

# I - Series NZ Combi Boiler

## Installation Manual

## Important



**If the information in these instructions is not followed exactly, a fire or explosion may result causing property damage, personal injury, or loss of life.**

This appliance must be installed in accordance with:

- Manufacturer's installation instructions.
- Current AS/NZS 3000, AS/NZS 3500, AS/NZS 5601.1 and G12/AS1 and all other relevant local codes and standards.
- For use in hydronic central heating systems providing heating and/or heating and hot water. Not suitable for installations only requiring hot water heating.



This product is factory set for use with **natural gas only**. If LPG is intended to be used, contact Central Heating New Zealand aftersales for advice. The gas nozzle **must** be changed and the relevant instructions for gas type changeover must be followed according to [Rinnai I series LPG conversion document](#)

For more information regarding this appliance please call: 0800 357 1233.

Central Heating New Zealand  
52 Pilkington Way  
Wigram  
Christchurch 8042  
New Zealand  
[info@centralheating.co.nz](mailto:info@centralheating.co.nz)

[centralheating.co.nz](http://centralheating.co.nz)  
[youtube.com/c/centralheatingnz](https://youtube.com/c/centralheatingnz)  
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### Document Revision Register

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## 1.0 Safety Information

### 1.1 Meaning of symbols used throughout this manual.

	Indicated important information		Warning of risk or injury		Indicates a condition which is prohibited.
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### 1.2 Safety Precautions



Please read the below carefully. If in doubt with any of its contents, contact Central Heating New Zealand on 0800 357 1233

- The gas connection of this product must be installed and commissioned following all relevant standards and best practice guidelines ensuring that no gas leaks are present.
- Be sure to use the type of gas indicated on the appliance data plate. This product is only suitable for natural gas applications; If LPG is required, please contact Central Heating New Zealand aftersales.
- This product is only suitable for ~ 230-240V, 50Hz.
- This appliance is not to be used by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.
- Children should be supervised so that they do not play with the appliance.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent, or similarly qualified persons in order to avoid a hazard.
- Annual servicing by a suitably qualified person is required for the safe operation of the boiler.
- Improper installation can cause harm to people, animals, and property.
- Do not modify or install any modified appliances or components related to this product.
- The flue connection must be made with new approved flue components only.
- Do not store or use petrol or other flammable vapours and liquids in the vicinity of this or any other appliance.

#### **What to do if you Smell gas**

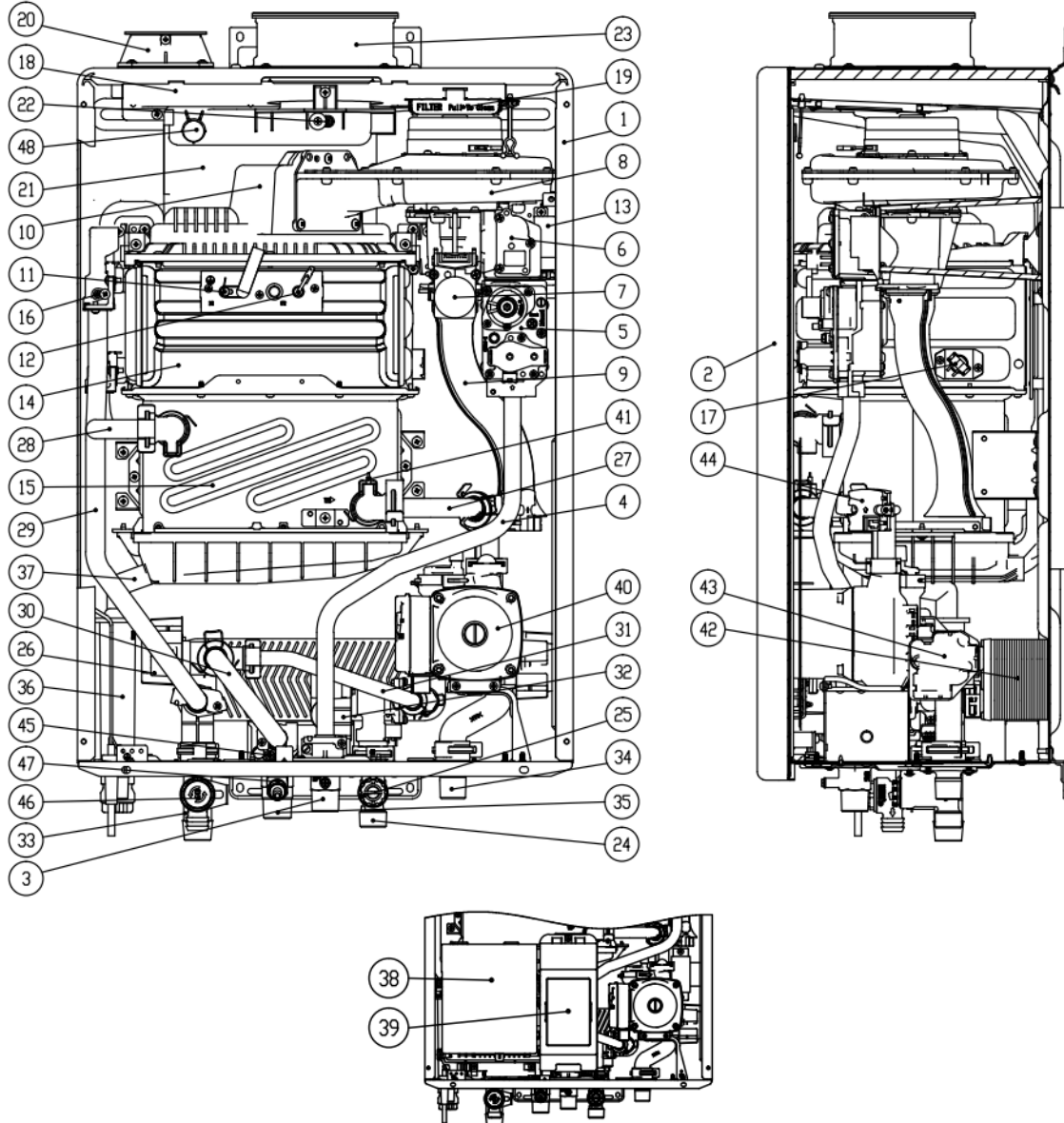
- Do not try to light any appliance
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbours phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call 111.

