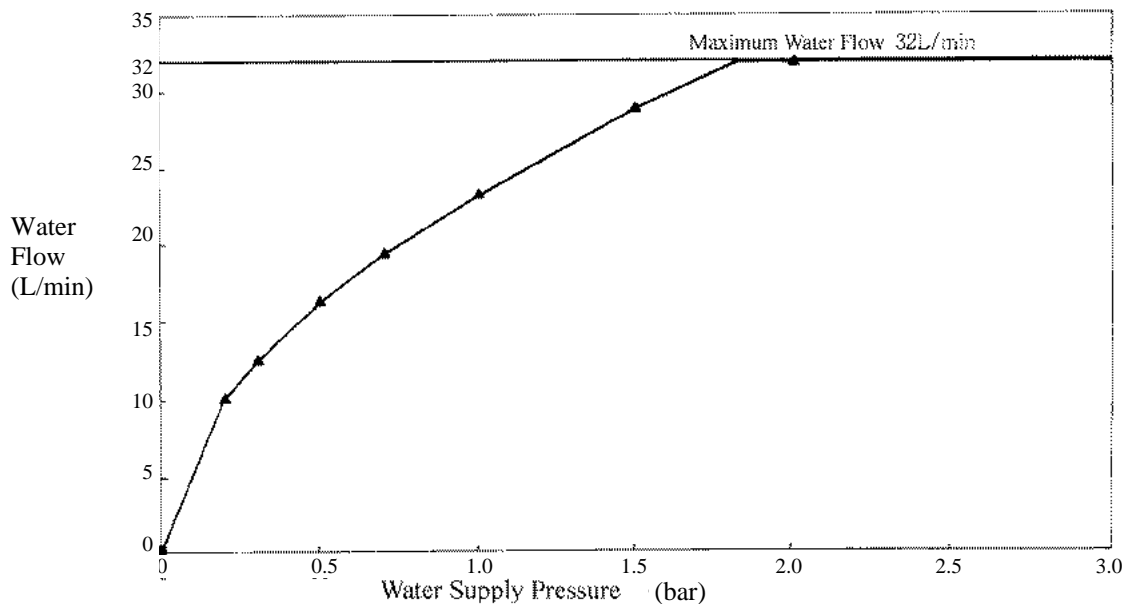
  

Temperature Rise °C	65			70			75		
	L/min	L/hr	kW	L/min	L/hr	kW	L/min	L/hr	kW
thru unit	12.2	733	69	11.3	681	69	10.6	635	69

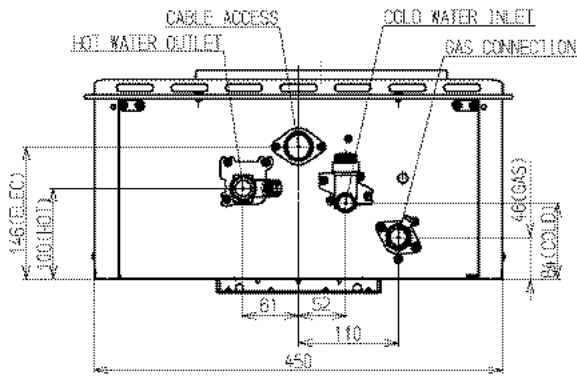
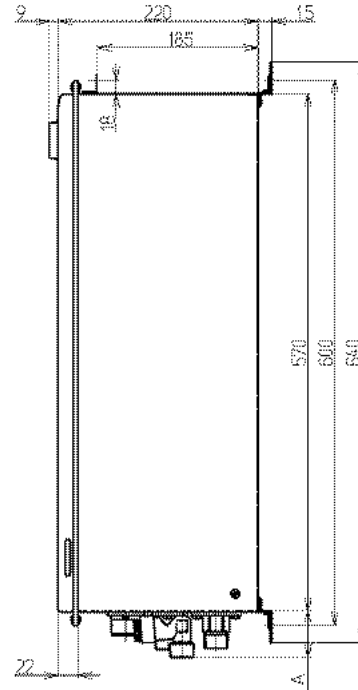
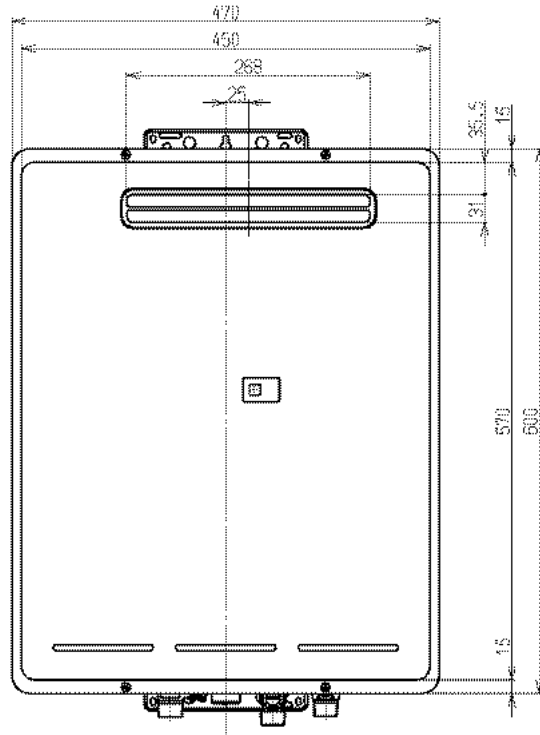
The flow listed as thru unit assumes that the demand required is through the heater and is the amount of water and the gas used to raise the temperature of the water by that many degrees only. The listed Maximum is how much mixed water can be raised by that many degrees by heating the water through the unit to maximum capacity and mixing with cold until the necessary change in temperature is reached.

## Water Pressure

As seen in the table below a minimum supply pressure of 1.8 bar is required to operate at the rated flow of 32 L/min. In an actual installation, pressure losses in the plumbing system also need to be considered.



# 4. Dimensions

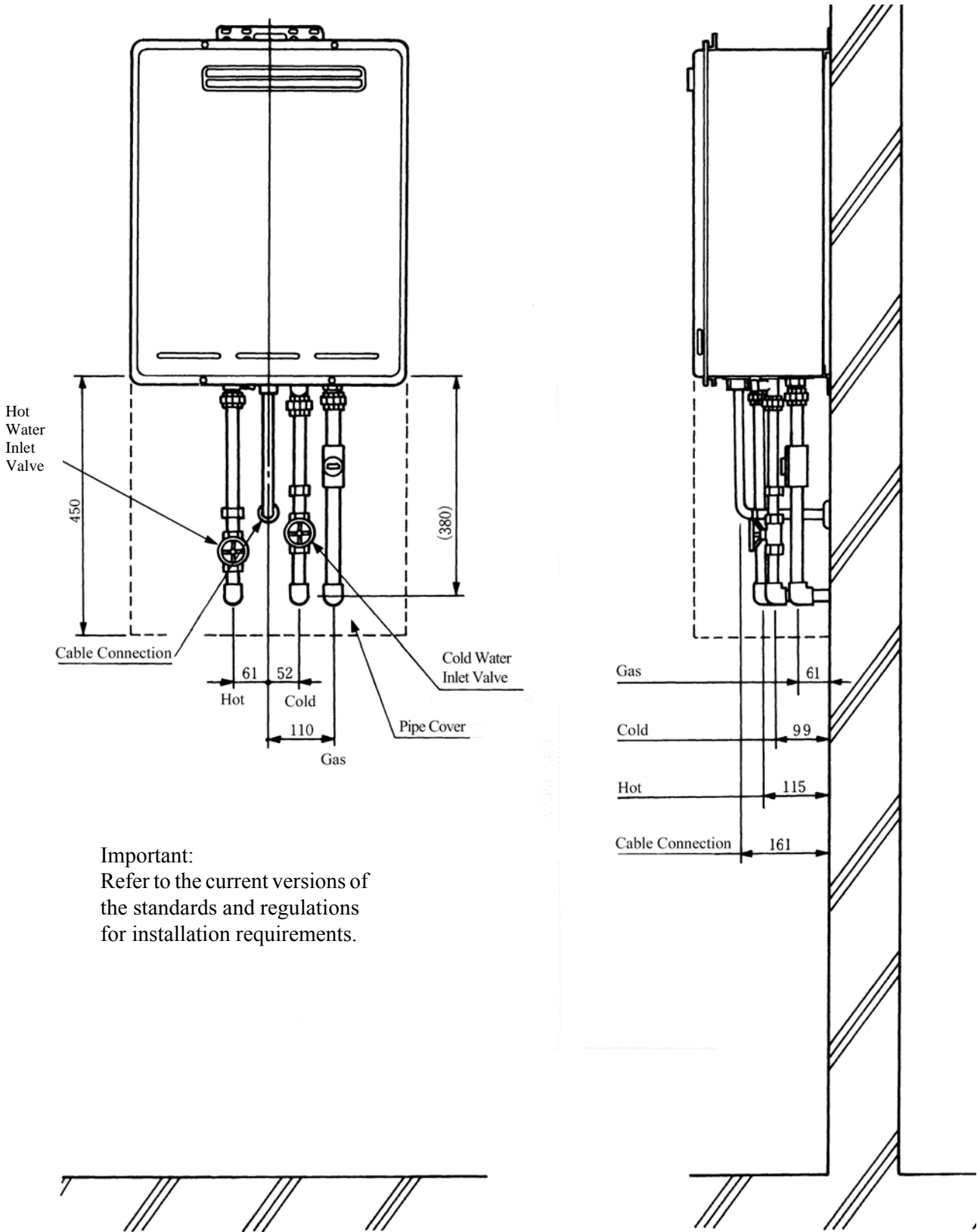


Note: All dimensions are in mm.

	A DIMENSION
GAS	41
COLD	51
HOT	42
ELEC.	27

# 5. Installation

## External Wall Installation



Important:  
Refer to the current versions of the standards and regulations for installation requirements.

## 6. Remote Controls

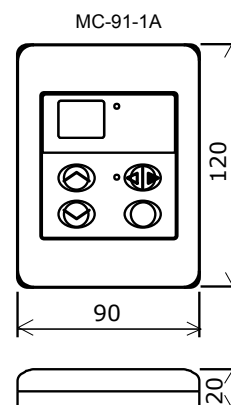
### Remote Controls

Remote Controllers are an optional extra. 'Standard' and 'Deluxe' controllers can be fitted.

Standard controllers allow temperature selection only. Deluxe controllers have temperature selection, bath-fill and voice prompting functions. For detailed information regarding controller operation refer to the 'How to use your water heater' booklet supplied with the appliance. Other manufacturers' controllers are NOT compatible with this appliance.

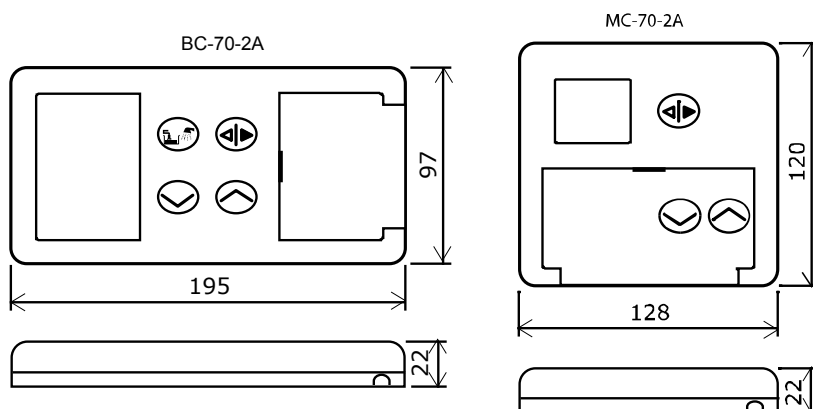
### Standard Controller (Model MC-91)

Up to 4 Standard Controllers can be fitted to the appliance. They are normally installed in the areas where the majority of hot water is used, for example, the kitchen, bathroom, ensuite and laundry.



### Deluxe Kitchen Remote Control (MC-70) and (BC-70A)

Deluxe controllers have 'Kitchen' (MC-70-2A) and 'Bathroom' (BC-70-2A) versions. 'Kitchen' controls are intended for the Kitchen or other convenient area where the majority of hot water is used. Bathroom Controllers are intended to be fitted in the bathroom or ensuite and allow the user to have a bath filled to the required level and temperature automatically.



Up to three 'Deluxe' Controllers can be connected as follows:

Kitchen	Bathroom	Ensuite
MC70-2A		
MC70-2A	BC70-2A	
MC70-2A	BC70-2A	BC70-2A

### Positioning of Controllers

Controllers must be installed in shaded and clean locations. They should be fitted out of reach of children (suggested height from floor at least 1500 mm). Controllers are water resistant, however, durability is improved when positioned outside the shower recess or at least 400 mm above the highest part of a sink, basin or bath.

## Do not install the Controllers

- Near a heat source, such as a cook top, stove or oven. Heat, steam smoke and hot oil may cause damage.
- In direct sunlight.
- Outdoors unless an enclosure is provided which protects the controller against sunlight and dust ingress.
- Against a metal wall unless the wall is earthed in accordance with current regulations.

## Remote Controller Connection

Remote controls operate at extra low voltage (12 Volts DC) which is supplied from the appliance. Controllers are supplied with 15 m of electrical cable. The cable wires for connection to the appliance are fitted with spade terminals.

Extension cables are available from Rinnai. Alternatively, a two core sheathed (double insulated) flex with minimum cross-sectional area of 0.5 mm<sup>2</sup> can be used. Maximum cable length is 50 m.

For connection refer to the “CONNECTING REMOTE CONTROL CABLES” section.

## Water Heater and Controller installation configurations

If the front cover of the appliance contains "Max. 50 deg C unit" install it in accordance with Diagram 1 below:

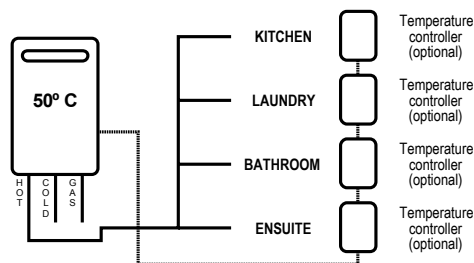


Diagram 1. 50° C Appliance

If the front cover of the appliance does NOT contain the above text install it in accordance with Diagram 2:

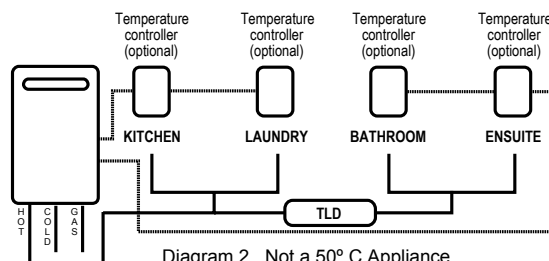



Diagram 2. Not a 50° C Appliance  
Note: TLD = Temperature Limiting Device.

**IMPORTANT:** If the appliance is to deliver water primarily for the purposes of personal hygiene in an early childhood centre, primary or secondary school, nursing home or similar facility for young, aged, sick or disabled persons a Temperature Limiting Device (TLD), such as a Thermostatic Mixing Valve, may be required even if the appliance is set to 50° C or less. For these types of applications contact Rinnai UK.

# Connecting Remote Control Cables

 Do not attempt to connect the remote control cable terminals to the appliance with the power on.  
**RISK OF ELECTRICAL SHOCK !**

## Connecting One or Two Controllers

1. Isolate the power supply
2. Remove the front cover from the Appliance (4 screws) fig. 1.
3. Thread the cable(s) through the cable access hole at the base of the appliance.
4. Connect the spade connectors to the terminals marked "Remote Control" on the printed circuit board (fig. 2). Polarity is not important. Either wire colour can be connected to either terminal.
5. Replace cover of the Appliance. Ensure that the screw with the star washer is placed at the bottom right hand corner for earthing purposes.

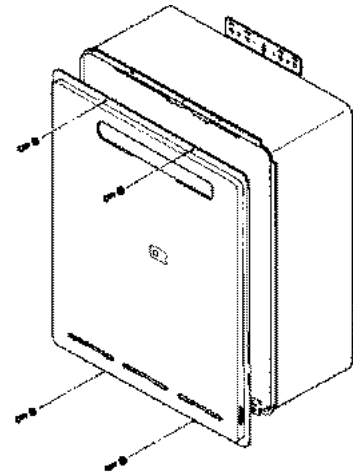


fig.1

## Connecting Three Controllers

6. Isolate the power supply
7. Remove the front cover from the Appliance (4 screws) fig.1.
8. Cut the spade connectors from 2 of the controller cables to be connected to the appliance (4 spade connectors should be cut off) and discard. Connect the wires from these two cables and terminate into two new spade connectors as shown in fig.3. Spade connectors are available from your local electrical component retailer.
9. Thread the 3 cables through the cable access hole at the base of the appliance. Connect the 4 spade connectors to the terminals marked "Remote Control" on the printed circuit board (fig.2). Polarity is not important. Either wire colour can be connected to either terminal.
10. Replace cover of the Appliance. Ensure that the screw with the star washer is placed at the bottom right hand corner for earthing purposes.

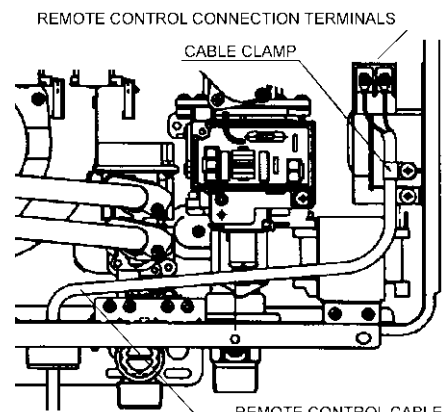


fig.2

## Connecting Four Standard Controllers

11. Isolate the power supply
12. Remove the front cover from the Appliance (4 screws) fig. 1.
13. Cut the spade connectors from all four controller cables to be connected to the appliance (8 spade connectors should be cut off) and discard. Connect the wires from two cables and terminate into two new spade connectors as shown in (fig. 3).

Repeat for the remaining two cables. Spade connectors are available from your local electrical component retailer.

14. Thread the 4 cables through the cable access hole at the base of the appliance. Connect the 4 spade connectors to the terminals marked "Remote Control" on the printed circuit board (fig 2). Polarity is not important. Either wire colour can be connected to either terminal.
15. Replace cover of the Appliance. Ensure that the screw with the star washer is placed at the bottom right hand corner for earthing purposes.

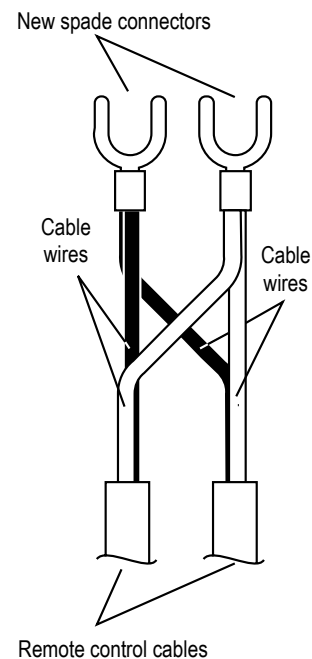


fig. 3



# MC-91A Controller Programming

## Question 1: Are four Controllers connected ?

IF YES: You will need to activate the fourth controller.

### STEP 1:

For the Controller in the 'KITCHEN' only, press and hold the 'Transfer' and 'On/Off' buttons simultaneously (see fig. 1) until a 'beep' is heard (approximately 5 seconds).

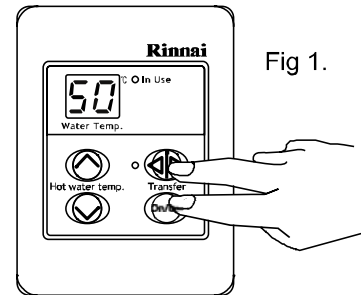


Fig 1.

### STEP 2:

Check that the display on ALL FOUR controllers is lit and displaying a temperature when 'switched on'. If any ONE of the controller displays two dashes (see fig. 2) in the display repeat STEP 1.

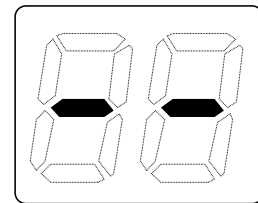


Fig 2.

This completes the activation procedure. Ignore Question 2.

IF NO: (You have three controllers or fewer), go to Question 2.

## Question 2: Does your kitchen controller temperature go above 50 deg C?

IF YES: No further action required.

IF NO: You will need to program the Kitchen controller to enable selection of temperatures higher than 50° C.

### STEP 1:

For the controller in the KITCHEN only, press and hold the 'Transfer' and 'On/Off' buttons simultaneously (see fig 1.) until a 'beep' is heard (approximately 5 seconds).

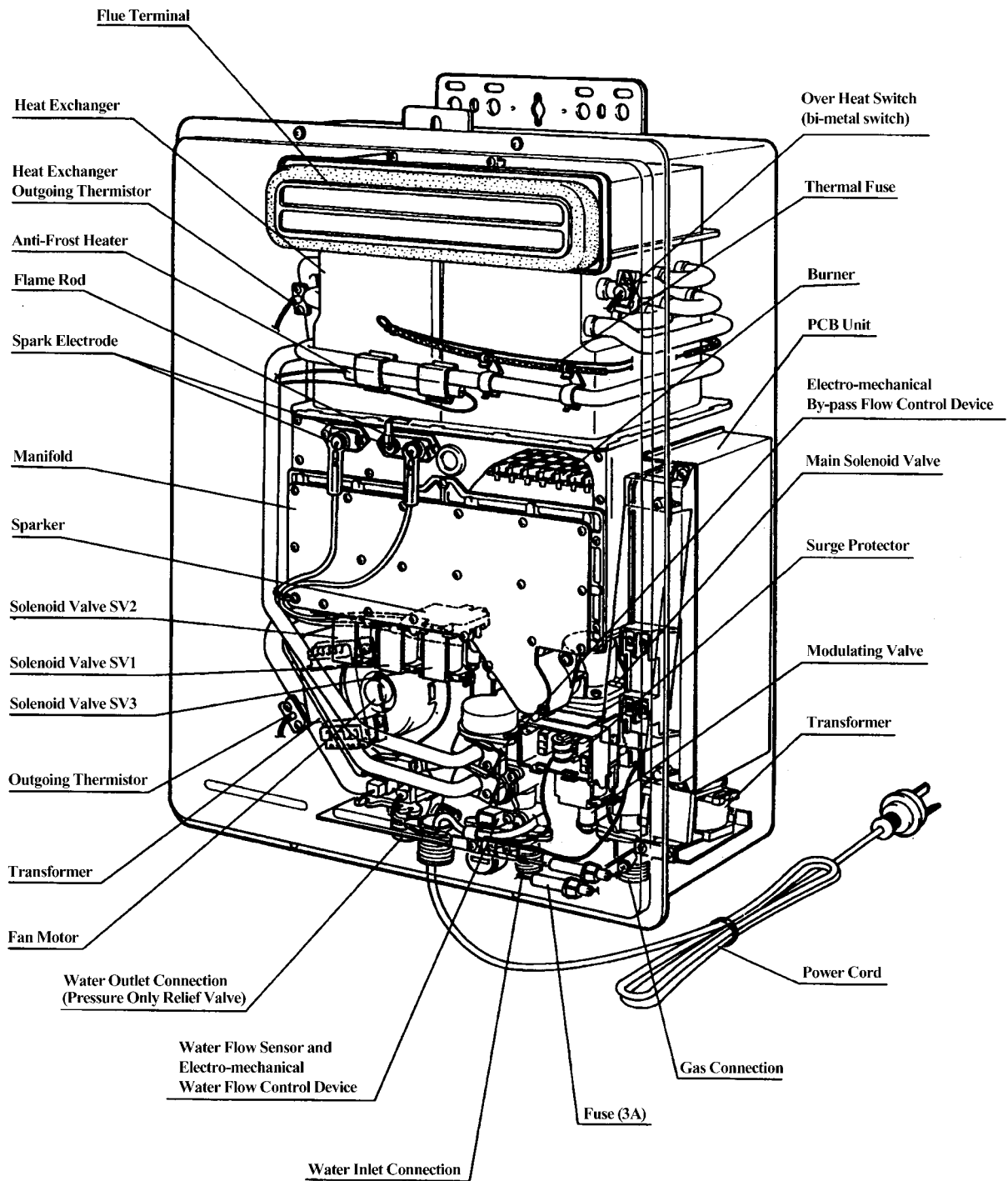
### STEP 2:

When the controller fitted in the KITCHEN is switched on, it should be possible to select temperatures higher than 50° C. If not, repeat Step 1.

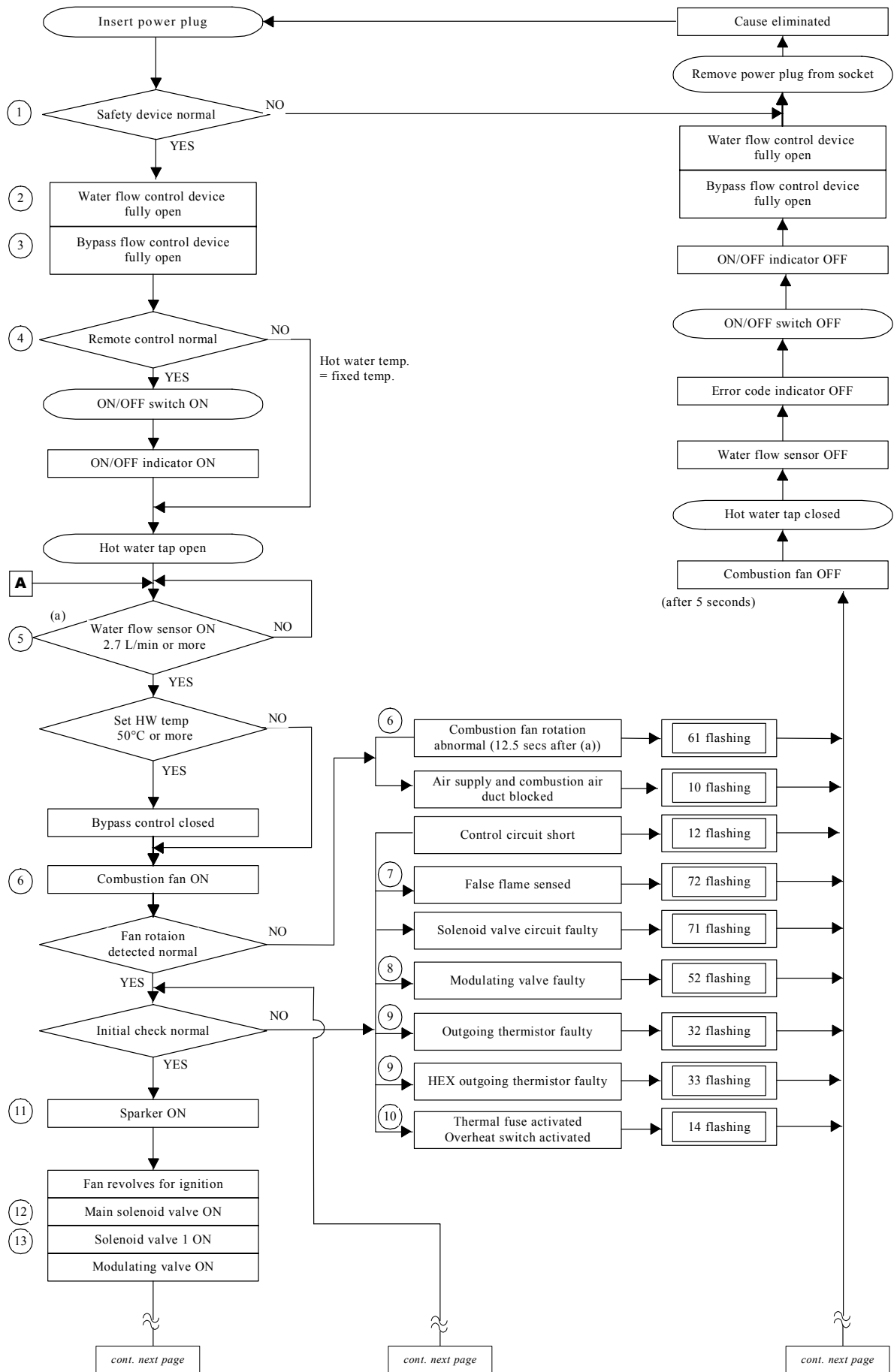
### Note:

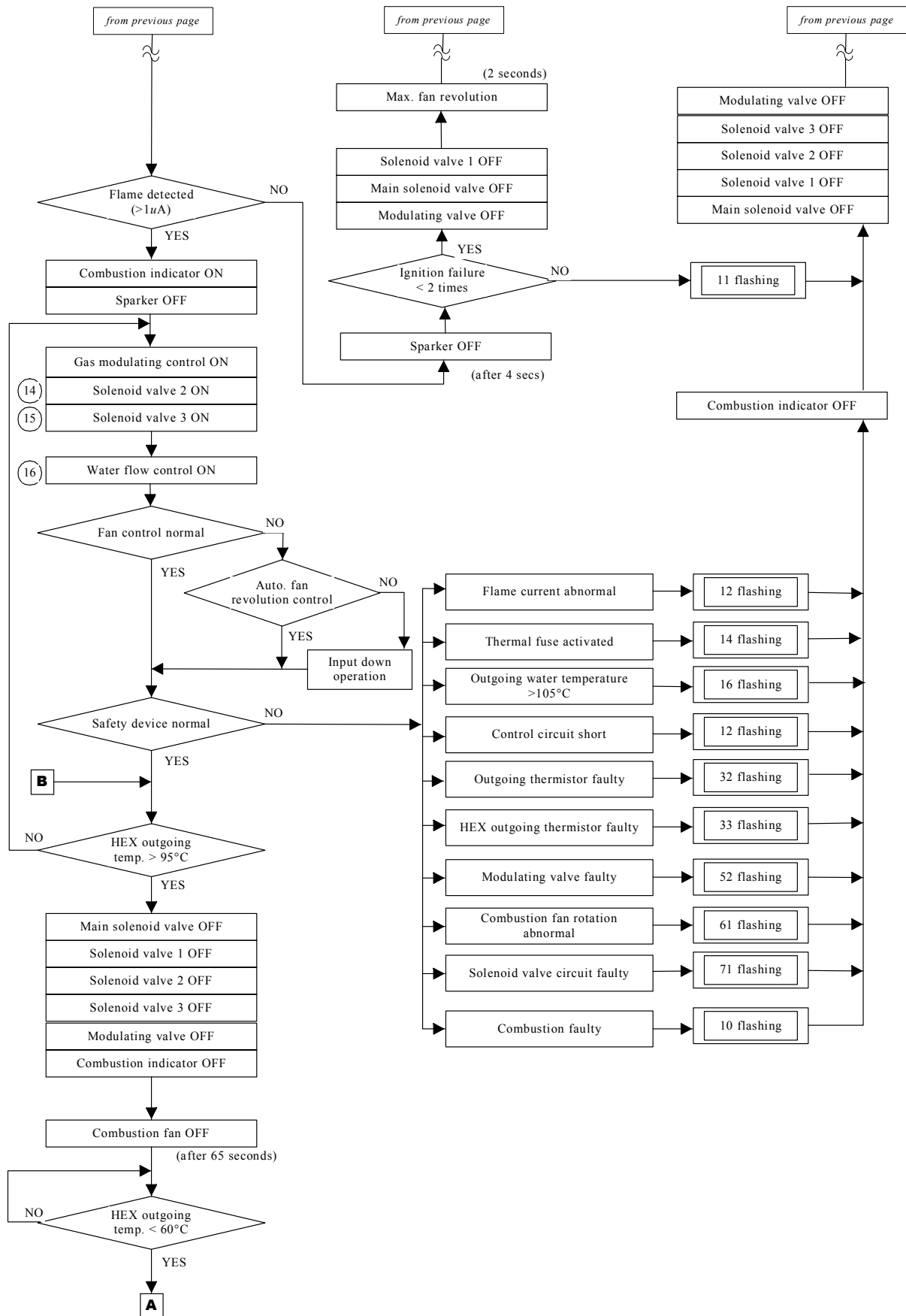
- If the kitchen controller is replaced, repeat STEP 1 above for the replacement controller.
- If the kitchen controller is swapped with another controller (for example, the controller fitted in a bathroom), repeat STEP 1 for the controller moved from the kitchen to the bathroom. Then perform STEP 1 for the controller moved from the bathroom to the kitchen.

# 7. Cutaway Diagram

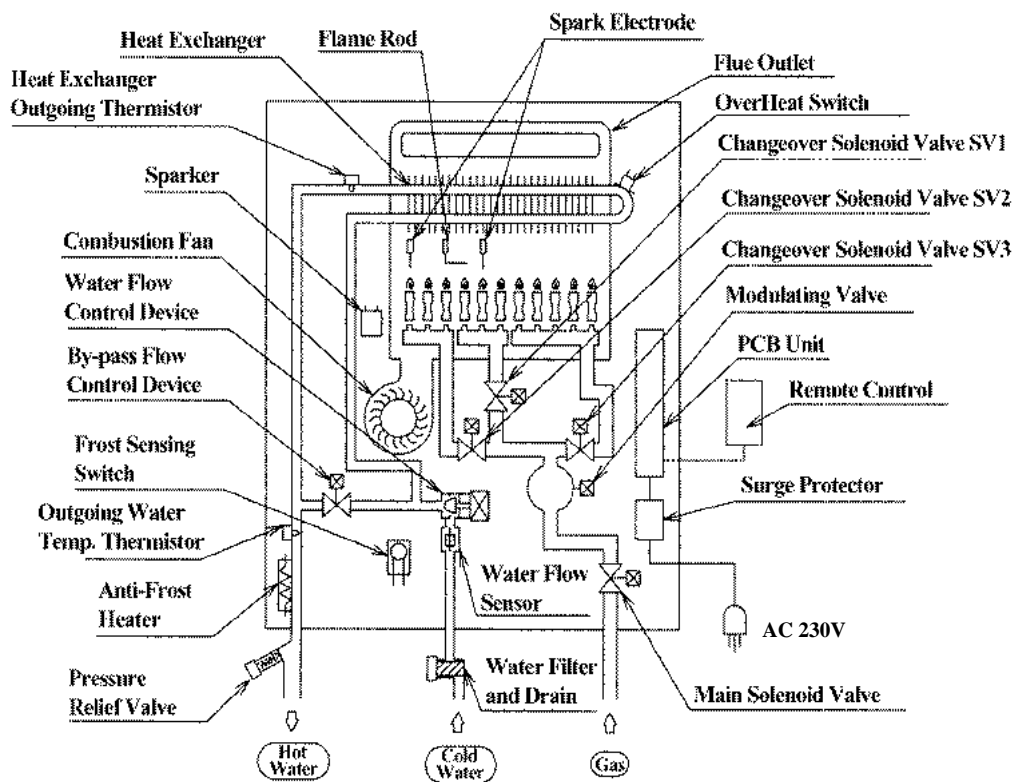


# 8. Operational Flow Chart





## 9. Operation Principles



### Hot Water Operation

#### 1. Ignition

- Activate controllers (if fitted) and open the hot water tap (for full details regarding operation of controllers refer to the 'How To Use Your Water Heater' booklet).
- When water flows through the unit, the water flow sensor rotates and sends an electrical 'pulse' signal to the Printed Circuit Board (PCB). This signal is proportional to the water flow rate.
- The PCB sends electrical current to the combustion fan motor causing it to turn. The fan motor sends an electrical pulse signal to the PCB. If fan rotation is OK, the main solenoid and changeover solenoid valves open as required, the spark generator activates and the spark electrode ignites the burner.

#### 2. Water Temperature / Flow Control / Volume Control

- The PCB will automatically control operation of the internal components to achieve the programmed temperature. When a high temperature rise is required, the PCB may cause the Water Flow Servo to close partially resulting in a lower flow rate to achieve the programmed temperature. This is a necessary operational feature of the unit.
- When operating in 'Bath Fill' mode, the signal from the water flow sensor is also used by the PCB to compute the volume of water that has been passed through the unit at any instant whilst the bath is filling.

#### 3. Shut Down

- When operating in 'Bath Fill' mode, the PCB causes the Water Flow Servo to close when the programmed Bath Fill volume has passed through the unit. Alternatively, flow is stopped when the user closes the hot water tap.
- When water flow stops, the water flow sensor stops rotating and the pulse signal to the PCB stops. The PCB then causes the main solenoid and solenoid valves to close and the burner is extinguished. The combustion fan will continue to operate for some time to purge the combustion chamber.

# 10. Main Components

---

## 1) Printer Circuit Board

- The Printed Circuit Board controls all operational functions including Air Supply Control, Gas Control, Water Flow Measurement, Water Flow Control, Combustion System and all sensors and safety devices.

## 2) Gas Flow Control

- During normal operation, the PCB keeps the main solenoid valve open whilst there is flow through the unit and the burner needs to be lit.
- Gas flow rate is controlled by the modulating valve assembly and three changeover solenoid valves to always ensure constant outlet water temperature, regardless of flow rate or incoming water temperature.
- The modulating valve is electronically controlled by the PCB using signals from the water flow sensor, water flow control device, bypass flow control device, water temperature thermistors and combustion fan speed sensor. The modulating valve directs gas to the three changeover solenoid valves.
- The three changeover solenoid valves direct gas to each of the three burner banks independently. Any one, two or all of the solenoid valves may be open during operation.
- Gas flow is modulated between 5.6 and 69 kW by a combination of the modulating valve and changeover solenoid positions.
- The maximum gas rate is predetermined and the appliance cannot be overloaded when correctly installed.

## 3) Water Flow Control

- Water flow is detected by a turbine coupled to a magnetic pulse generating device. The magnetic pulses are detected and counted by the PCB. The PCB calculates the exact water flow from the frequency of pulses generated by the turbine, as well as the volume of water that has passed through the unit at any instant during 'Bath Fill' operation. A minimum flow rate of 2.7l/min. is required for the burner to ignite.
- Water flow control is achieved through the use of servo driven water flow and bypass valves. Both servo motors are controlled by the PCB. The 'Water Flow Valve' restricts the flow of water into the heat exchanger assembly if the programmed temperature cannot be achieved. Also, when the Bath Fill function is activated, flow of water is stopped when the bath is full. During normal operation, cold water from the inlet valve is mixed with hot water from the heat exchanger outlet. The 'Bypass Valve' mixes the correct proportion of cold and hot water to ensure accurate hot water delivery temperature over the available range of flow rates. The water flow and bypass valves are a combined assembly on the cold water inlet of the appliance.

## 4) Air Supply Control

- Air for combustion is supplied by a centrifugal fan driven by a variable speed DC motor. The voltage to the motor is determined by the PCB based on water flow, delivered water temperature and programmed water temperature. The actual fan speed is monitored by a magnetic pulse counter. This counter emits a signal to the PCB. From the voltage supplied to the DC motor and the fan speed signal, the PCB determines whether an error condition exists with the fan.