## 2.0 About The Boiler:

### 2.1 Specification

<b>Model</b>	<b>REB-A4058FF-ZK</b>	<b>Unit</b>
Heating Input (min/max)	4.4-39.5	kW
Heating temperature range	40-82	°C
Heating output 80/60°C (min/max)	4.0-32.4	kW
Heating output 50/30°C (min/max)	4.3-35.4	kW
DHW Input	53.0	kW
DHW temperature range	37-50 °C (1°C increment) 52-60°C (2°C increment)	°C
DHW Production ΔT 25°C	29	L/min
DHW Production ΔT 30°C	24	L/min
Minimum DHW flow rate	1.5	L/min
Max rated input (gross)	208	MJ/h
Max Heating System Pressure	3	Bar
Max DHW pressure	10	Bar
Appliance Type	Wall-mounted, gas-fired combi boiler	
Installation Type	Indoor	
Ignition system	Direct Electronic Ignition	
Flue type	Forced Exhaust	
Heat Exchanger	Stainless Steel	
Gas Type	Natural Gas (G20)	
Gas pressure range -_NG	1.13-3.0	kPa
Enclosure rating	IPX5D	
Sound Power	47	dB(A)
Electrical	230-240V~ 50hz	
Power Consumption	175	W
Dimensions	H671 x W470 x D276	mm
Weight	34	Kg