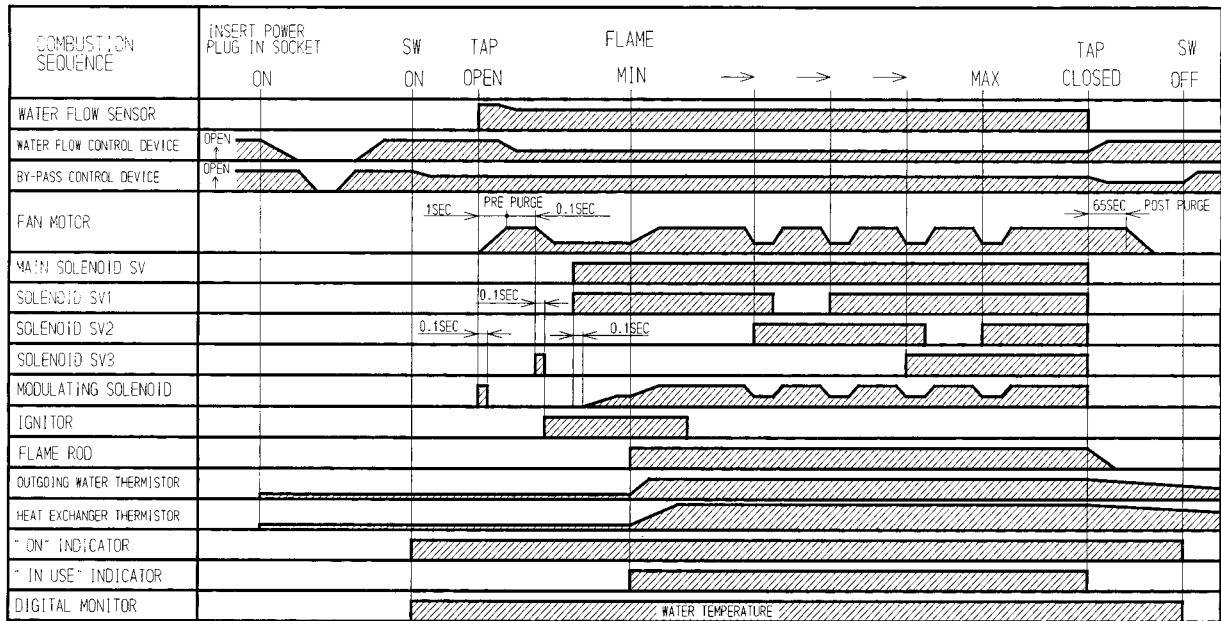
## 5) Combustion System

The combustion chamber is housed within the heat exchanger assembly and comprises:

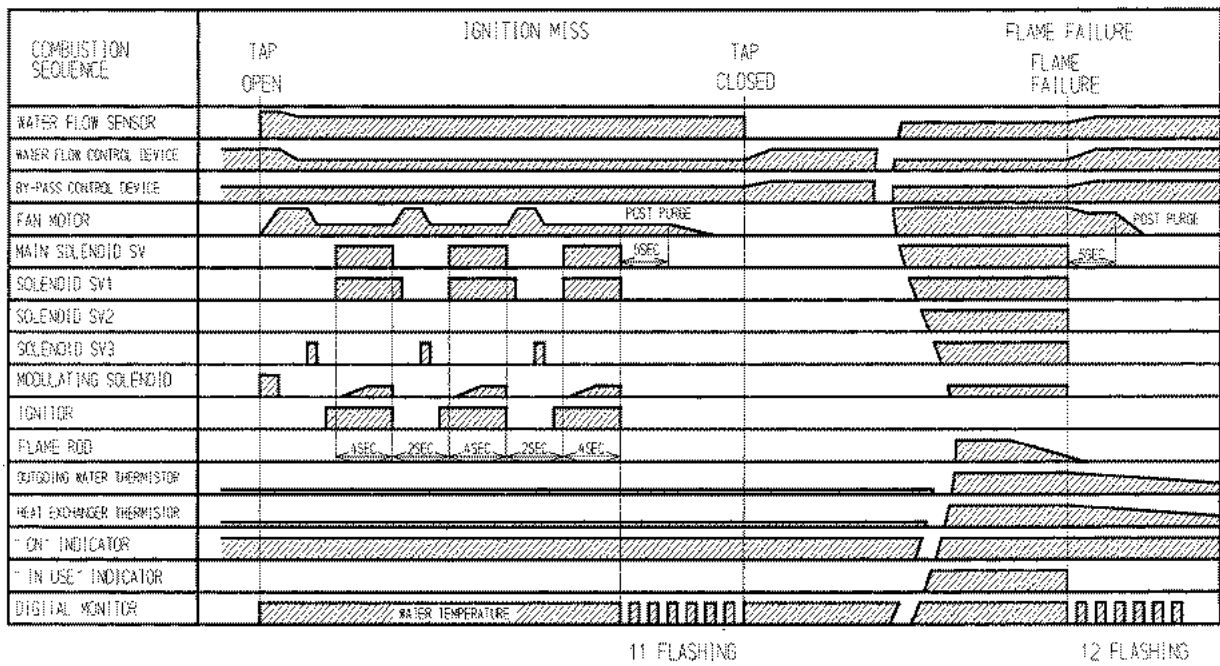
- A three chamber aluminium alloy manifold with a total of 44 integral injectors, arranged in two rows of twenty two. The middle chamber houses eight injectors, the left chamber, twelve, and the right chamber, twenty four injectors. Gas flow to each chamber is controlled by an electronic solenoid valve (refer 'Gas Flow Control' above).
- A burner assembly comprising twenty two identical modular stainless steel bunsen burners secured by an aluminised steel framework. The manifold is attached to the front of the burner module. Each bunsen burner is supplied by two injectors.
- A combustion chamber. Integrated into the combustion chamber front panel are the flame rod and two ignition electrodes.

# 11. Time Charts

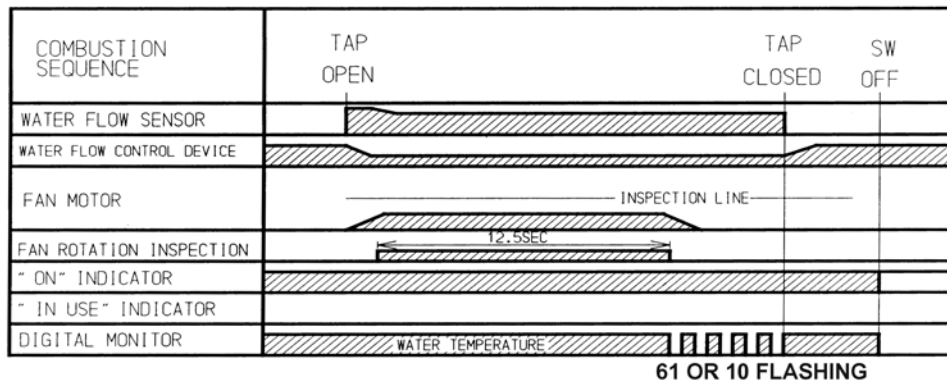
## Normal Combustion



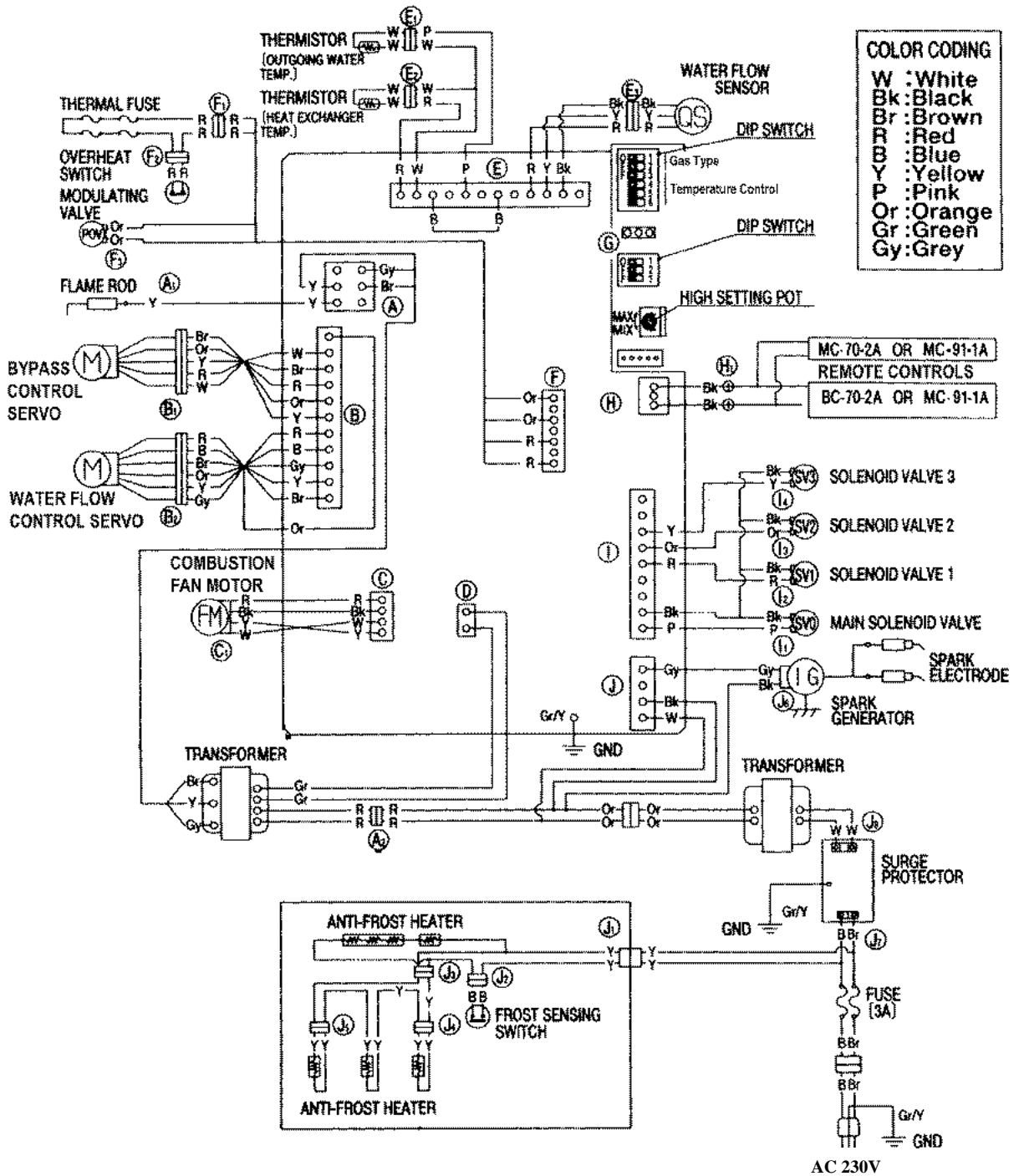
## Miss-Ignition / Flame Failure



## Abnormal Pre-Purge (Air Supply/Exhaust Blockage)



# 12. Wiring Diagram

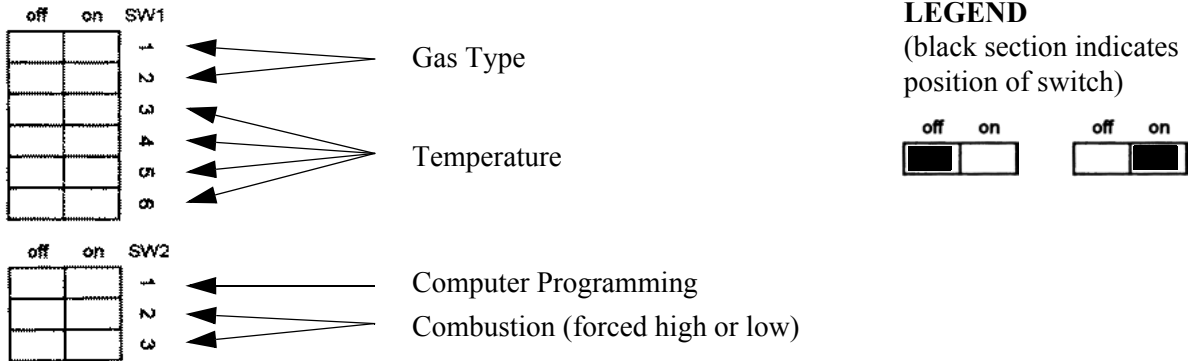




# 13. Dip Switch Settings

**WARNING: Dip Switch settings must only be changed by an authorised person.**

## Dip Switches explained

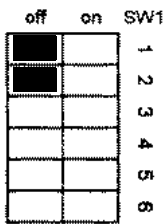


## Dip Switches

### Gas Type

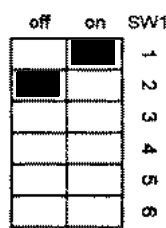
#### LP

1: OFF  
2: OFF



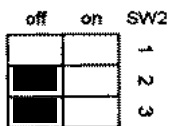
#### Natural

1: ON  
2: OFF

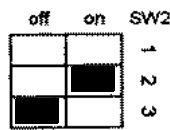


Note :  
Only alter gas type positions when converting from one gas type to another. For gas conversion instructions refer to page 41.

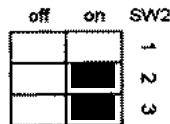
### Combustion



Normal Combustion

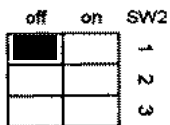


Forced 'Low' Combustion



Forced 'High' Combustion

### Computer Programming



Switch is always in OFF position for Infinity 32e and HD 70e

# Fixed Temperatures

With or Without Remote Controllers

**40°C**

**43°C**

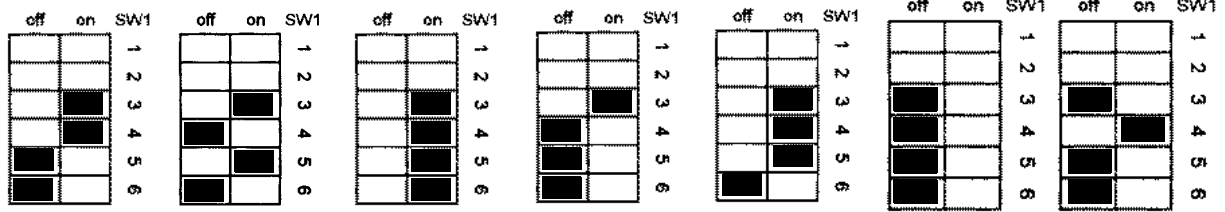
**50°C**

**55°C**

**60°C**

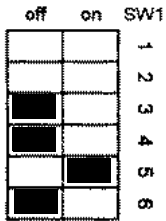
**65°C**

**75°C**



Without Remote Controllers Only \*\*

**85°C**

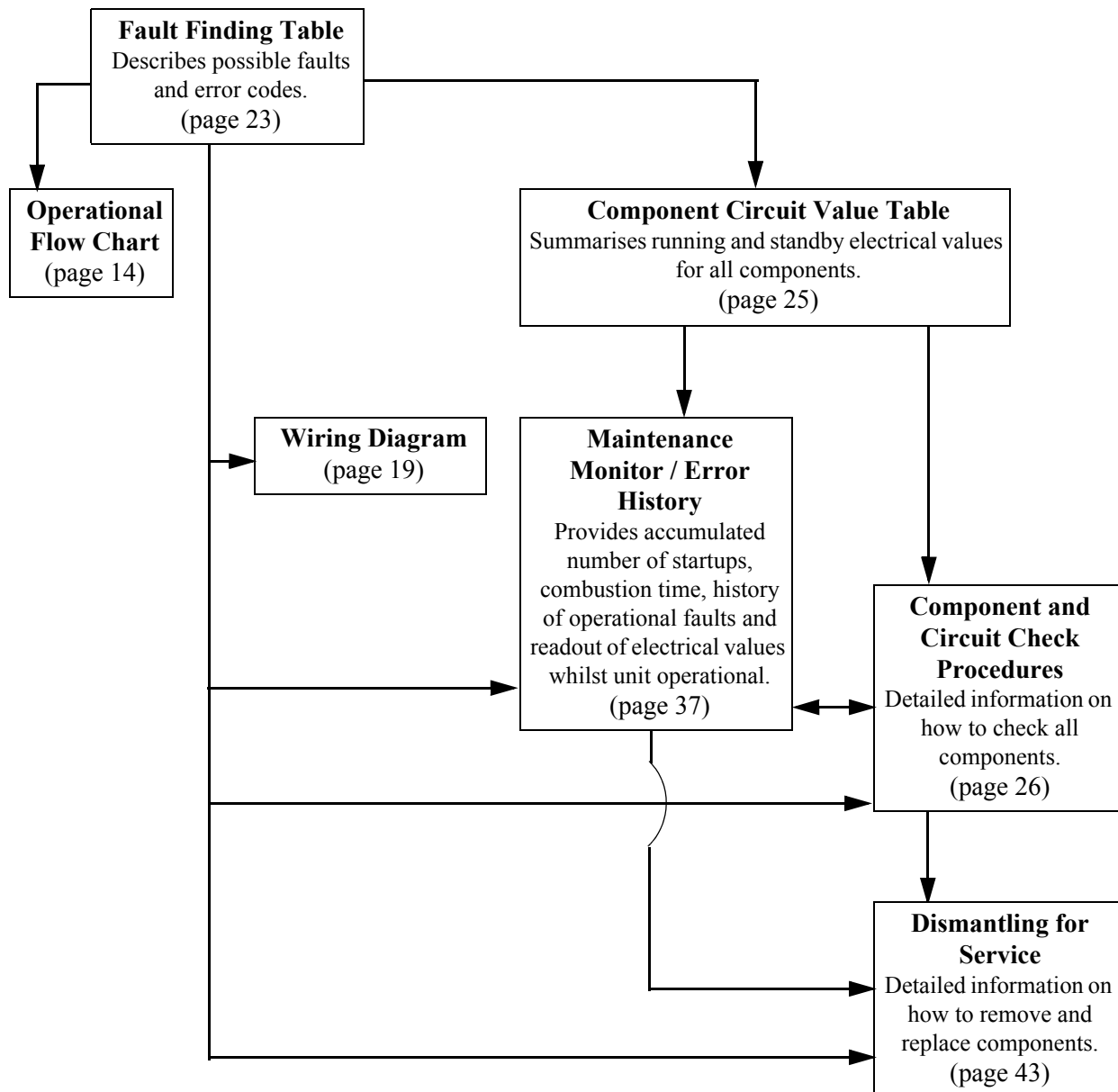


# 14. Fault Finding



If there is a fault with the appliance, and controllers are installed, a numerical fault code may appear on the digital display controller. If controllers are not installed, one may be fitted to find out the fault code. Fault finding without controllers (and thus fault codes) is possible but more time consuming.