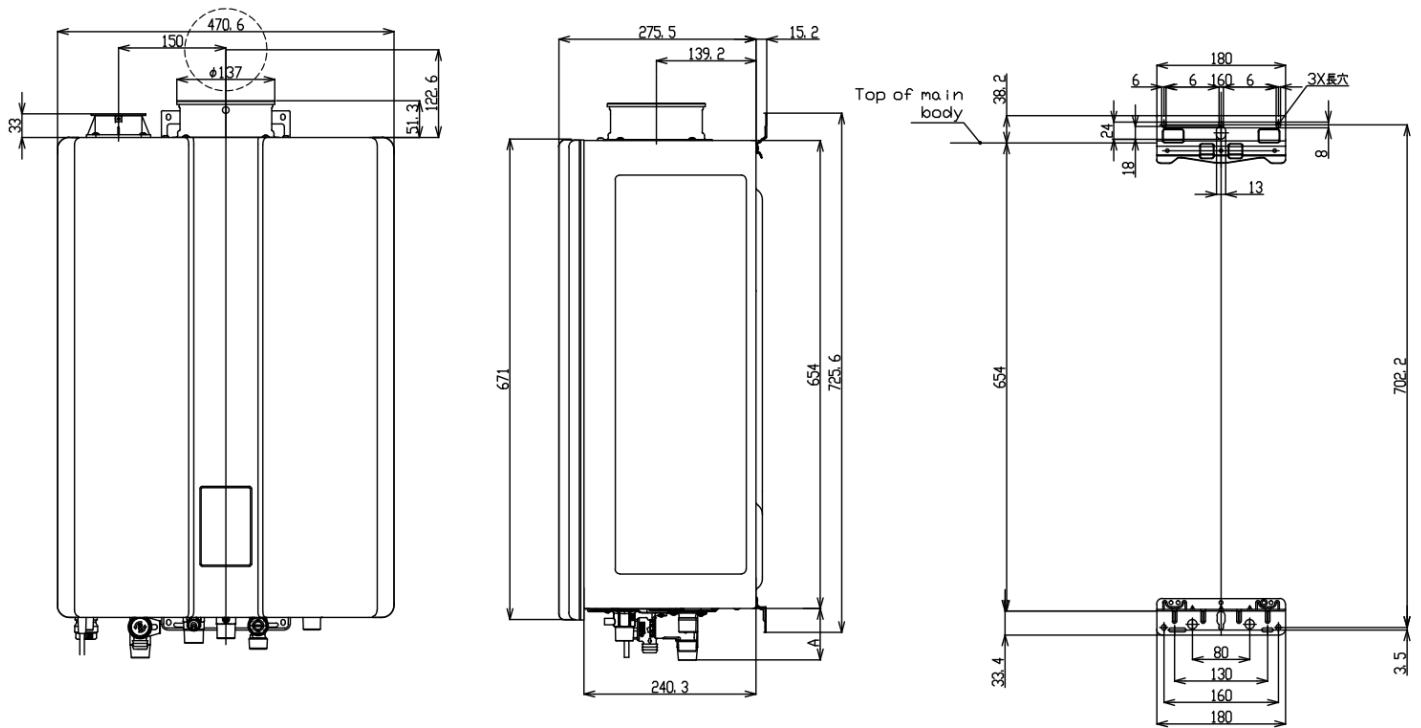
## 2.2 Main Components



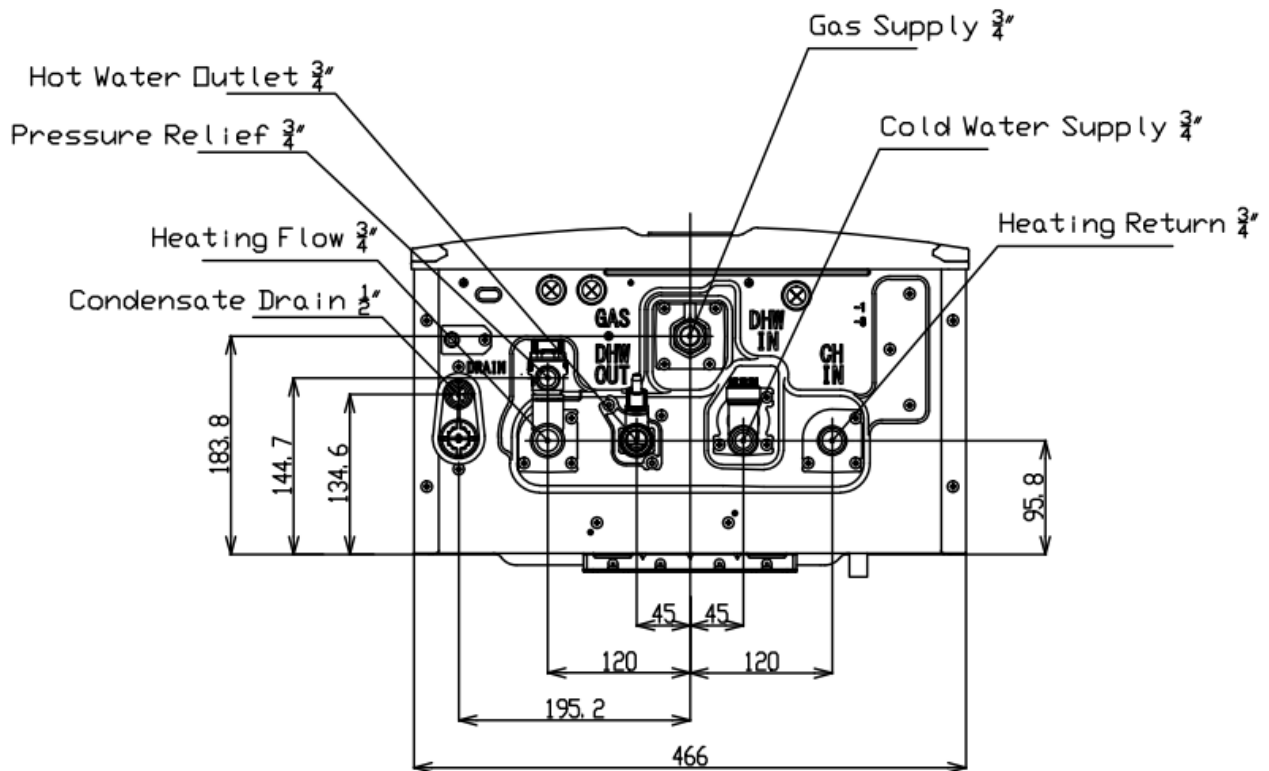
No	Name	No	Name	No	Name
1	Boiler chassis	17	Overheat thermostat	33	Heating flow port
2	Front cover	18	Air supply box	34	Heating return port
3	Gas connection port	19	Supply air filter	35	DHW water supply port
4	Gas connection pipe	20	Air supply port (blanking plate)	36	Condensate Trap
5	Gas valve	21	Exhaust duct	37	Drain tube
6	Gas nozzle	22	Exhaust temperature thermistor	38	PCB box
7	Venturi unit	23	Supply/exhaust port	39	Controller
8	Fan	24	DHW water inlet port	40	Circulation pump
9	Noise filter	25	Water filter	41	Heating return thermistor
10	Burner case	26	Bypass servo	42	DHW heat exchanger
11	Ignition electrode	27	Return pipe	43	Three-way valve
12	Flame sensing electrode	28	Main and sub-connection pipe	44	Water pressure sensor
13	Ignition transformer	29	Hot water connection pipe	45	DHW thermistor
14	Primary heat exchanger	30	Hot water connection pipe	46	Pressure relief valve (heating)
15	Secondary heat exchanger	31	Bypass pipe	47	Pressure relief valve (hot water supply)
16	Heating flow thermistor	32	DHW flow sensor	48	Exhaust inspection port