To diagnose and rectify faults, the **Fault Finding Table** is used as illustrated below:



## Fault Finding Table

Code on Controller	Fault	Flow Chart No.	Action	'Component Check' and 'Circuit Value' Items	Dismantling Item	Wiring Diagram Item	Maintenance Monitor Item
03	Power interruption during Bathfill. Water will not flow when power restored.		1. Turn off all hot water taps.				
			1. Press the ON/OFF button on a controller twice.				
10	Combustion fan current too high. Unit operates, then stops.	6, 18	1. Check blockage of air intake/flue outlet.				
			2. Check combustion fan.	1	5	C <sub>1</sub>	5 and 9
11	No ignition. Unit stops without flame igniting	21, 17, 19	1. Check gas supply				
			2. Check sparker unit	2	4	J <sub>6</sub>	
			3. Check gas valves	3	8 and or 9	F <sub>3</sub> , I <sub>1</sub> , I <sub>2</sub> , I <sub>3</sub> , I <sub>4</sub>	
12	Flame Failure / Earth Leakage	21, 18, 19	1. Check gas supply				
			2. Check flame rod	4		A <sub>1</sub>	
			3. Check earth wire lead	5		J <sub>7</sub> , PCB, Power Supply Lead	
			4. Check remote control	15		H <sub>1</sub>	06
14	Thermal fuse and/or overheat switch activated. Unit operates, then stops.	19	1. Check thermal fuse	6	11	F1	
			2. Check overheat switch	7	11	F2	
			IMPORTANT- If thermal fuse or overheat switch were faulty : a. Check heater for damage b. Confirm "Gas Type" and "Combustion" dip switch settings (page 20). c. Confirm test point pressures (page 39).				
16	Over temperature warning. Unit operates, then stops.	19, 20	1. Confirm "Gas Type" and "Combustion" dip switch settings (page 20)				
			2. Confirm test point pressure (page 39)				
			3. Check gas valves	3. a) - 3. d)	8 and or 9	F <sub>3</sub> , I <sub>1</sub> , I <sub>2</sub> , I <sub>3</sub> , I <sub>4</sub>	
			4. Check water flow sensor	8	3	E <sub>3</sub>	01
			5. Check water flow servo	9	3	B <sub>2</sub>	07
			6. Check heat exchanger outlet temperature thermistor	10	6	E <sub>2</sub>	11
			7. Check hot water outlet temperature thermistor	11	6	E <sub>1</sub>	02
32	Outlet water thermistor flow	1, 19	Check hot water outlet thermistor	11	6	E <sub>1</sub>	02
33	Heat exchanger thermistor error	1, 19	Check heat exchanger thermistor	10	6	E <sub>2</sub>	11
52	Modulating solenoid valve fault. Unit stops without flame ignition.	12, 19	Check modulating solenoid valve	3. e)	9	F <sub>3</sub>	
61	Combustion fan rotation error	6, 18, 21	Check combustion fan	1	5	C <sub>1</sub>	05 and 09
65	Water flow control device error. Water flow is not controlled. Water temperature too low.	19	Check water flow servo	9	3	B <sub>2</sub>	07

71	Solenoid valve circuit error. Unit does not operate.	19	Check gas valves	3	8 and or 9	F <sub>3</sub> , I <sub>1</sub> , I <sub>2</sub> , I <sub>3</sub> , I <sub>4</sub>	
72	Flame rod circuit error. Unit does not operate.	19	Check flame rod	4	8	A <sub>1</sub>	
-	Appliance does not operate at all. No display on the remote controllers (if fitted).	-	1. Check power cord plugged in and supply turned on.			J <sub>7</sub>	
			2. Check power supply voltage.	12		J <sub>7</sub>	
			3. Check electrical fuse.	13			
			4. Check transformer.	14	7	A <sub>2</sub> , A, D	
			5. Check gas valves	3. a) - 3. d)	8 and or 9	F <sub>3</sub> , I <sub>1</sub> , I <sub>2</sub> , I <sub>3</sub> , I <sub>4</sub>	
			6. Check sparker unit.	2	4	J <sub>6</sub>	
			7. Check earth leads and connections.	5		J <sub>7</sub> , PCB and power supply lead	
			8. Check for short circuits.				
			9. Check remote controller(s) - if fitted.	16		H <sub>1</sub>	06
-	No combustion despite remote control indicating that combustion is occurring - if remote controller(s) fitted)	-	1. Check water flow sensor.	8	3	E <sub>3</sub>	
			2. Check flame rod.	4	??	A <sub>1</sub>	
			3. Check heat exchanger outlet thermistor.	10	6	E <sub>2</sub>	11
			4. Check hot water outlet thermistor.	11	6	E <sub>1</sub>	02
			5. Check combustion fan.	1	5	C <sub>1</sub>	5 and 9
			6. Check the sparker unit.	2	4	J <sub>6</sub>	
			7. Check gas valves.	3. a) - 3. d)	8 and or 9	F <sub>3</sub> , I <sub>1</sub> , I <sub>2</sub> , I <sub>3</sub> , I <sub>4</sub>	
			8. Check thermal fuse.	6	11	F <sub>1</sub>	
			9. Check overheat switch.	7	11	F <sub>2</sub>	
			IMPORTANT - If thermal fuse or overheat switch were faulty: a) check heater for damage; b) confirm "Gas Type" and "Combustion" dip switch settings; c) confirm test point pressure.				
-	Combustion stops during operation.	-	1. Check gas supply				
			2. Check flame rod	4	8	A <sub>1</sub>	
			3. Check earth leads and connections.	5		J <sub>7</sub> , PCB and power supply lead	
-	Cannot adjust the hot water temperature via the controller(s) - only if controller(s) fitted.	-	1. Check hot water outlet thermistor.	11	6	E <sub>1</sub>	02
			2. Check heat exchanger outlet thermistor.	11	6	E <sub>1</sub>	02
			3. Check gas valves	3. a) - 3. d)	8 and or 9	F <sub>3</sub> , I <sub>1</sub> , I <sub>2</sub> , I <sub>3</sub> , I <sub>4</sub>	
			4. Check water flow servo.	9	3	B <sub>2</sub>	07
			5. Check bypass servo.	15	3	B <sub>1</sub>	12
-	Anti-frost heater does not operate.	-	1. Check anti-frost heater components	16			J <sub>1</sub> , J <sub>3</sub> , J <sub>4</sub> , J <sub>5</sub> , J <sub>8</sub>
			2. Check frost sensing switch	17			J <sub>2</sub>

# 15. Component Circuit Value Table

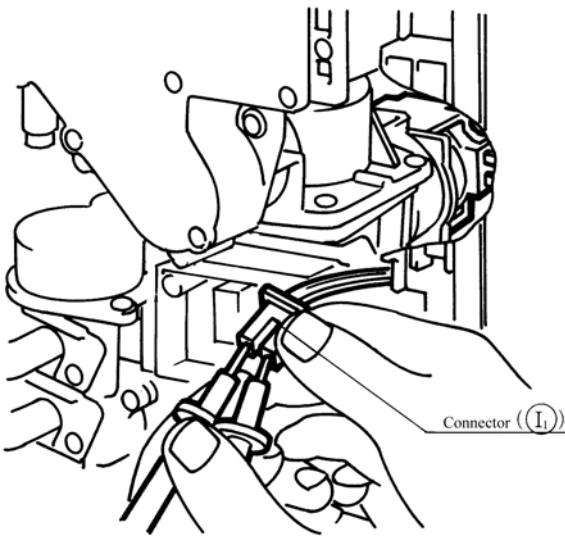
Table Reference	Component	Measurement Point		Normal Value	A Note
		CN	Wire Colour		
13	Surge Protection	J <sub>7</sub>	B-Br	AC207~264V	
9	Water Flow Control Device	B <sub>2</sub>	R-B	DC11~13V	Operate Electricity
			Gy-Or	DC11~13V	Control Electricity
			Gy-Y	Below DC1V (Limiter On)	Full Open Position
				DC4~6V (Limiter Off)	
			Gy-Br	Below DC1V (Limiter On)	Full Close Position
DC4~6V (Limiter Off)					
15	By-Pass Flow Control Device	B <sub>1</sub>	Br-W Or-W	DC2~6V	Operate Condition
			Y-W R-W <sub>GND</sub>	15~35Ω	
16	Remote Control	H <sub>1</sub>	Bk-Bk	DC11~13V	
8	Water Flow Sensor	E <sub>3</sub>	R-Bk	DC11~13V	On 2.7L/min (30Hz) Over 1800 PULSE/min Off 2.0L/min (20Hz) Below 1200 PULSE/min
			Y-Bk <sub>GND</sub>	DC4~7V (Pulse 17~460Hz)	
1	Combustion Fan	C	W-Bk <sub>GND</sub>	DC2~9V	
			Check Terminal	60~360Hz	
4	Flame Rod	A <sub>1</sub>	Y-BODY EARTH	AC100~160V	After Ignition
				Over DC1μA	Flame Condition
3e	Modulating Valve	F <sub>3</sub>	Or-Or	AC1.0~25V 70~90Ω	
11	Outgoing Thermistor	E <sub>1</sub>	W-W	15° C... 11.4 ~ 14.0kΩ	
12	Heat Exchanger Outgoing Thermistor	E <sub>2</sub>		30° C... 6.4 ~ 7.8kΩ	
				45° C... 3.6 ~ 4.5kΩ	
				60° C... 2.2 ~ 2.7kΩ	
100° C... 0.6 ~ 0.8kΩ					
6	Thermal Fuse	F <sub>1</sub>	R-R	Below 1Ω	
2	Igniter	J <sub>6</sub>	Gy-Bk	AC90~110V	
3a	Main Solenoid Valve	I <sub>1</sub>	P-Bk	DC80~100V 1.5~1.9kΩ	
3b	Solenoid Valve 1	I <sub>2</sub>	R-Bk	DC80~100V 1.8~2.2kΩ	
3c	Solenoid Valve 2	I <sub>3</sub>	Or-Bk	DC80~100V 1.8~2.2kΩ	
3d	Solenoid Valve 3	I <sub>4</sub>	Y-Bk	DC80~100V 1.8~2.2kΩ	
14	Transformer	A <sub>2</sub>	R-R	AC90~110V 12~21Ω	
		D	Gr-Gr	AC12~18V 2.4~4.3Ω	
		A	Br-Gy	AC30~50V 2.2~3.9Ω	
		A	Y-Gy	AC180~220V 300~530Ω	

# 16. Component and Circuit Checks



1. Combustion Fan Circuit	
	<p>Check the Motor</p> <p>Check the combustion fan if the error indicator displays "61".</p> <p>Measure voltages between Black and Red of the PCB connector (C).</p> <p><i>Normal:</i> DC7~45V (when fan ON) DC0V (when fan OFF)</p> <p>If normal proceed to check the rotation sensor</p> <p><i>Faulty:</i> Replace PCB</p>
	<p>Check for the Fan Rotation Sensor</p> <p>a.) Measure voltages between Black and Yellow of connector (C).</p> <p><i>Normal:</i> DC10~14V</p> <p>If normal, proceed to b.</p> <p><i>Faulty:</i> Replace PCB.</p> <p>b.) Measure voltages between Black and White of connector (C).</p> <p><i>Normal:</i> DC2~9V</p> <p>If normal, proceed to Sparker Circuit 2.</p> <p><i>Faulty:</i> Replace Combustion Fan.</p>
2. Sparker Circuit	
	<p>a.) Measure voltage between Grey and Black of connector (J<sub>6</sub>).</p> <p><i>Normal:</i> AC90~110V</p> <p>If normal, proceed to b.</p> <p><i>Faulty:</i> Replace PCB.</p> <p>b.) Disconnect connector (J<sub>6</sub>) and measure resistance between both terminals of the sparker.</p> <p><i>Normal:</i> &gt; 1MΩ</p> <p>If not sparking, adjust or replace ignition plug.</p> <p><i>Faulty:</i> Replace Sparker.</p>

### 3a. Main Solenoid Valve (SV<sub>0</sub>) Circuit



Check the main solenoid if error indicator “11” is displayed.

- a.) Disconnect Main Solenoid connector and measure resistance between Pink and Black.

*Normal:* 1.5~1.9k $\Omega$

If normal, proceed to b.

*Faulty:* Replace Main Solenoid.

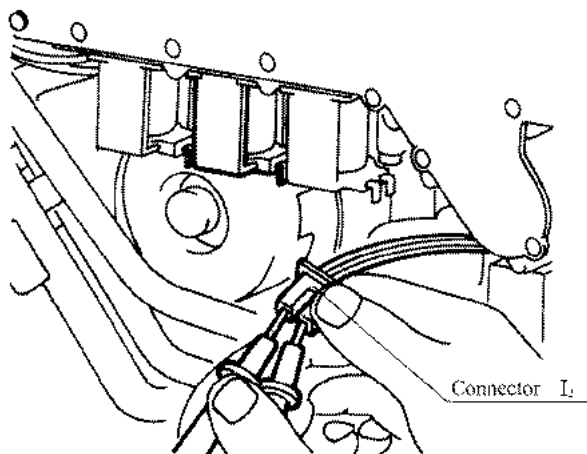
- b.) Measure voltage between Pink-Black of Main Solenoid connector.

*Normal:* DC80~100V

If normal, proceed to Solenoid Valve SV<sub>1</sub>

*Faulty:* Replace PCB.

### 3b. Solenoid Valve 1 (SV<sub>1</sub>) Circuit



Check Solenoid 1 if error indicator “11” is displayed.

- a.) Disconnect Solenoid 1 connector and measure resistance between Red and Black.

*Normal:* 1.8~2.2k $\Omega$

If normal, proceed to b.

*Faulty:* Replace Solenoid 1.

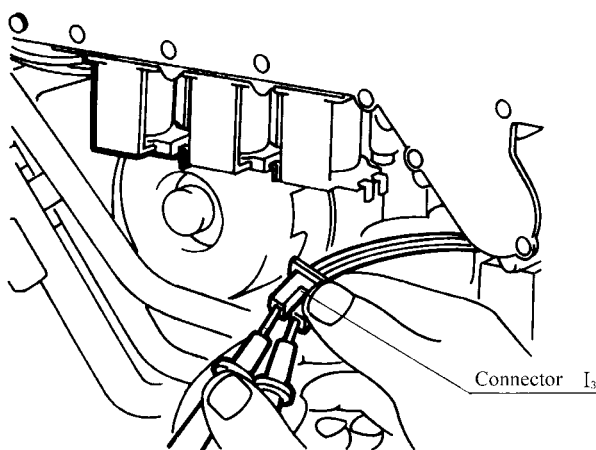
- b.) Measure voltage between Red and Black of Solenoid 1 connector.

*Normal:* DC80~100V

If normal, proceed to Solenoid Valve 2 (SV<sub>2</sub>) Circuit

*Faulty:* Replace PCB.

### 3c. Solenoid Valve 2 (SV<sub>2</sub>) Circuit



- a.) Disconnect Solenoid Valve 2 connector and measure resistance between Orange and Black.

*Normal:* 1.8~2.2k $\Omega$

If normal,, proceed to b.

*Faulty:* Replace Solenoid Valve 2.

- b.) Measure voltage between Orange and Black of Solenoid Valve connector.

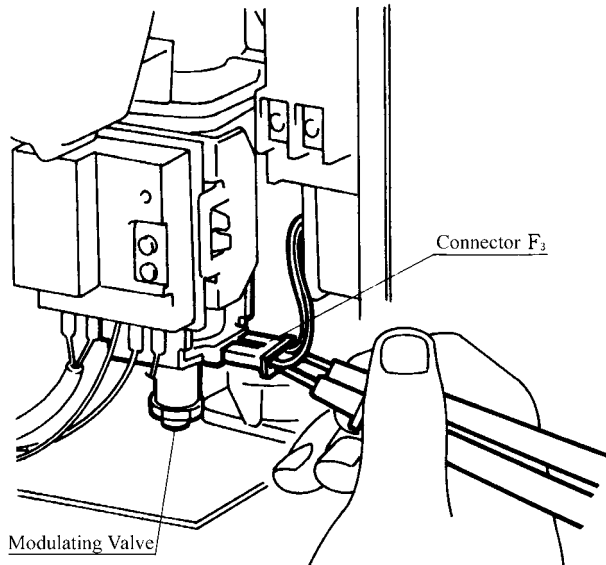
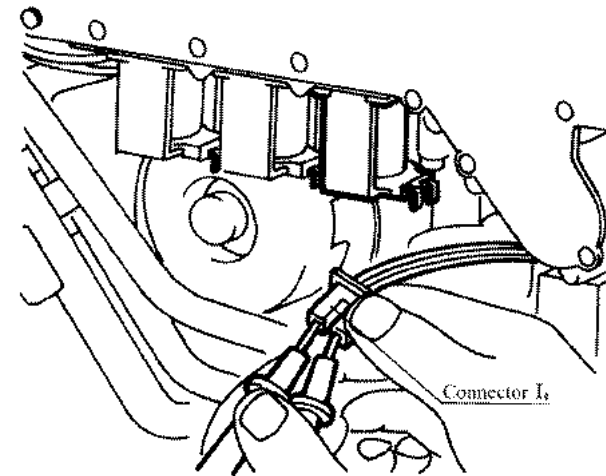
*Normal:* DC80~100V

If normal, proceed to Thermal fuse Circuit.

*Faulty:* Replace PCB.



### 3d. Valve Circuit



- a.) Disconnect Solenoid connector, measure resistance between Yellow and Black.

*Normal:* 1.8~2.2k $\Omega$

If normal, proceed to b.

*Faulty:* Replace Solenoid Valve 3.

- b.) Measure voltage between Yellow and Black of SV<sub>3</sub> connector.

*Normal:* DC80~100V

If normal, proceed to Modulating valve circuit.

*Faulty:* Replace PCB.

- c.) Disconnect Modulating Valve fasten terminal and measure resistance between terminals.

*Normal:* 70~90 $\Omega$

If normal, proceed to b.

*Faulty:* Replace Modulating Valve.

- d.) Measure voltage between Orange and Orange of Modulating Valve fasten terminal.

*Normal:* DC1.0~25V

If normal, proceed to c.

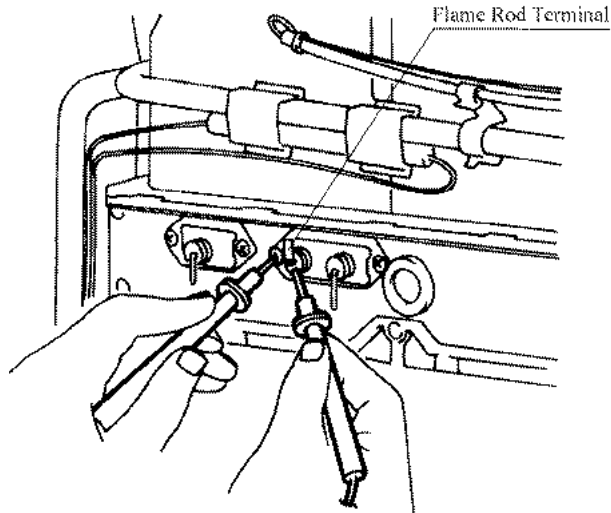
*Faulty:* Replace PCB.

- e.) Check the gas secondary pressure change when set temperature on the remote control changes from 37 to 55 $^{\circ}$ C.

*Normal:* If secondary pressure changes, go to Water Flow Servo Circuit.

*Faulty:* Replace Modulating Valve.

#### 4. Flame Rod Circuit



Check flame rod.

Disconnect flame rod terminal ( $A_1$ ), and re-operate.

“72” indicated:- Proceed to 3.

“72” is not indicated:- check for electrical leaks from the flame rod.

Measure resistance between flame rod terminal ( $A_1$ ) and appliance earth.

*Normal:*  $>1M\Omega$

If normal, replace PCB.

*Faulty:* Replace flame rod.

a.) Remove the Flame Rod terminal ( $A_1$ ) repeat operation procedure, if 72 is displayed again check the Hot water outlet thermistor. If 72 is not displayed check current leakage from the Flame Rod.

b.) Measure voltage between body earth and Flame Rod terminal ( $A_1$ ).