## 2.3 Dimensions



## 2.4 Bottom View & Connection Locations

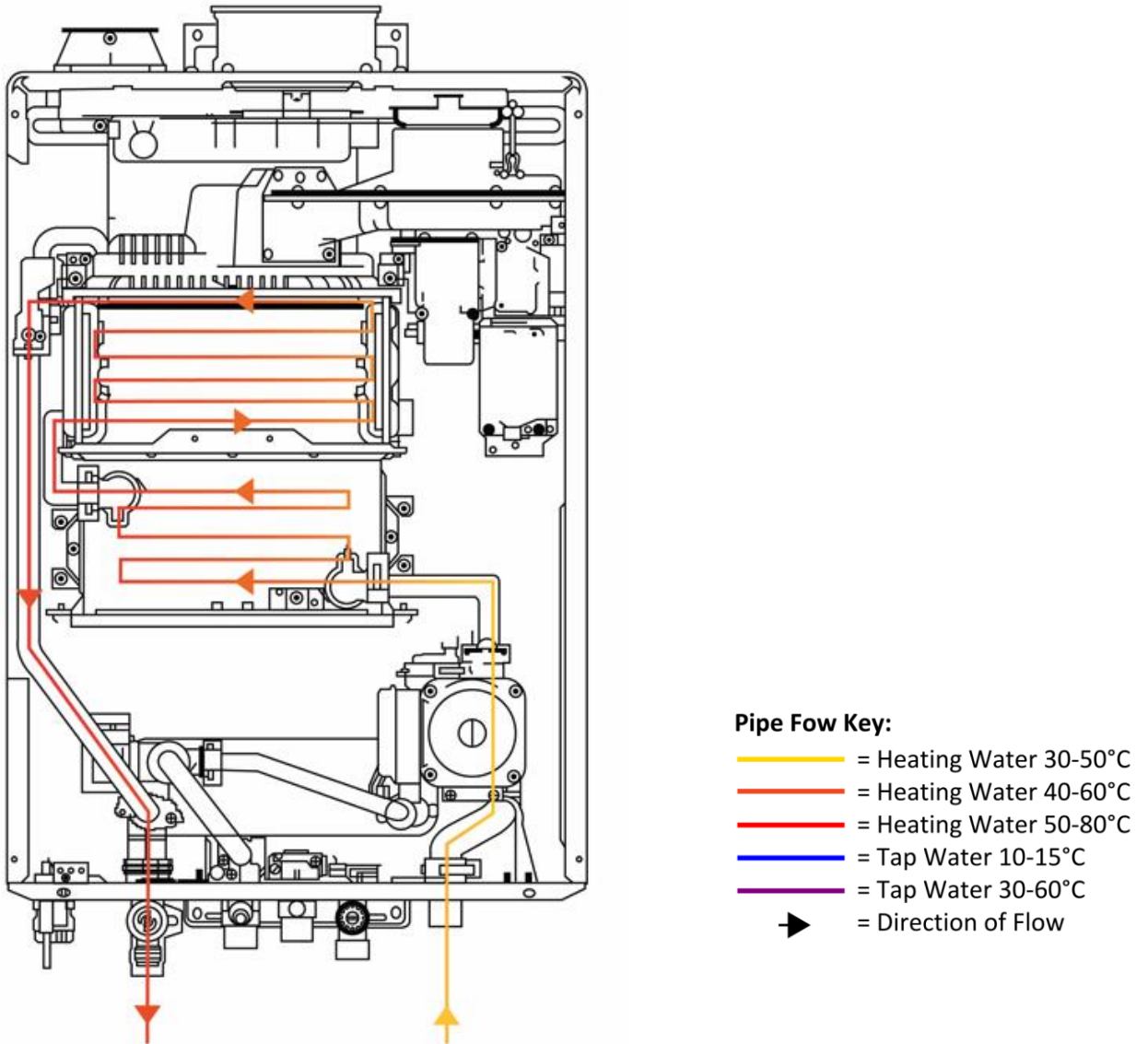


## 2.5 Description of Boiler Operation:

For each of the possible operating modes for the boiler a diagram showing the internal flow path is shown below.

### 2.5.1 Central Heating Mode:

The diagram below shows the flow of heating water through the boiler when it is operating in central heating mode. In this mode the boiler will provide all of the heating flow to the heating system ensuring maximum heating power is provided.

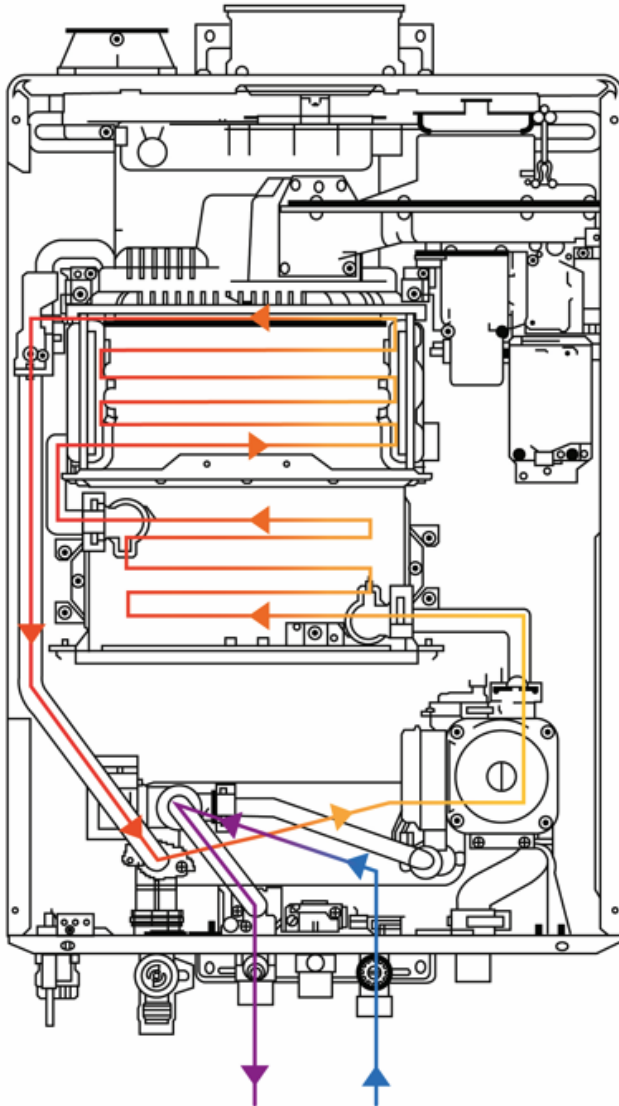


While the boiler is in '**Comfort mode**' (Section 8.3.3), the boiler will fire intermittently even **with no heating demand** in order to maintain the temperature of the secondary heat exchanger. This consumes slightly more energy but increases the response time for hot water requests.

In '**Eco mode**' the above function is disabled. The boiler will not maintain the temperature of the plate heat exchanger, saving energy but slightly increasing the time to provide hot water.

## 2.5.2 Domestic Hot Water Priority Mode (Default):

The diagram below shows the flow of heating and domestic hot water through the boiler, when it is operating in DHW mode. In this mode the boilers 2x three port valves are fully diverted to recirculate 100% of the boilers flow around the boiler and provide dedicated heating of the domestic hot water, this mode allows a large amount of domestic hot water to be provided.

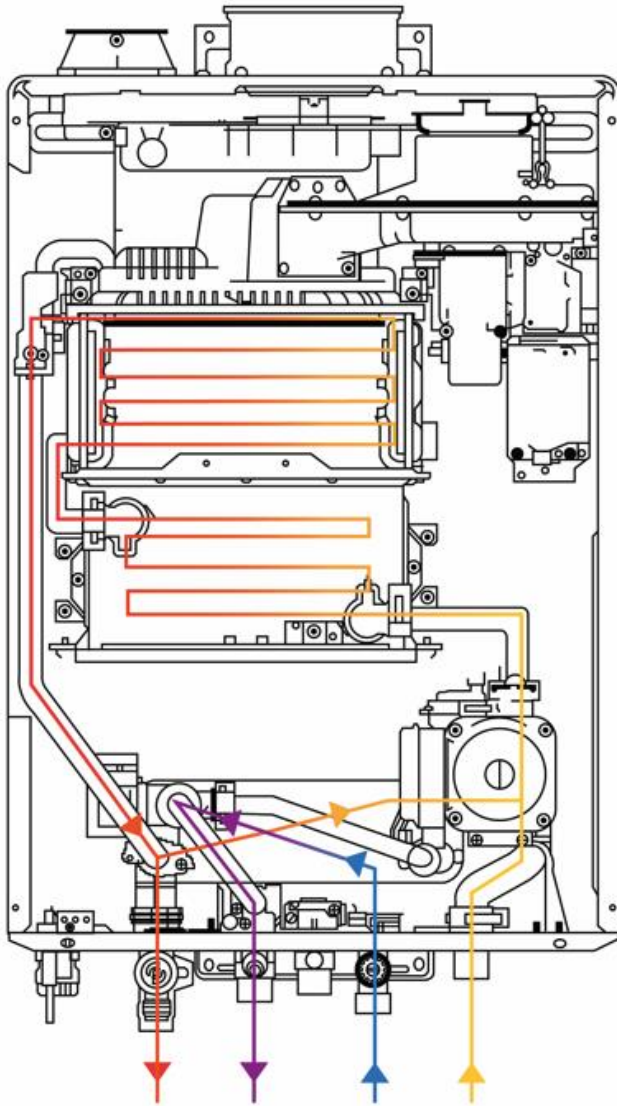


### Pipe Flow Key:

- = Heating Water 30-50°C
- = Heating Water 40-60°C
- = Heating Water 50-80°C
- = Tap Water 10-15°C
- = Tap Water 30-60°C
- ➔ = Direction of Flow

### 2.5.3 Simultaneous Central Heating and DHW Mode (Optional):

The diagram below shows the flow of heating and domestic hot water (DHW) through the boiler when it is operating in simultaneous central heating and DHW mode. In this mode the boiler's internal 3 port valves are diverted to allow partial flow of the heating water through the plate heat exchanger to allow heating of up to half of the maximum flow rate of potable water without the central heating system being stopped.




#### Pipe Flow Key:

- = Heating Water 30-50°C
- = Heating Water 40-60°C
- = Heating Water 50-80°C
- = Tap Water 10-15°C
- = Tap Water 30-60°C
- ➔ = Direction of Flow



The central heating water can be as high as 82°C or higher during simultaneous operation. If the heating set point is lower than 60°C the boiler will operate in DHW priority mode to prevent supplying to high temperature heating water into a low temperature central heating system.

## 3.0 Installation

 This section is intended for the Installer. A trained and qualified professional must install the appliance, inspect it, and leak test the boiler before use. The warranty will be voided due to any improper installation. The trained and qualified professional should have skills such as: Gas sizing; Connecting gas lines, water lines, valves, and electricity; Knowledge of applicable national and local codes; Installing venting through a wall or roof; and training in installation of condensing boilers.



The appliance and its main gas valve must be disconnected from the gas supply piping system during any pressure testing of the system at test pressures in excess of 3.5 kPa. For system testing at pressures less than or equal to 3.5 kPa, the appliance must be isolated from the gas supply piping by closing its individual manual shutoff valve.




The appliance, when installed, must be electrically grounded in accordance with local codes or, in the absence of local codes, with the AS/NZS3000 standards.





Ensure the wall is of sufficient strength to support the weight of the boiler, piping and any other components needed for installation; if it is not, please reinforce the wall as appropriate.


Operating limits of the boiler:


Maximum boiler set point temperature	82°C
Maximum operating pressure	3.0 bar
Maximum allowable working temperature	99°C
Maximum allowable working pressure	3.0 bar

 DO NOT install the boiler in an area where water leakage of the unit or connections will result in damage to the area adjacent to the appliance or to lower floors of the structure. When such locations cannot be avoided, it is recommended that a suitable drain tray, adequately drained, be installed under the boiler. The tray must not restrict combustion airflow.

 DO NOT install the boiler in an area with negative air pressure.

 DO NOT obstruct the flow of combustion and ventilation air.

 DO NOT use substitute parts that are not authorized for this boiler.

 DO NOT install the boiler on areas with carpet flooring.

### 3.1 Appliance Location

When choosing an installation location, you must ensure that all clearances are met, and that the flue length will be within required limits. Please see below illustration for clearances required when hanging the boiler.

#### 3.1.1 Internal installation:

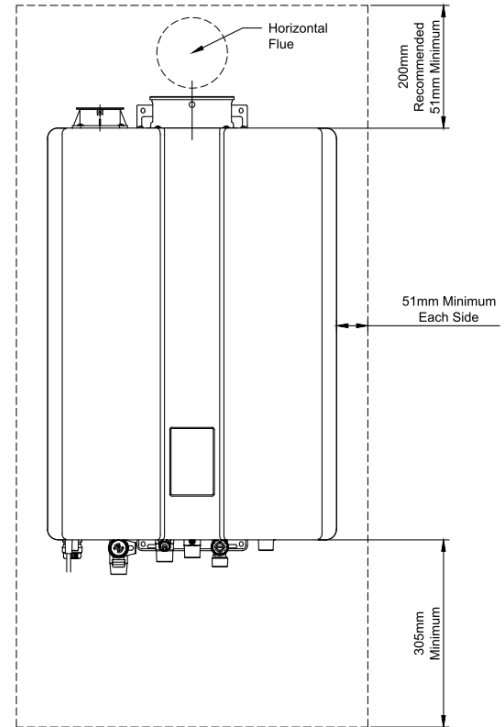
##### 3.1.1.1 Environment



Air surrounding the boiler, venting, and vent termination(s) is used for combustion and must be free of any compounds that cause corrosion of internal components. These include corrosive compounds that are found in aerosol sprays, detergents, bleaches, cleaning solvents, oil-based paints/varnishes, and refrigerants. The air in beauty shops, dry cleaning stores, photo processing labs, and storage areas for pool supplies often contains these compounds. The boiler, venting, and vent termination(s) should not be installed in any areas where the air may contain these corrosive compounds.