*Normal:* Voltage AC100 ~160V

If normal, replaced PCB

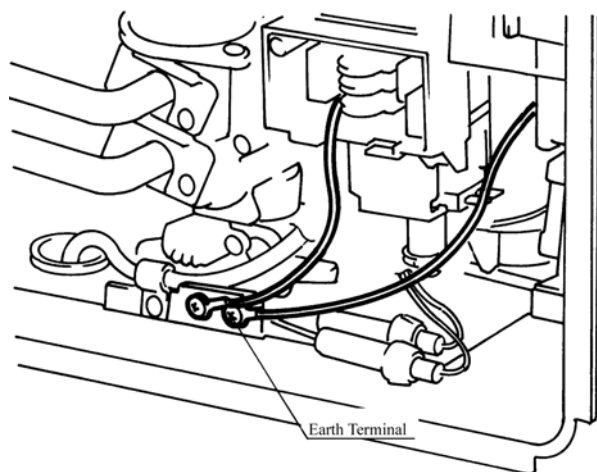
*Faulty:* Replace Flame Rod.

c.) Check if the Flame Rod is securely fitted.

*Normal:* replace the PCB

*Faulty:* Adjust the fitting of the Flame Rod

#### 5. Earth Lead

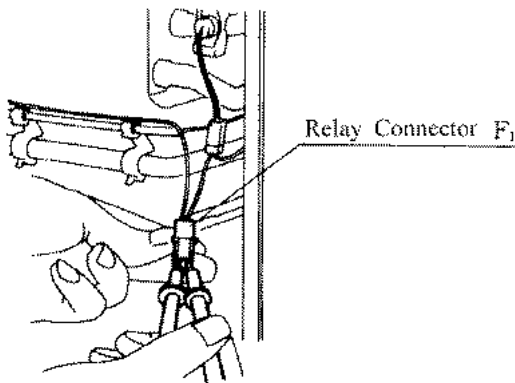


Confirm the Earth Lead connection is secure (at round terminal), and check for broken or short circuits in the lead.

If normal, check other possible causes for flame failure (is gas valve open?, is the filter blocked? etc.).

If faulty, tighten the earth lead, PCB, power cord and surge arrester.

## 6. Thermal Fuse Circuit



Check the Thermal Fuse.

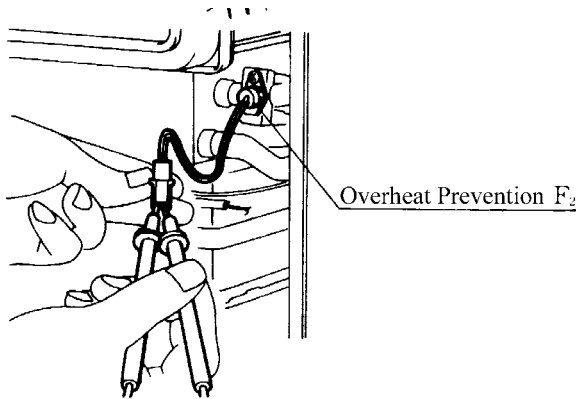
Disconnect relay connector ( $F_1$ ) and measure resistance between Red and Red.

*Normal:*  $< 1\Omega$

If normal, replace PCB.

*Faulty:* Replace Thermal Fuse if after confirming there is no damage to the appliance.

## 7. Overheat Switch Circuit



Measure resistance between Overheat Switch terminals ( $F_2$ ).

*Normal:*  $< 1\Omega$

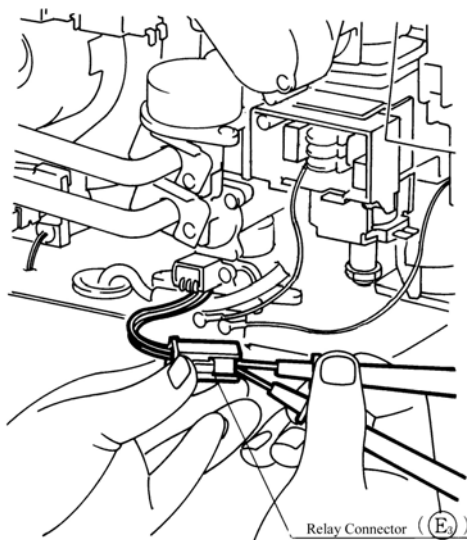
If normal, replace PCB.

*Faulty:* Replace Overheat Switch.

*Note:* If Thermal fuse or Overheat Switch were faulty.

- Check heater for damage
- Confirm gas type and combustion dipswitch settings
- Confirm test point pressure.

## 8. Water Flow Sensor



a.) Measure voltage between Red - Black of relay connector ( $E_3$ ).

*Normal:* DC 11~13V

If normal, proceed to b.

*Faulty:* Replace PCB.

b.) Measure voltage between Yellow - Black of relay connector ( $E_3$ ).

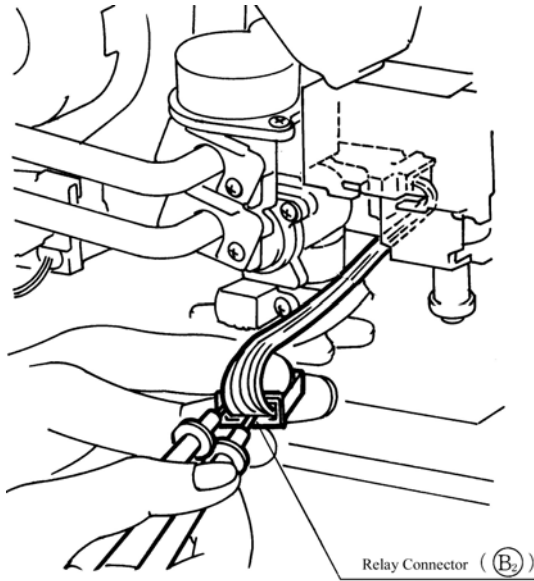
*Normal:* DC 4~7V

If normal, proceed to 2.

*Faulty:* Replace water flow sensor.

*Note:* For controller readout of water flow whilst operational refer maintenance monitor (chapter 17) No. 1.

## 9. Water Flow Servo Circuit



a.) Disconnect relay connector (B<sub>2</sub>), and measure resistance between Red and Blue of Water Flow Servo.

*Normal:* 10~30Ω

If normal, proceed to b.

*Faulty:* Replace Water Flow Servo and Water Flow Sensor.

b.) Disconnect relay connector (B<sub>2</sub>), and measure voltage between Orange (+) and Grey (-) on PCB unit side.

*Normal:* DC11~13V

If normal: proceed to c.

*Faulty:* Replace PCB unit.

c.) Measure voltage between Brown and Grey with relay connector (B<sub>2</sub>) connected (with no water flowing, water flow servo fully open).

*Normal:* DC4~6V

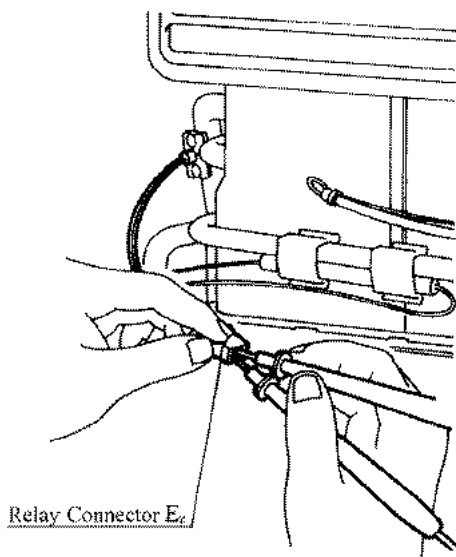
*Faulty:* Replace Water Flow Servo with Water Flow Servo.

d.) Measure voltage between Yellow and Grey with relay connector (B<sub>2</sub>) connected (with no water flowing, water flow servo fully open).

*Normal:* < DC1.0V

*Faulty:* Replace Water Flow Servo and Water Flow Sensor.

## 10. Heat Exchanger Outlet Thermistor Circuit



Check Heat Exchanger Outlet Thermistor if error indicator "33" is displayed.

Disconnect relay connector (E<sub>2</sub>) and measure resistance between White and White.

*Circuit Break:* Resistance > 1MΩ

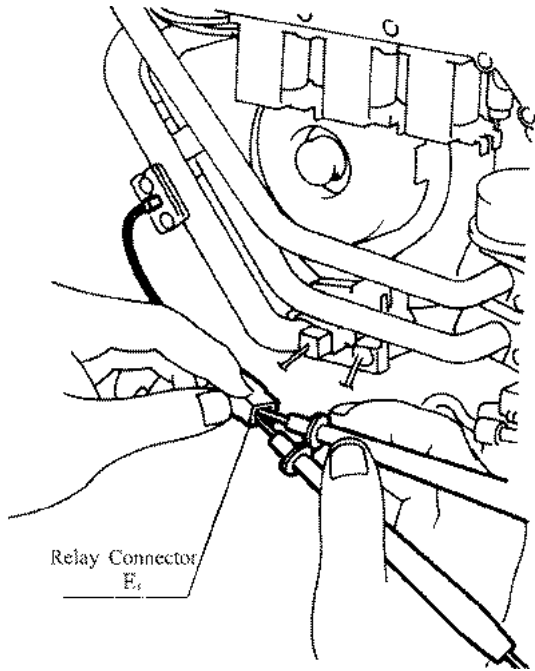
*Short circuit:* Resistance < 1Ω

If normal, proceed to Water Flow Servo Circuit

If faulty, replace Heat Exchanger Outlet Thermistor.

*Note:* For controller readout of thermistor temperature whilst operational refer maintenance monitor (chapter 17) No. 11.

### 11. Hot Water Outlet Thermistor Circuit



Check Hot Water Thermistor if error code 32 is displayed.

Disconnect relay connector (E<sub>1</sub>) and measure resistance White -White.

*When disconnected:* resistance >1MΩ

*When short circuit:* resistance > 1 Ω

*Normal:* Check Heat exchanger outlet thermistor

*Faulty:* Replace hot water outlet thermistor.

*Normal*

Temp.	15°C	30°C	45°C	75°C
Resistance	12.3 kΩ	7.0 kΩ	4.1 kΩ	1.6 kΩ

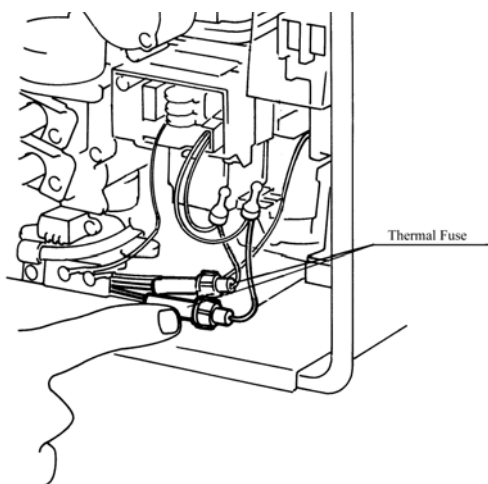
If normal proceed to Flame Rod circuit.

*Faulty:* Replace the Hot water Outlet Thermistor.

*Note:* For controller readout of thermistor temperature whilst operational refer maintenance monitor (chapter 17) No. 2.

Disconnect relay connector (E<sub>1</sub>) and measure resistance White -White.

### 12. Electrical Fuse



Check the fuse.

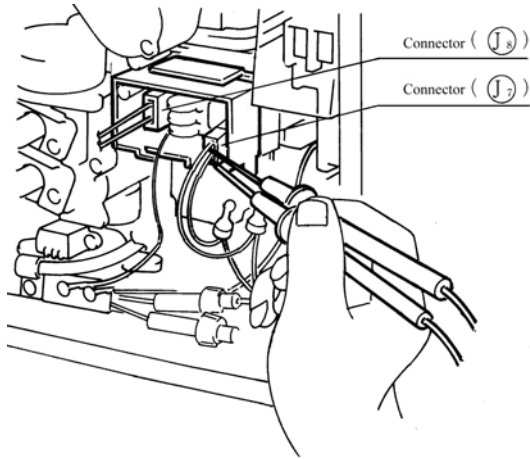
- Unplug the power plug.
- Check whether or not the fuse (3A) x 2 has blown by measuring the resistance.

*Normal:* <1Ω

If normal go to step Electrical Fuse 13.

*Faulty:* Replace fuse/s (3Ax2). Check for a short next time it's turned off.

### 13. Surge Protector



a.) Measure voltage between blue and brown on the connector J<sub>7</sub>

*Normal* :AC 207~264V

If normal proceed to b.

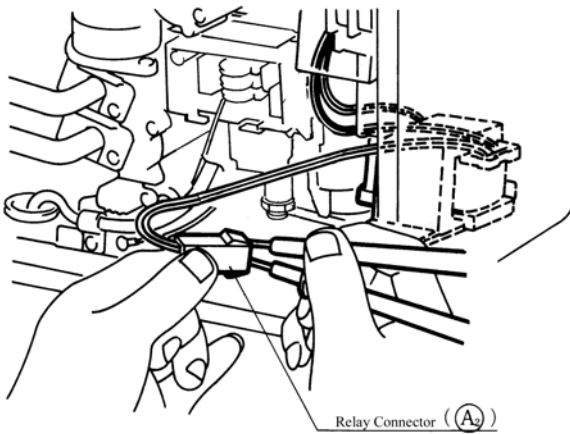
*Faulty*: Check if voltage on the fuse terminal is AC207~264V

b.) Measure voltage between white and white on the J<sub>8</sub>.

*Normal*: AC207~264V.

*Faulty*: replace surge protector unit.

### 14. Transformer



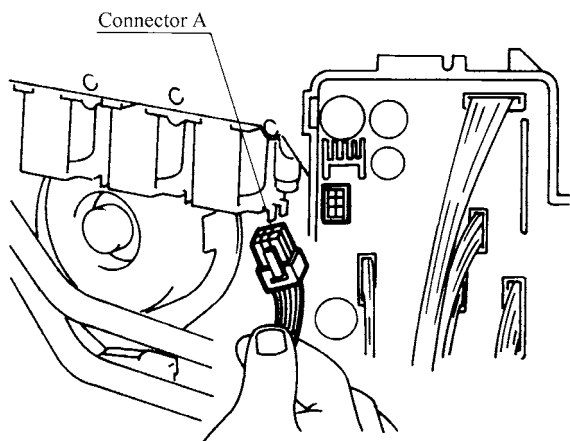
Check for the transformer

a.) Measure the voltage between red and red on the transmission connector (A<sub>2</sub>).

*Normal*: AC90~110V (12~21 Ω)

If normal proceed to b.

*Faulty*: Check if the voltage on fuse terminals is AC90~110V.



b.) Measure the voltage of the connector (A) on the PCB.

*Normal*: Between Brown and Grey AC 30~50V

Between Yellow and Grey AC 180~220V

If normal, proceed to c

*Faulty*: Replace transformer.

c.) Measure voltage between Green and Green of connector (D) on PCB.

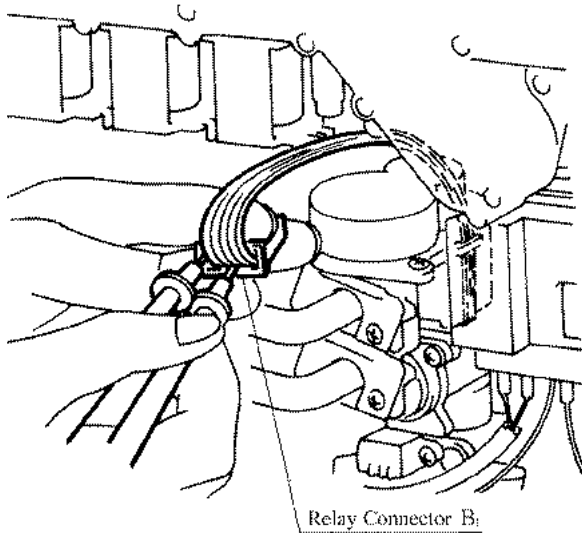
*Normal*: AC 12~18V

If normal, proceed to 4.

*Faulty*: Replace transformer.

*Note*) The above transformer voltages are measured while the appliance is in standby mode - not while it is operating.

### 15. Bypass Servo Circuit 15.



a.) Disconnect relay connector (B<sub>1</sub>) and measure resistance.

*Normal*

CN	Wire Colour	Value
B <sub>1</sub>	Br - W	15~35Ω
	O - W	
	Y - W	
	R - W <sup>GND</sup>	

If normal, proceed to b.

*Faulty:* Replace PCB.

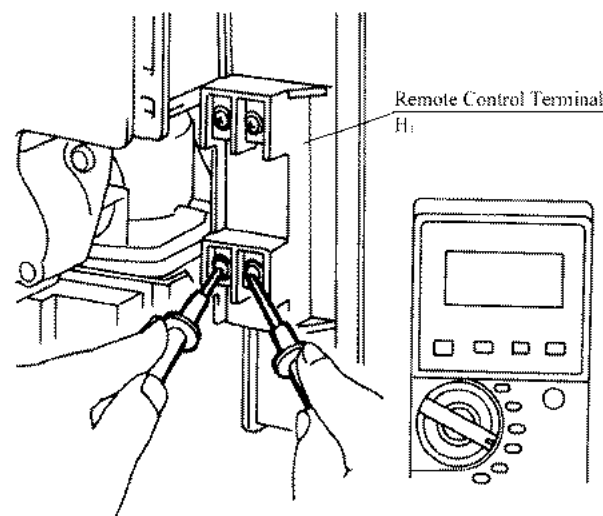
b.) Measure working voltage while relay connector (B<sub>1</sub>) is connected.

*Normal*

CN	Wire Colour	Value
B <sub>1</sub>	Br - W	DC 2~6V
	O - W	
	Y - W	
	R - W <sup>GND</sup>	

*Faulty:* Replace Bypass Servo.

### 16. Remote Control



Check the voltage between the 2-core remote control cable.

Measure the voltage between terminals on the remote control terminal (H<sub>1</sub>).

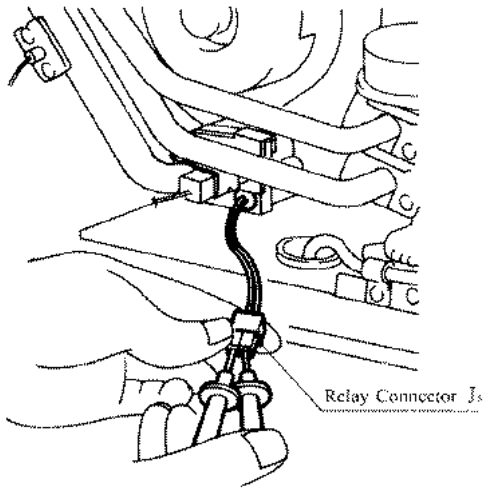
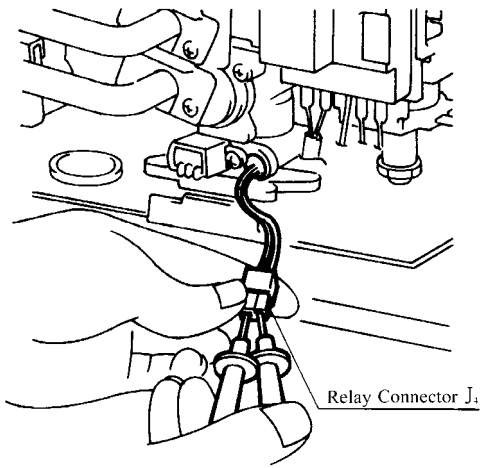
*Normal:* DC 11~13V

If normal, replace the remote control after confirming that the cable hasn't been damaged or shorted.

*Faulty:* Because normal voltage is not given due a short circuit, despite the PCB being in normal state, check Water Flow Servo circuit.

If solution is not given from the above replace PCB.

## 17. Anti-frost Heater Circuit

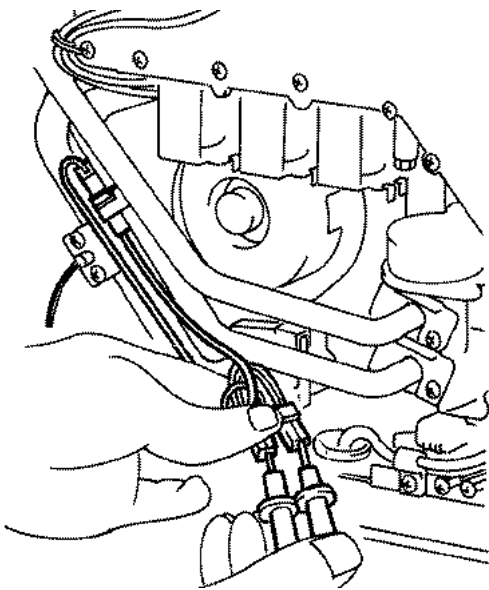


- a.) Disconnect relay connectors ( J<sub>4</sub> ) and ( J<sub>5</sub> ) and measure resistance between White and WhiteW on heater side (water flow servo and HW connection).

*Normal:* 408Ω

If normal, proceed to b.

*Faulty:* Replace Valve Heater.



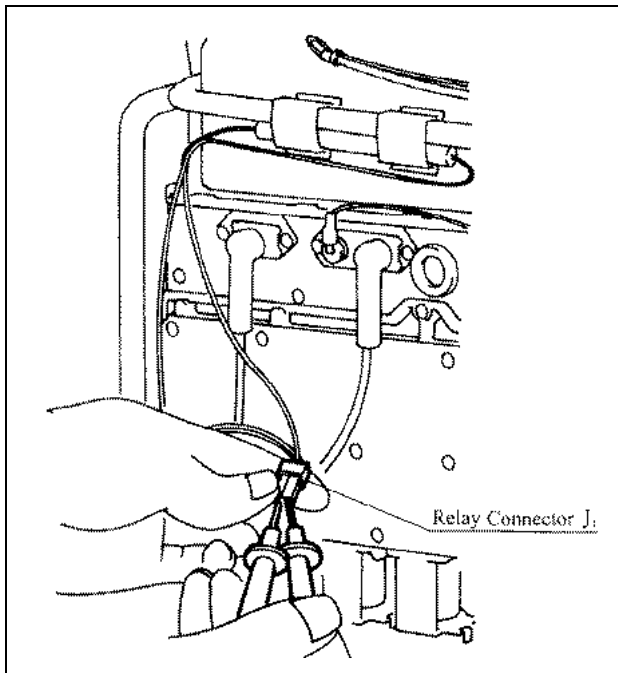
- b.) Disconnect relay connector ( J<sub>4</sub> ) and ( J<sub>5</sub> ) and measure resistance between Yellow and Yellow on each conector on heater side.

*Normal:* 653Ω

If normal, proceed to c.

*Faulty:* Replace Anti-frost Heater B (assy).





c.) Disconnect relay connector (J1) and ( J3) and measure resistance between Yellow and Yellow on Heat Exchanger Heater side.

*Normal:* 825Ω

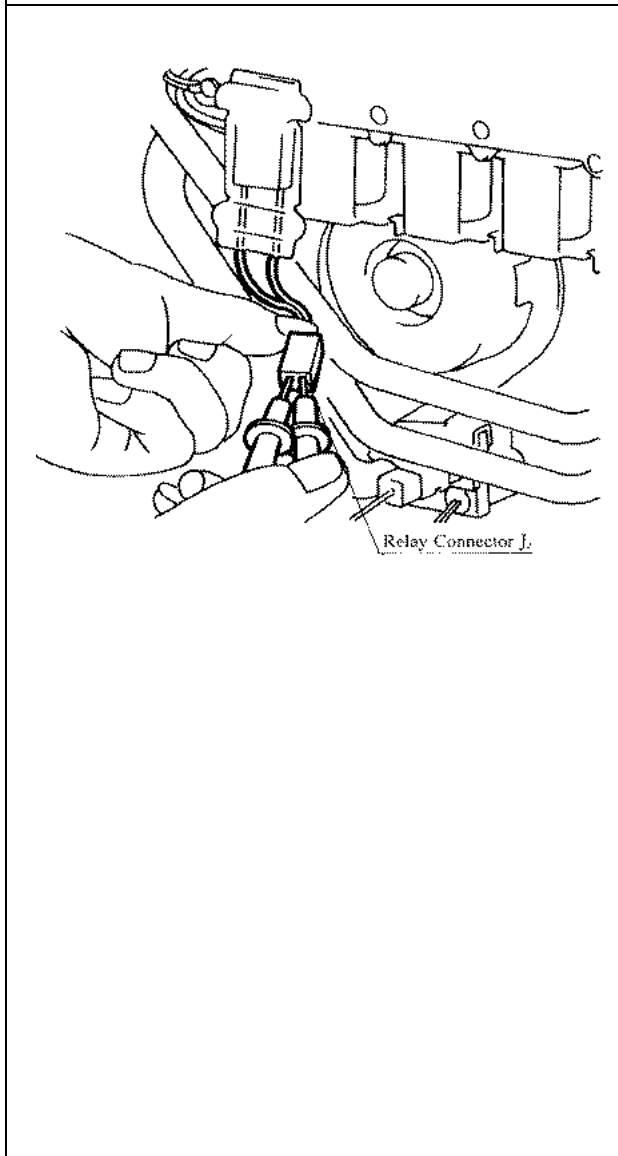
If normal, proceed to Frost Sensing Switch 18.

*Faulty:* Replace Anti-frost Heater A (assy).

[Measure when temperature is 4+/- 3°C.]

Note: If you cannot get the temperature low enough, cool the low-temperature sensing switch with ice etc.

### 18. Frost Sensing Switch



a.) Disconnect relay connector (J<sub>2</sub>) and measure resistance between Blue and Blue.

*Normal:* < 1Ω

If normal, check wiring (AC230V circuit).

*Faulty:* Replace Frost Sensing Switch.

# 17. Maintenance Monitor / Error History

This feature is available where the appliances are connected with a deluxe controller (MC70-2A or BC70-2A). This will enable service personnel to locate the maintenance history and faulty components, with the appliance in operation.

NB. When the maintenance information, error history is shown, use only one controller. If two or more remote controls are used at the same time, it may not operate correctly.

### To display Maintenance Information

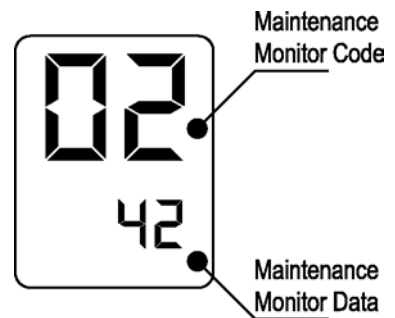
16. With the controller in the "OFF" position press the Water Temperature "DOWN" (Cooler) button while holding the "ON/OFF" button to activate the maintenance monitor. Press the "ON/OFF" button a second time to set the controller in the "ON" mode. This feature can now be used with the appliance in operation.

17. The maintenance number will be shown in the Water Temperature display.

18. Data will be shown in the Clock display.

19. To select the required maintenance number, press the Water Temperature "UP" and "DOWN" buttons.

Note: Infinity 32e and HD70e use Maintenance Numbers 1-12.



Display Monitor Contents			
No.	Contents	Units	Data Range
01	Water flow sensor recognition flow (Example 123 = 12.3L/min).	0.1L/min	0~400
02	Hot water Outlet thermistor temperature (Example 20 = 20° C)	°C	0~999
03	Hot water combustion time (Example 6 = 600 hours)	100 hours	000~999
04	Hot water operation frequency (Example 6 = 600 Operations)	100	0~999
05	Hot water fan frequency	Hz pulses/sec	0~999 *Note 1

**\*Note 1 Fan Frequency rpm Conversion**

$$(rpm) = (Hz) \times 15$$

06	Remote control connection	none	0 or 1 *Note 2
----	---------------------------	------	----------------

**\*Note 2 Remote Control Connections**

Bathroom Remote		Kitchen remote	
Additional remote			
“0”	1	1”	

Controls connected	Display
No	“0”
Yes	“1”

07	Water flow servo present recognising positioning	None	0~2 *Note 3
----	--	------	-------------

**\*Note 3 Water Flow Servo Positioning**

Servo Position	Open	Centre	Closed
Display	"1"	"0"	"2"

08	Inlet water temperature (PCB recognition value) (Example 25 = 25 ° C)	° C	0~999
09	Hot water fan current flow value (Example 6 x 10 = 60 mA)	10 mA	0~999
10	Bath fill amount (this counts the litres during bath fill operation).	Litres	0~999
11	Heat exchanger exit thermistor temperature (Example 55 = 55 ° C)	° C	0~999
12	Bypass servo present recognition positioning (Example 0 = Closed 250 = Half open 500 = Open)	Degrees	0~500

**To return to normal operation**

- Press the ON/OFF button again while holding down the Water Temperature "DOWN" (Cooler) button.

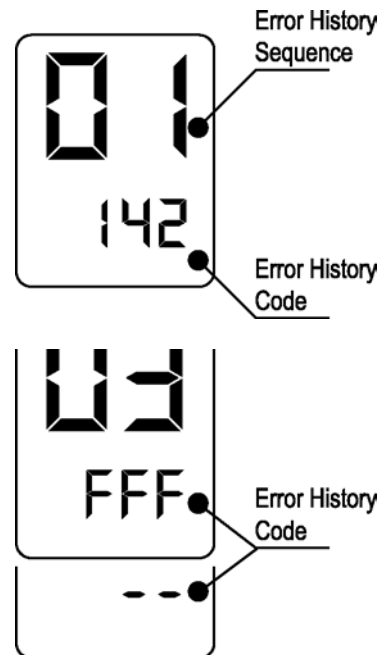
**Error History**

**To Display Error Memory (History)**

*(This feature will show the last 10 faults in sequence)*

1. Turn off at the ON/OFF button. (This can be done during operation)
2. Press the ON/OFF button while holding the Water Temperature "UP" (Hotter) button.

- The Sequence will be shown in the Water Temperature display.
- Error Code will be shown in the Clock display. (See service Manual for error codes).
- Where there are less than a total of 9 errors, "FFF" or " - - " will be displayed in the Clock display.



**To return to normal operation.**

- Press the ON/OFF button again while holding the Water Temperature "UP" (Hotter) button.
- This feature will automatically shut down after 3 minutes.

# 18. Gas Pressure Setting Procedure



The regulator on the Infinity is electronically controlled and factory pre-set. Under normal circumstances it **does not** require adjustment during installation. Perform this procedure only if the unit is not operating correctly and **all** other possible causes for incorrect operation have been eliminated.

- 1) Turn 'OFF' the gas supply
- 2) Turn 'OFF' 230V power supply.
- 3) Remove the front cover from the appliance.
- 4) Check gas type switches (fig. 1) are in the correct position (top set or SW1 of switches).

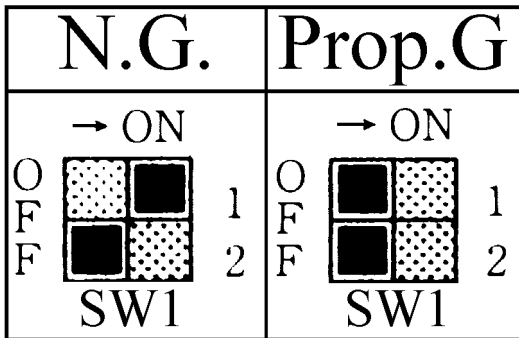
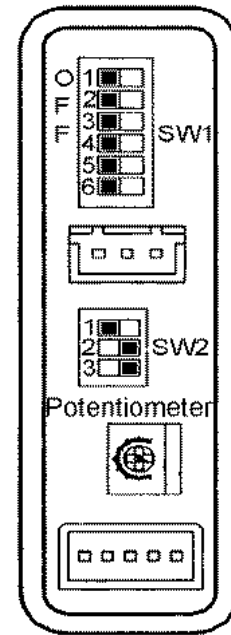


fig. 1



- 5) Attach pressure gauge to burner test point. (fig. 2)
- 6) Turn 'ON' the gas supply.
- 7) Turn 'ON' 230V power supply.
- 8) If remote controllers are fitted, turn the unit 'ON' at the kitchen controller, select a delivery temperature of 55°C and open a hot water tap fully. **(CAUTION: Ensure building occupants do not have access to hot water outlets during this procedure.)**
- 9) Set the Infinity to 'Forced Low' combustion by setting No. 2 dipswitch of the bottom (SW2) set of dip switches to 'ON'. (fig 3)
- 10) Check the burner test point pressure.

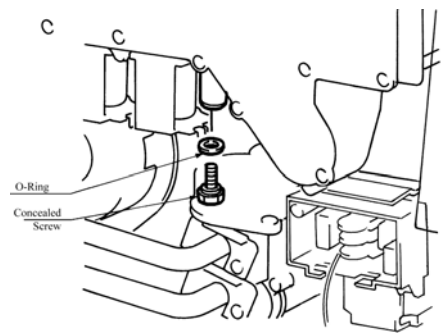


fig. 2

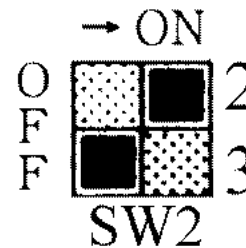


fig. 3

- 11) Adjust the regulator screw on the modulating valve as required to the pressure below. (fig. 4).

Pressure Setting low	
N.G.	1.8 mbar
Propane	3.5 mbar

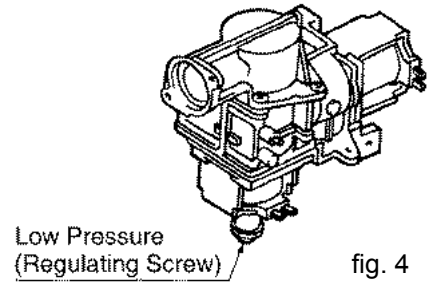


fig. 4

- 12) Lock the regulating screw on the modulating valve.
- 13) Set the Infinity to 'Forced High' combustion by setting both No. 2 and No. 3 dipswitches of the bottom (SW2) set to 'ON'. (fig.5) Ensure maximum water flow.
- 14) Check the burner test point pressure.
- 15) Adjust the high pressure Potentiometer (POT) on the Printed Circuit Board (PCB). As required to the pressure shown.

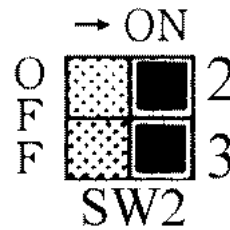
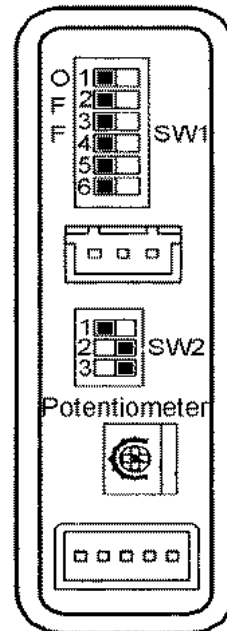


fig. 5

Pressure Setting high	
N.G.	7.4 mbar
Propane	17.6 mbar



- 16) **IMPORTANT:** Set dip switches No's 2 and 3 on the bottom (SW2) set of switches to 'OFF' to return the appliance to 'Normal' combustion.
- 17) Close hot water tap.
- 18) Turn OFF the gas supply and 230V power supply.
- 19) Remove pressure gauge, and replace sealing screw.
- 20) Turn 'ON' the gas supply and 230V power supply.
- 21) Operate unit and check for gas leaks at test point.
- 22) Replace the front cover of the appliance.

## Warning

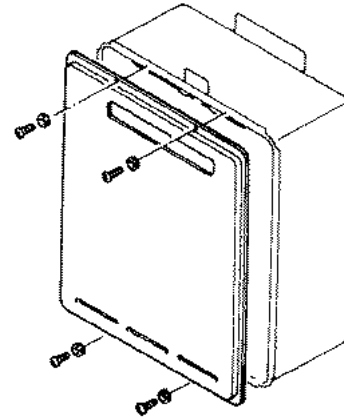
DURING PRESSURE TESTING OF THE INSTALLATION ENSURE GAS COCK SITUATED BEFORE UNIT IS SHUT OFF.

FAILURE TO DO SO MAY RESULT IN SERIOUS DAMAGE TO THE APPLIANCE AND POSSIBLE INJURY.

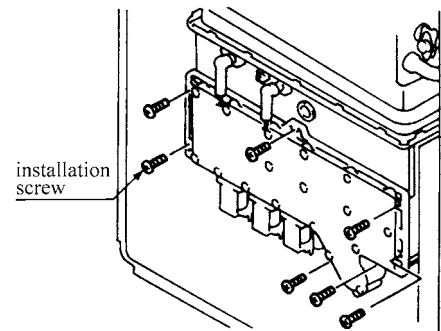
# 19. Gas Conversion Procedure



- 1) Close the main gas valve.  
Turn power OFF (disconnect the power cord).
- 2) Remove front cover. (4 screws)



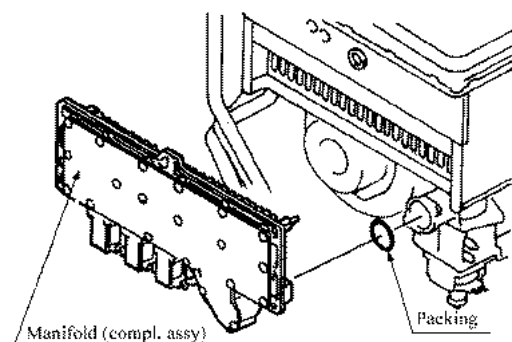
- 3) Remove manifold (complete assembly). (7 screws)



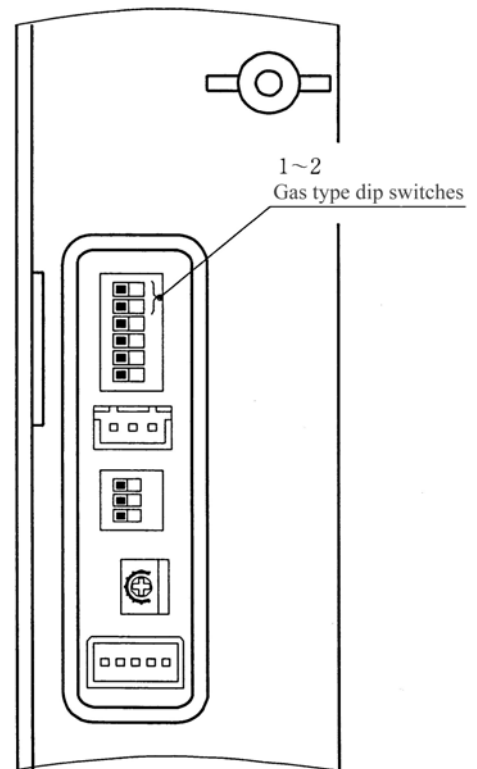
- 4) Replace the manifold (complete assembly) and the packing. (7 screws)

Note: Do not loose or damage the O-ring when reassembling.

Ensure connections for the solenoid and sparker lead are made properly.