##### 3.1.1.2 Clearances

Location	Clearance
Top	51 mm (200mm recommended)
Bottom	305 mm
Front	610 mm (minimum clearance for servicing)
Back	0 mm
Sides (both)	51 mm
Vent	0 mm



##### 3.1.2 External installation:



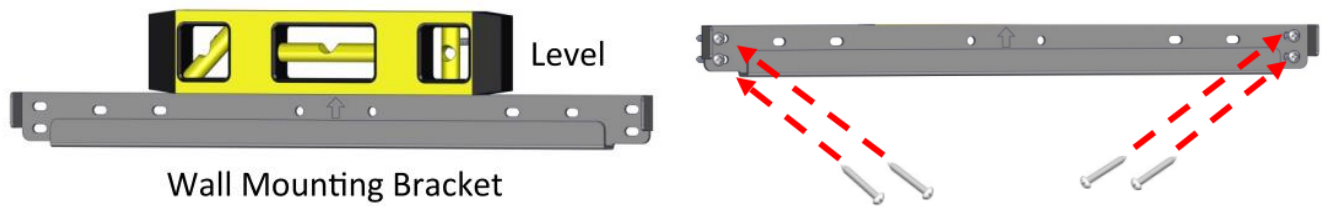
**The Rinnai I-Series boiler is not suitable for direct external installation.** The boiler is suitable to be installed outside the home where the boiler is in a covered outdoor area that will limit the boiler's exposure to rain and UV rays. This installation must comply with all relevant codes and regulations as well as all relevant sections of this manual.

Where it is unclear if an external installation will be suitable, please contact the Central Heating New Zealand Aftersales Team.

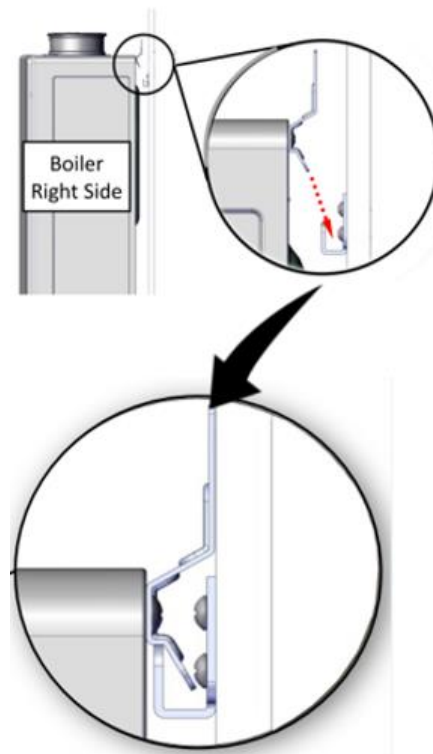
### 3.2 Mount the Boiler to the Wall:

	<p><b>The boiler must be installed vertically with the flue connection at the top and hydraulic connections on the underside of the boiler. No other installation arrangements are permitted.</b></p>
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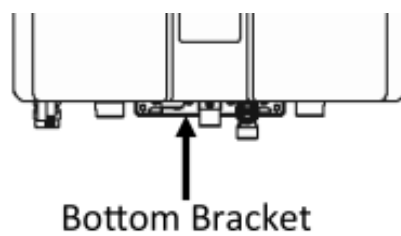
3.2.1 Using the supplied bracket, level and fix this to the wall:



3.2.2 Hang boiler over wall bracket:



3.2.3 Fix Bottom Bracket to Secure Boiler:



### 3.3 Water quality:

#### 3.3.1 System Water Quality Requirements:

The system water used with the Rinnai I-Series boiler must not exceed the levels specified in the table below:

Component	Total Hardness	Aluminium	Chlorides	Copper	Iron	Magnesium	Total Dissolved Solids	Zinc	pH
Maximum Limit	200mg/l	0.2mg/l	250mg/l	1mg/l	0.3mg/l	0.05mg/l	500mg/l	5mg/l	6.5-8.5

#### 3.3.2 System Water Treatment:

Once the boiler is commissioned a suitable water treatment product must be added to the closed heating circuit. Only the following water treatment products are allowed:

- Fernox F1 Central Heating Protector: available in various sizes and forms to suit all system types.
- Fernox Alphi 11 Antifreeze and Protector: for freeze and corrosion protection of small systems, minimum concentration 25%, maximum concentration 40%
- Fernox HP-5C Antifreeze and Protector: for freeze and corrosion protection of medium to large systems, minimum concentration 10%, maximum concentration 40%

After initial system treatment annual testing and recording of water treatment levels is mandatory.

#### 3.3.3 Domestic Water Requirements:

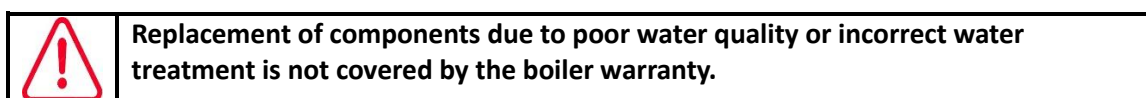
The water used for potable hot water and heated through the plate heat exchanger of this boiler must not exceed the levels specific in the table below:

TDS (Total Dissolved Solids)	Total Hardness	Dissolved (free) CO2	pH	Chlorides	Magnesium	Sodium	Iron	Langelier Index
Up to 600mg/l	Up to 200mg/l	Up to 25mg/l	6.5-8.5	Up to 300mg/l	Up to 10mg/l	Up to 150mg/l	Up to 1mg/l	Between - 1.0-0.8

Most metropolitan water supplies fall within these limits. If sludge or foreign matter is present in the water supply, a suitable filter should be installed.


Some water supplies will require additional water treatment systems installed prior to the water entering the boiler, examples of this are:

- Hard water (areas including Whanganui)
- Aggressive water (areas including Christchurch)
- Combination of hard and aggressive water (some bore water supplies)