- 5) Change over the gas conversion switches (1 ~ 4) on the PCB unit
- 6) Reset Gas pressurs as per instructions in 18. Gas Pressure Setting Procedure. (page 39)



LPG		NG	
	→ ON		→ ON
F/O		O/N	
	1 2 3		1 2 3

## 20. Dismantling for Service

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*230 volt potential exposure. Isolate the appliance and confirm with a multimeter.*

<i>Item</i>	<i>Page</i>
1. Removal of the <b>Front Panel</b> .....	44
2. Removal of the <b>PCB Unit</b> .....	44
3. Removal of the <b>Water Flow Sensor, Servo and Bypass Servo</b> .....	44
4. Removal of the <b>Sparkers</b> .....	45
5. Removal of the <b>Combustion Fan</b> .....	45
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9. Removal of the <b>Gas Control</b> .....	46
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11. Removal of the <b>Thermal Fuse and OHS</b> .....	47

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



## IMPORTANT

For some areas of dismantling you may need to isolate any or all of the following:

- \* Isolate gas supply.
- \* Disconnect electrical supply from wall socket.
- \* Isolate water supply.
- \* Drain **all** water from appliance.

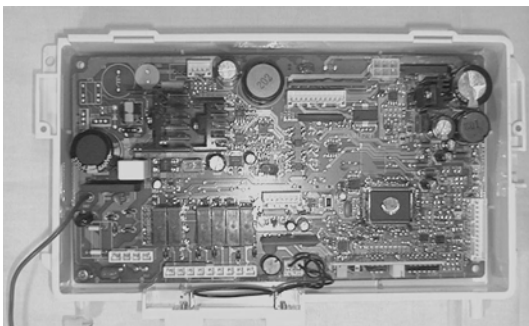
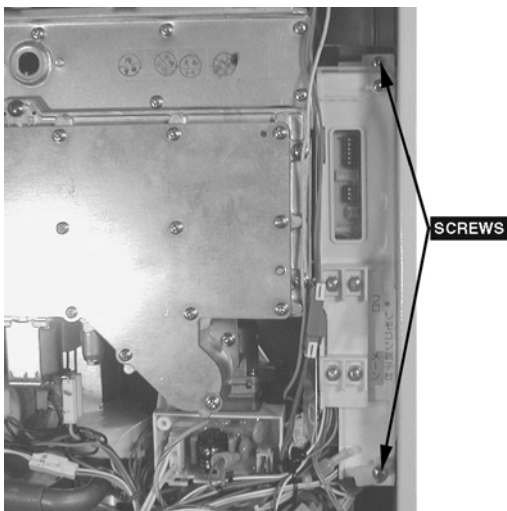
### 1) Removal of the Front Panel

- a. Remove four (4) screws.



### 2) Removal of the PCB Unit

- a. Remove the front panel. (Refer Item 1.)
- b. Remove two (2) PCB unit fixing screws and pull out forward.



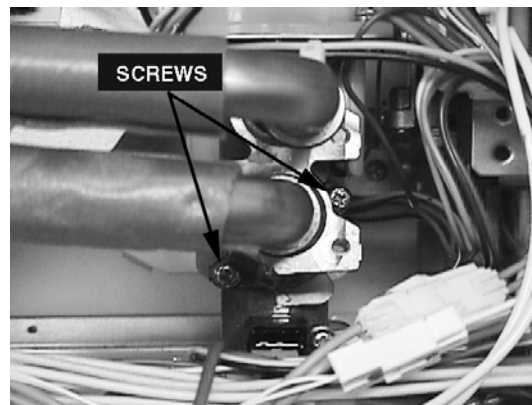
### 3) Removal of the Water Flow Sensor, Servo and Bypass Servo

- a. Remove the front panel. (Refer Item 1.)
- b. Remove two (2) screws and locking plates located on the water supply pipe and bypass pipe. Pull bypass pipe and water supply pipe forward to clear servo valves. Ensure O-rings are not lost or damaged.



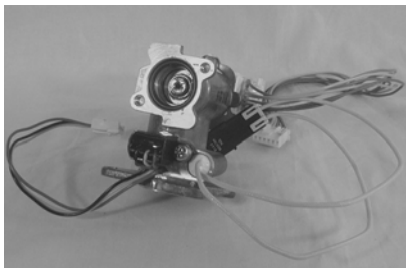
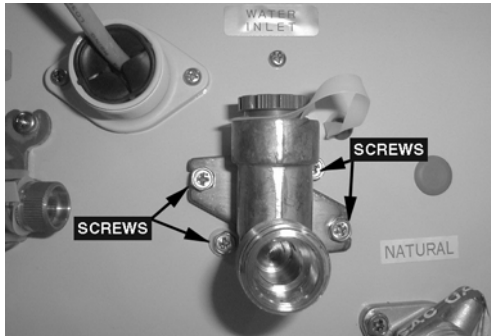
### \* Removal of the Bypass Servo

- c. Remove two (2) screws from the water flow servo body, and pull the bypass servo out forwards. Ensure O-rings are not lost or damaged..



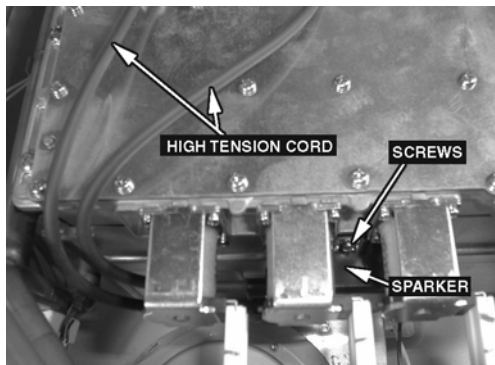
\* Removal of the **Water Flow Servo with Sensor**

- d. Remove four (4) screws from water supply connection body and take out the water flow servo with sensor and the water supply connection. Ensure O-rings are not lost or damaged..



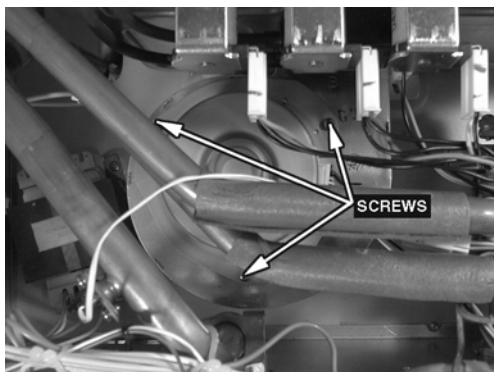
4) Removal of the **Sparkers**

- a. Remove front panel. (Refer Item 1.)
- b. Remove one (1) sparker screw, unplug high tension leads from spark ignitors, and take out the sparker.



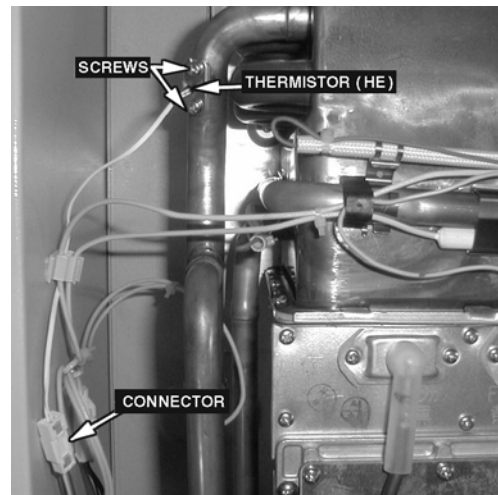
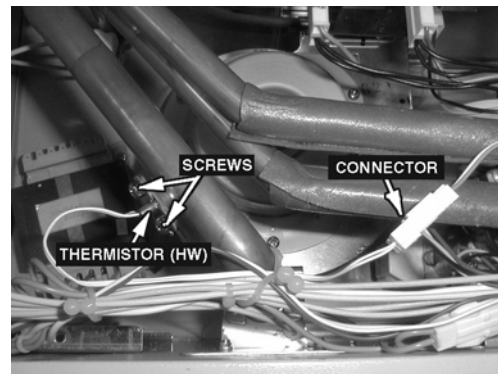
5) Removal of the **Combustion Fan**

- a. Remove front panel. (Refer Item 1.)
- b. Remove three (3) combustion fan screws, pull forward and slide to the side to remove fan.



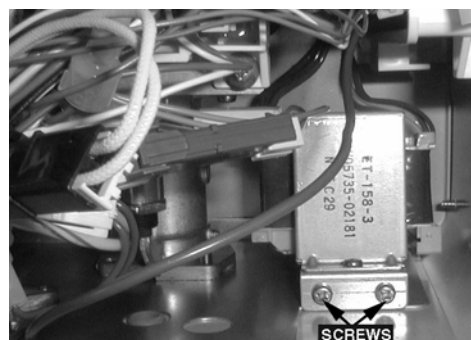
6) Removal of the **Hot Water Outlet & Heat Exchanger Outlet Thermistors**

- a. Remove front panel. (refer Item 1.)
- b. Remove two (2) thermistor screws and remove the Hot Water Outlet thermistor (HW), unplug.
- c. Remove two (2) thermistor screws and remove the Heat Exchanger Outlet thermistor (HE), unplug.

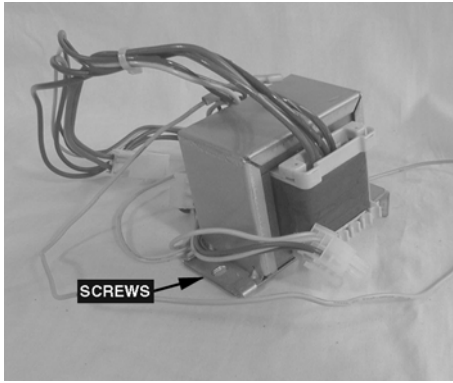


7) Removal of the **Transformers ( 230V / 110V )**

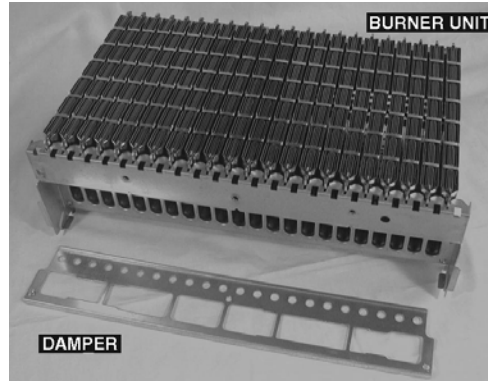
- a. Remove front panel. (Refer Item 1.)
- b. Remove PCB unit (assembly). (Refer Item 2.)
- c. Remove two (2) transformer screws and pull out forward (2 screws).



d. Remove transformer installation bracket screw.

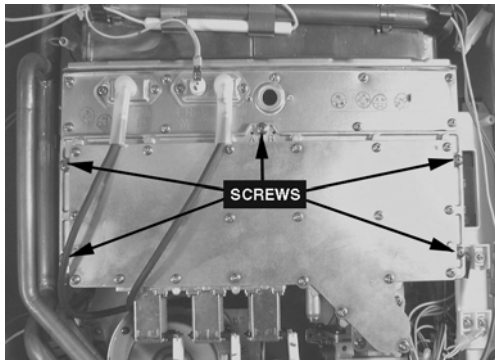


g. Take out the burner unit.

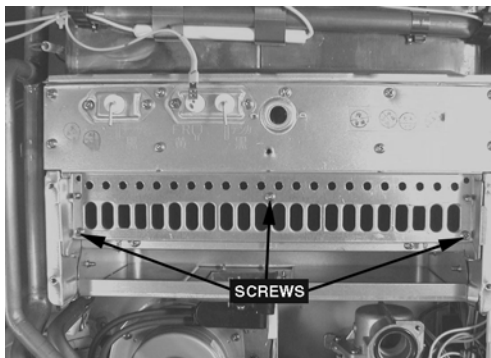


**8) Removal of the Gas Inlet, Solenoid, Flame Rod**

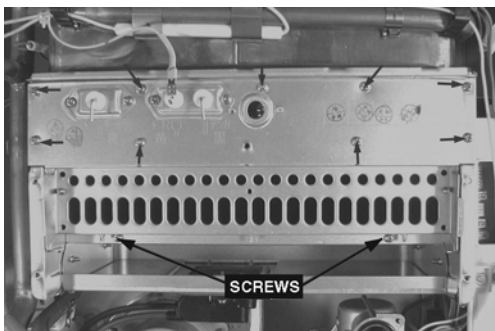
- a. Remove front panel (4 screws). (Refer Item 1.)
- b. Remove five (5) combustion screws located on outer edge of manifold plate.
- c. Remove two high tension leads from spark ignitors. Unplug wiring from solenoid coils.
- d. Remove two (2) manifold and gas control screws and take out by hand.



e. Remove damper (3 screws).

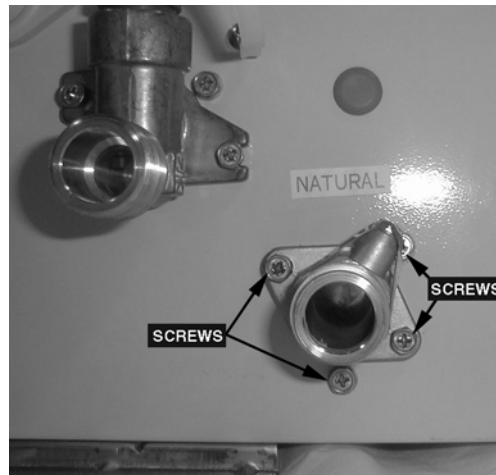


f. Remove two (2) burner retaining screws, then remove combustion chamber front panel (9 screws).

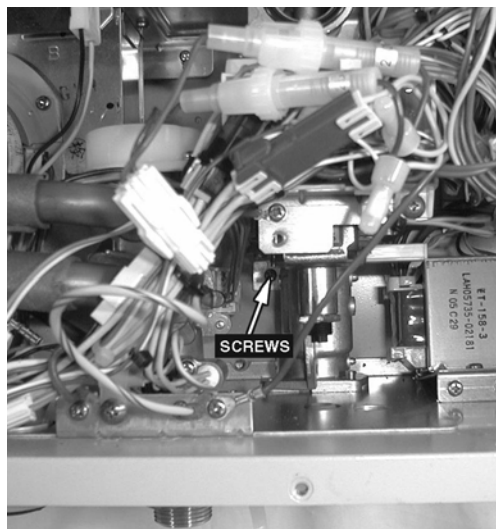


**9) Removal of the Gas Control**

- a. Remove front panel (4 screws). (Refer Item 1.)
- b. Remove the manifold. Refer to section 8) a. to d.
- c. Remove four (4) screws on gas connection inlet and gas control (assy), and pull out the gas connection. Handle O-ring carefully.

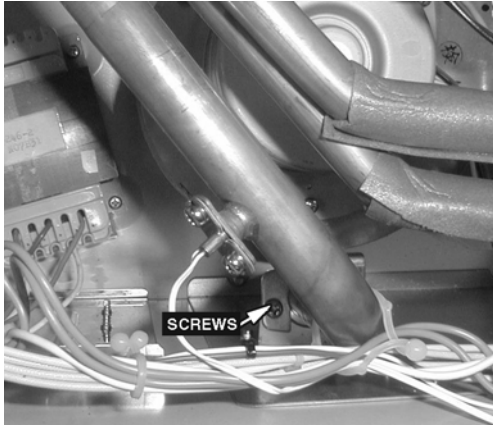


d. Remove one (1) gas control (assy) screw and pull out gas control (assy).

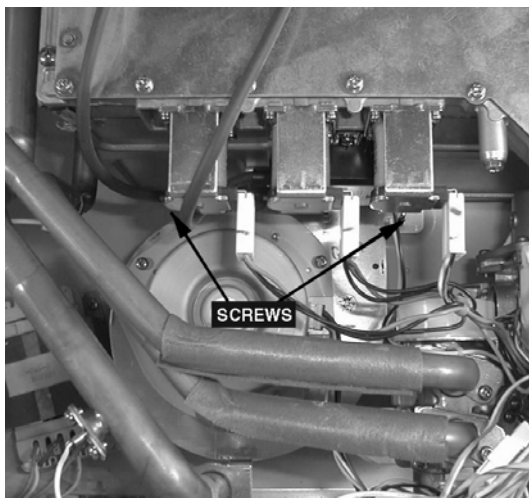
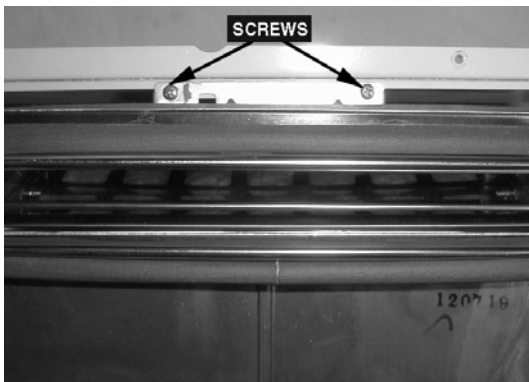


**10) Removal of the Heat Exchanger**

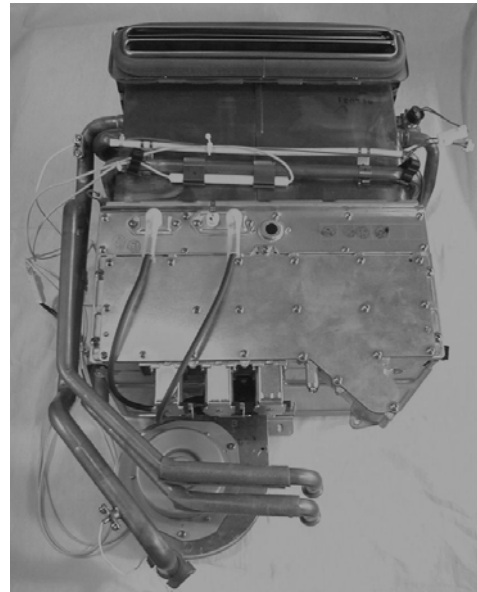
- a. Remove front panel (4 screws). (Refer Item 1.)
- b. Remove the PCB. (Refer Item 2.b.)
- c. Remove heat exchanger water supply pipe and bypass pipe. Refer to 3).
- d. Remove one (1) HEX HW pipe screw and pull the hot water pipe forward. Handle O-ring carefully..



- e. Remove the two (2) screws fixing the manifold and gas control.
- f. Remove four (4) heat exchanger unit screws.



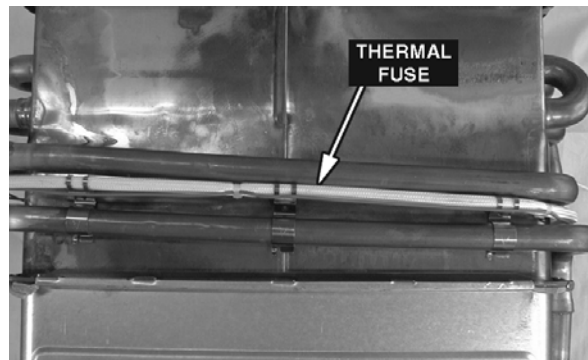
- g. Remove connectors of the fan motor, thermal fuse, flame rod etc.
- h. Pull the heat exchanger unit forward and out.



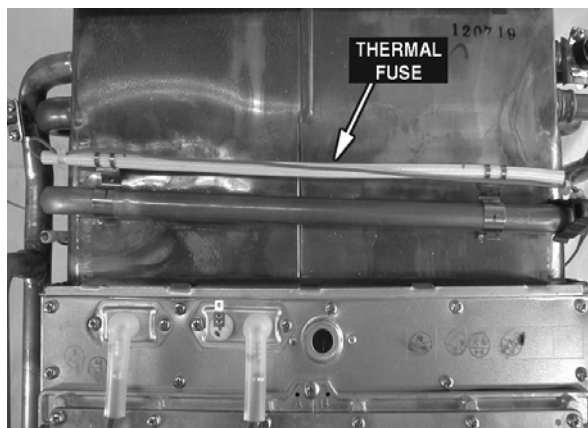
**11) Removal of the Thermal Fuse and OHS**

- a. Remove front panel (4 screws).
- b. Take out the heat exchanger unit. Refer to 10).
- c. Remove the thermal fuse.