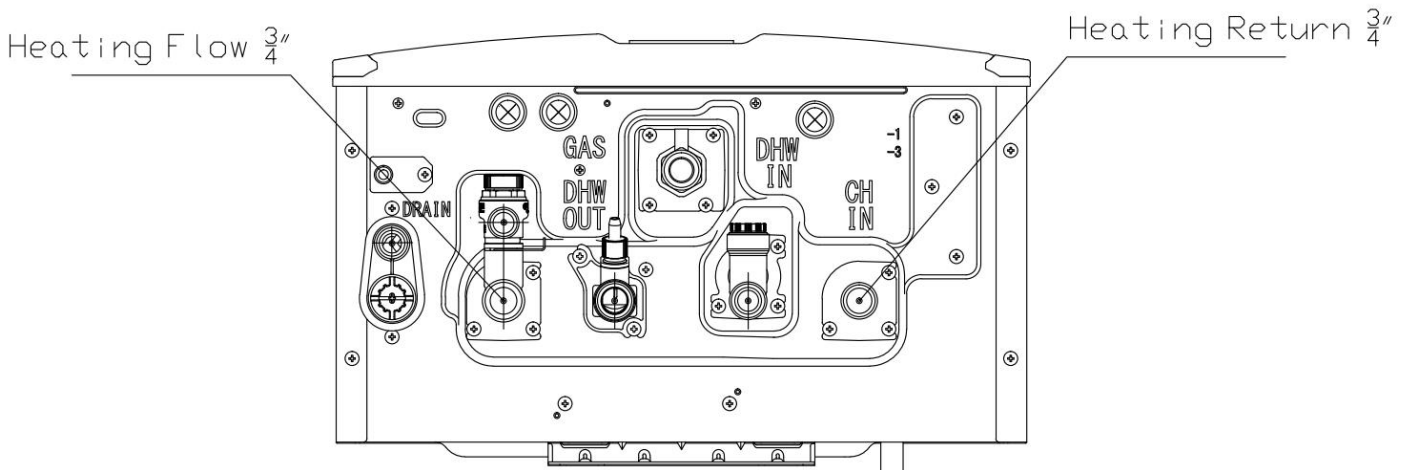
### 3.4 Gas Connection:

	<ul style="list-style-type: none"><li>• <b>A licenced professional must install the gas supply.</b></li><li>• <b>Turn off the power supply to the appliance while making the gas connection.</b></li><li>• <b>Leave the gas isolated until the boiler is ready to be run and commissioned.</b></li><li>• <b>Ensure no ignition sources are present while making and testing the gas connection.</b></li><li>• <b>Do not operate the boiler if a gas leak is suspected.</b></li></ul>
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- Check the type of gas and gas supply pressure. This boiler is suitable for use with natural gas only from the factory. If LPG is to be used a conversion kit should be installed. Check with CHNZ for requirements.
- Check the gas supply pressure at the closest test point upstream of the boiler. Supplied gas pressure must be tested with all gas appliances running and be within the limits shown in '2.1 - Specification'.
- The gas supply line shall be gas tight, sized and installed to meet the maximum demand of all gas consuming appliances at the location.
- Install a gas isolation valve on the boiler or within the gas supply line near the boiler.
- Perform a leak and pressure test prior to operating the boiler.

### 3.5 Heating Connection:

The two outer most connections are the supply and return for the central heating system, these are both  $\frac{3}{4}$ " male connections with a flat face permitting the use of union type ball valves with washers.



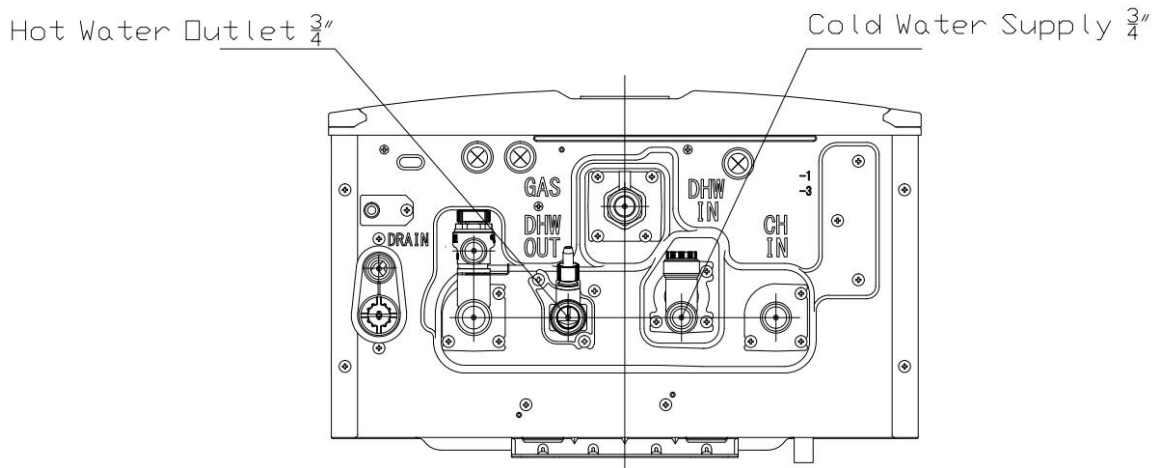
Composite (PERT-ALU-PERT) or metal pipes must be used for the central heating pipe work and all pipe and fittings should be suitable for up to 90°C and 3 bar.

- When removing the plastic sealing caps from the boiler connections, a small amount of water may come out of the boiler due to testing during manufacturing.
- All pipework must be insulated

The boiler includes a 3 Bar pressure relief valve fitted to the heating flow connection, this should be piped away to a suitable location or drain from the boiler.

### 3.6 DHW Connection:

- The piping and components connected to this appliance must be approved for use in potable water systems.
- The DHW connections and pipework must not be connected to any piping or components previously used with a non-potable water heating appliance.
- System water treatment and other toxic chemicals must **not** be introduced into the DHW circuit of the boiler or connected potable water piping.
- Ensure that the water filter on the boiler is cleaned and free of debris.
- Connect the cold inlet and hot outlet pipes to the boiler with suitable isolation valves.



The hot water outlet connection includes a 10 Bar pressure relief valve that should be piped away to a suitable drain, the water supply pressure to the boiler must be below this pressure and if required a suitable pressure reducing valve fitted on the cold water supply of the boiler.



### 3.7 Electrical Connection:

Connect the boiler to a 230VAC +/- 10% - 50Hz power supply. Do not use the gas or hydraulic lines for grounding.