*Note:* After replacing, install the thermal fuse as in the following diagrams.



**Heat Exchanger RHS**



**Heat Exchanger Front**



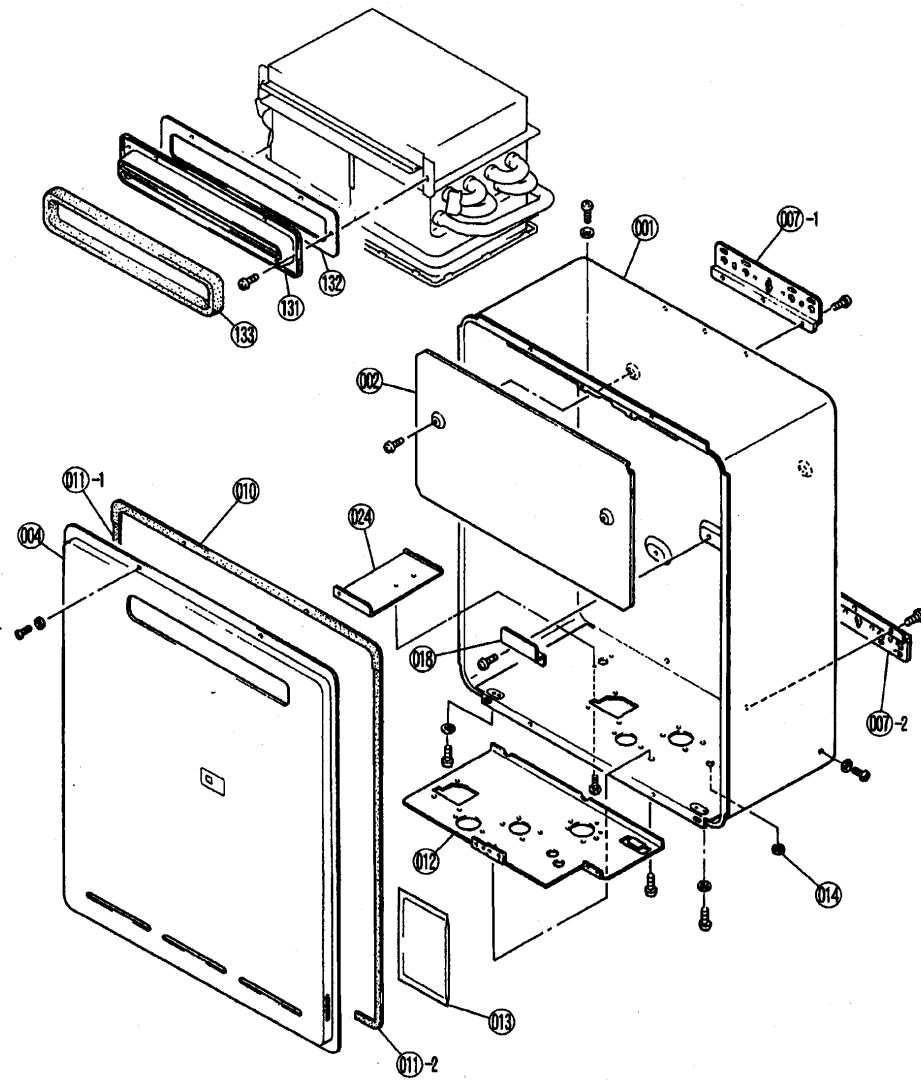
## Heat Exchanger Back

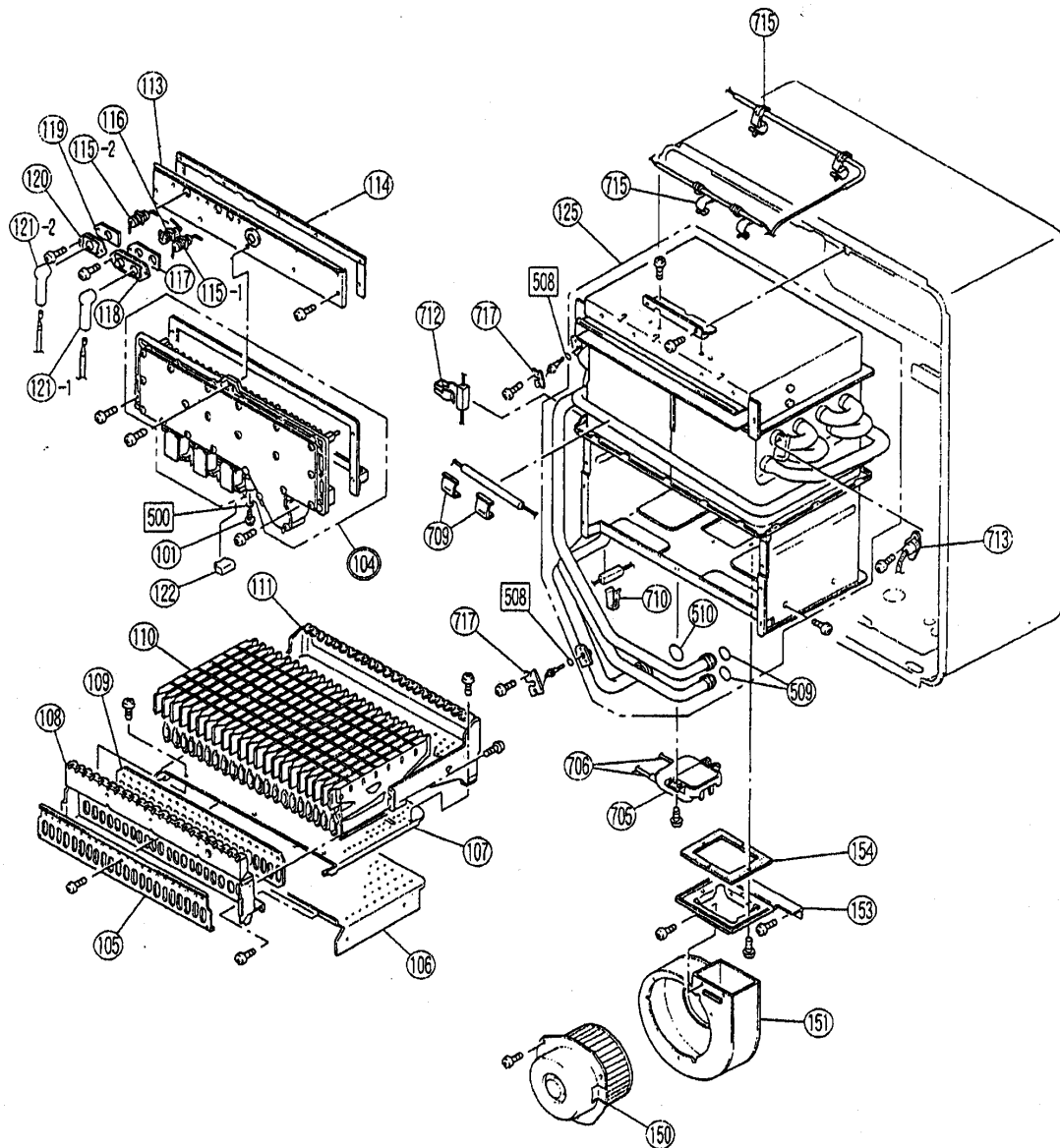
- d. Remove one (1) screw of the bi-metal overheating switch.

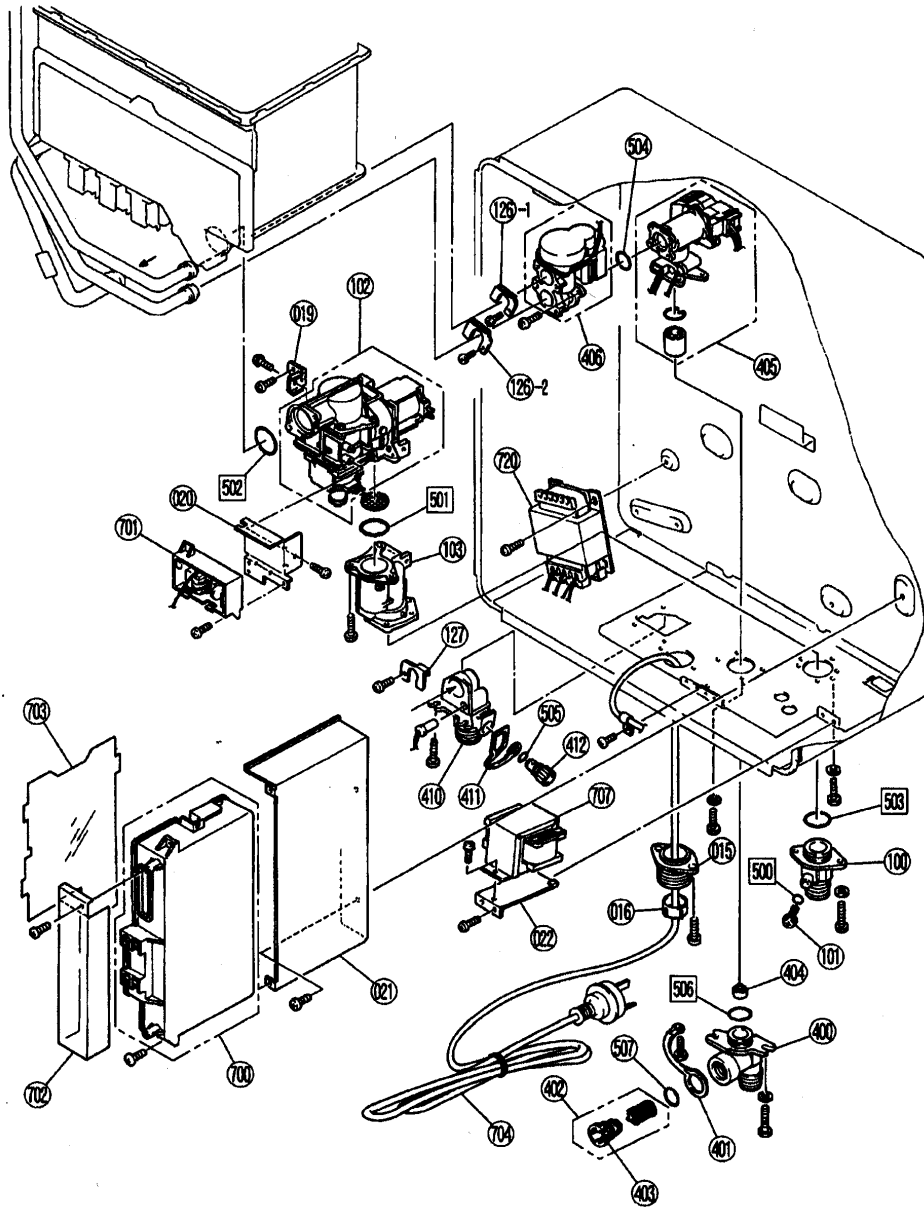


# 21. Exploded Diagram

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## 22. Parts List

No.	PART NAME	RJ DRAWING No.	RUK PART No.	Infinity 32e	HD70e
				QTY	QTY
001	BODY Assy, Main - White	U211-100-3		1	
001	BODY Assy, Main - Silver	U211-100-4			1
002	SHIELD, Heat Insulation	H73-065		1	1
004	PANEL Assy, Front - White	U211-110-5-B		1	
004	PANEL Assy, Front - Silver	U211-110-6-A			1
007	BRACKET, Wall Mounting	BH59-092-2X02		2	2
010	GASKET, Front Panel	BU195-167X01		1	1
011	SIDE GASKET, Main Body	AU103-106X01		2	2
012	PANEL, Connection Reinforcement	U211-105X02		1	1
014	PLUG, Rubber	AU105-113		1	1
015	Cable Connection	BU56-602-NX06	<b>106-104-000</b>	1	1
016	Cable Seal Packing	AU169-126	<b>580-306-000</b>	1	1
100	CONNECTION, 3/4 Gas	BCF2-417X03	<b>106-158-000</b>	1	1
101	SCREW, Test Point	C10D-5	<b>501-275-005</b>	2	2
102	CONTROL, Gas Assy Magnet Modu.	C36Q-1-S	<b>110-979-000</b>	1	1
103	CONTROL, Gas Connection Internal	U211-208	<b>106-321-000</b>	1	1
104	MANIFOLD Assy A (LPG)	U211-200-AX02	<b>101-422-000</b>	1	1
104	MANIFOLD Assy C (NG)	U211-200-C	<b>101-465-000</b>	1	1
105	DAMPER	U211-262X01	<b>140-599-000</b>	1	1
106	PLATE, Restrictor	U211-258		1	1
107	CASE, Lower Bnr	U211-260		1	1
108	CASE, Front Burner	U211-259		1	1
109	PACKING	U211-263		1	1
110	BURNER	B3A7-1X04		22	22
111	PANEL, Burner Case Back	U211-261		1	1
113	PANEL, Combustion Chamber front	U211-266X01		1	1
114	GASKET, Combustion Chamber Fr.	U211-267X01		1	1
115	ELECTRODE	H73-120	<b>202-156-000</b>	2	2
116	FLAME ROD Electrode	AH41-216	<b>230-047-000</b>	1	1
117	GASKET, Electrode / Flame Rod A	AH66-398X01	<b>580-507-000</b>	1	1
118	HOLDER, Electrode / Flame Rod A	AH66-393	<b>580-505-000</b>	1	1
119	GASKET - B, Electrode	U211-279		1	1
120	HOLDER, Electrode B	AU168-323	<b>506-149-000</b>	1	1
121	SLEEVE, Electrode	AU206-218		2	2
122	COVER, Magnet Valve	U211-1027		1	1
125	HEAT EXCHANGER, Complete Assy	U211-900-S	<b>314-347-000</b>	1	
126	BRACKET, Retention Pipes, Inlet	AH69-310		2	2
127	BRACKET - D, Retention Pipe, Out	U211-322		1	1
131	TERMINAL, Flue	U211-351		1	1
132	GASKET, Flue Terminal	U211-352		1	1
133	PACKING, Flue Terminal Front Seal	AH24-653-4		1	1
150	MOTOR, Assy Fan	BCF26-608	<b>222-371-000</b>	1	1
151	CASING, Fan	CH51-615X01		1	1
153	CONNECTION, Fan	U211-551		1	1
154	GASKET, Fan Connection	U211-552		1	1

No.	PART NAME	RJ DRAWING No.	RUK PART No.	Infinity 32e	HD70e
				QTY	QTY
400	CONNECTION, 3/4 Water Inlet	H73-501X02	<b>333-301-000</b>	1	1
401	RETAINER, Plug	H73-512X02		1	1
402	FILTER, Assy, Water	H73-511	<b>017-268-000</b>	1	1
403	RETAINER, Plug Filter	H73-510	<b>196-031-000</b>	1	1
404	FLOW STABILISER	M8D1-15X01	<b>330-107-000</b>	1	1
405	SERVO, Water Flow Assy	M8E-6-3-A	<b>301-074-000</b>	1	1
406	SERVO, By-pass Assy	M6J-1	<b>301-047-000</b>	1	1
410	3/4 inch Hot Water Outlet Connector	U211-321	<b>333-302-000</b>	1	1
411	RETAINER, Plug	AU129-526		1	1
412	VALVE - C, Pressure Relief / Drain	BU129-520-CX03	<b>337-048-000</b>	1	1
415	HARNESS - Wire, Mod. Solen. Vlv	U211-601X02		1	1
416	HARNESS - Wire, Fan Motor	U211-602		1	1
417	HARNESS - Wire, Sensor	U211-603X06		1	1
418	HARNESS - Wire, Water Flow Servo	U211-604X01		1	1
419	HARNESS - Wire, Transformer	U211-1037		1	1
420	HARNESS - Wire 3 Amp Fuse	BU195-1630X03		1	1
500	O-RING Test Point Nipple	M10B-13-4	<b>520-300-010</b>	2	2
501	WASHER	C36B3-4		1	1
502	WASHER	C36F8-1		1	1
503	O-RING	M10B-1-24	<b>520-043-010</b>	1	1
504	O-RING	M10B-2-18	<b>520-049-010</b>	1	1
505	O-RING	M10B-2-7	<b>520-281-010</b>	1	1
506	O-RING	M10B-2-18	<b>520-049-010</b>	1	1
507	O-RING	M10B-2-16	<b>520-048-010</b>	1	1
508	O-RING	M10B-2-4	<b>520-209-010</b>	2	2
509	O-RING	M10B-2-14	<b>520-193-010</b>	2	2
510	O-RING	M10B-2-18	<b>520-049-010</b>	1	1
700	BOARD, PC	U211-1030-B	<b>210-568-000</b>	1	1
701	BOARD, SUB PCB	BU195-1643	<b>210-462-000</b>	1	1
702	COVER - Front, PCB	BH43-755		1	1
703	COVER - Side, PCB	U211-506		1	1
704	POWER LEAD UK	CP-90506		1	1
705	SPARKER ASSY	EI-145X02	<b>261-014-000</b>	1	1
706	SPARKER Leads	BH38-710-540		1	1
707	TRANSFORMER ASSY Small	ET-158-3	<b>224-218-000</b>	1	1
708	HEATER - A, Anti Frost ASSY	U211-1033		1	1
709	CLIP, Anti Frost Heater A, circular	AU195-675X01		2	2
710	CLIP, Anti-frost Heater B, square	AU100-721X03		1	1
711	HEATER - B, Anti Frost ASSY	U211-1035	<b>235-265-000</b>	1	1
712	CLIP, Anti-frost Heater, square	AU124-618X01		1	1
713	OVERHEAT SWITCH	BU129-821-2	<b>234-543-000</b>	1	1
714	FUSIBLE LINK ASSY	U211-610X01		1	1
715	CLIPS, Fusible Link	CP-80531X01		7	7
716	THERMISTOR	BH45-650X01	<b>233-108-000</b>	2	2

No.	PART NAME	RJ DRAWING No.	RUK Part No.	Infinity 32e	HD 70e
				QTY	QTY
717	RETAINER Thermistor	CP-90172		2	2
718	ANTI FROST THERMAL SWITCH	H73-750	<b>234-444-000</b>	1	1
719	HEATER - C, Anti Frost ASSY	U211-1034	<b>235-266-000</b>	1	1
720	TRANSFORMER, Main	ET-246-2	<b>224-277-000</b>	1	1
800	SCREW	ZEDB0408UK		2	2
801	WASHER	AU33-184X01		6	6
802	SCREW	ZAD0408UK		4	4
803	SCREW	CP-21478-412X01		2	2
804	SCREW	CP-80452-412		1	1
805	SCREW	ZEAB0406UK		4	4
806	SCREW	ZEDB0412SZ		2	2
807	SCREW	ZIAA0410SZ		3	3
808	SCREW	CP-21505-408		1	1
809	SCREW	ZFDB0408SZ		1	1
811	SCREW	AU48-174X01		2	2
812	SCREW	ZBA0508UK		2	2
888	CUSTOMER INSTRUCTION	U245-795		1	1
889	INSTALLATION INSTRUCTION	U211-1230		1	1

# Notes

## SERVICE CONTACT POINTS

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### **Rinnai** UK LTD.

9 Christleton Court  
Manor Park  
Runcorn  
Cheshire  
WA7 1ST

Tel. 01928 513870

Fax. 01928 531880

E-mail. [info@rinnaiuk.com](mailto:info@rinnaiuk.com)

Web. [www.rinnaiuk.com](http://www.rinnaiuk.com)