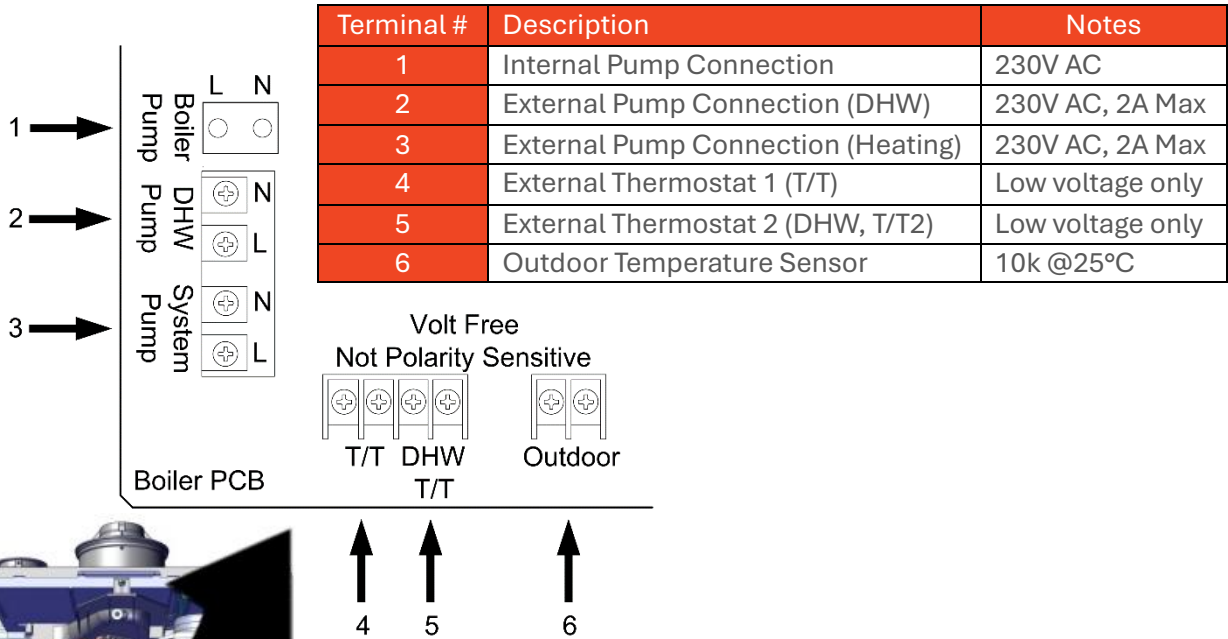
The electrical safety is ensured only when the device is provided with an appropriate grounding and when the grounding system has been realized according to the safety requirements envisaged by the law. Make sure that the electrical system is adequate for the maximum power absorbed and is equipped with a residual earth leakage circuit breaker.

The Appliance is supplied with an electrical cable already fitted with a plug; in case of replacement, contact a qualified technician and use only original Rinnai spare parts to avoid invalidating the warranty.

Do not use adapters, multiple sockets and extension cords. The boiler has an IPX5D protection class.

### 3.8 PCB Connections:

Devices such as the room thermostat, outdoor temperature sensor, zone pumps, and relay controls are connected to the boiler PCB.



**NOTE:** External thermostats using volt free contacts should be connected to **'Item # 4.'** To program the boiler to accept external demand, DIP Switch 2 should be changed to the 'ON' position (up). To fire the boiler **without** an external thermostat, DIP switch 2 should be left in the 'OFF' position. Please refer to sections **8.5.1 (Accessing the PCB/ DIP switches)** and **8.5.2 (DIP Switch Setting Reference Chart)**.

### 3.9 Condensate Pipe:

The boiler has an integral condensate trap to collect any condensate formed in the flue or heat exchanger, this condensate is slightly acidic and must be piped away from the boiler to a suitable drain. The very left most connection on the boiler is the condensate drain connection:

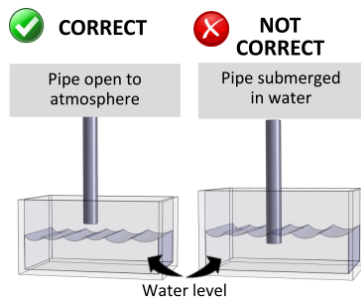


Condensate Drain

- All condensate must drain and be disposed of according to local codes.
- Do not overtighten connection onto the drain
- Use only corrosion resistant materials for the condensate drain lines such as PVC pipe or plastic hose.
- Condensation drains lines installed in areas that are subject to freezing should be wrapped with an approved supplemental heat source. Install as per manufacturer instructions.
- Condensate drains should have a continuous fall of at least 2° from boiler to discharge point. Lengths and bends in accordance with table below.

Lengths and changes of direction				
Max. length (m)	9	8	7	6
Max. changes of direction greater than 45°	3	4	5	6

- The end of the condensate pipe should be open to the atmosphere. The end should not be under water or any other substances.
- Cut discharge end of condensate pipe at 45° to prevent accidental covering or blockage



**DO NOT**

- DO NOT connect the condensate drain line with an air conditioning evaporator coil drain.
- Boilers have an integrated condensate trap. DO NOT install an external condensate trap.

**EXTERNAL TRAP NOT REQUIRED**

- If the condensate pipe is closed or stuck, the liquid will come out from the side hole on the condensate pipe connection.
- The condensate drainpipe should be as short as possible and have a downward pitch.
- **Before operation of the boiler, the internal condensate trap must be primed by filling with water.**

#### To connect the condensate pipe

- Apply thread sealant to ½" condensate drain port
- By hand, thread ½" fitting onto condensate drain port.

### 3.10 PRV Drain:

- A system pressure relief valve rated to 3 bar is fitted to the heating outlet of the boiler.
- A DHW pressure relief valve rated to 10 bar is fitted to the hot water outlet of the boiler.
- The discharge from the pressure relief valve should be piped to the ground or into a drain system as per relevant standards.
- The system pressure relief valve should be manually operated, if possible, once a year to check for correct operation.
- The discharge line from the pressure relief valve should pitch downward and terminate 150mm above drains where discharge will be clearly visible.
- The system discharge pipe must be suitable for water temperatures of 85°C minimum.
- The DHW discharge pipe must be suitable for water temperatures of 65°C minimum.



**Water discharged from the pressure relief valve could cause severe burns instantly from scalds**

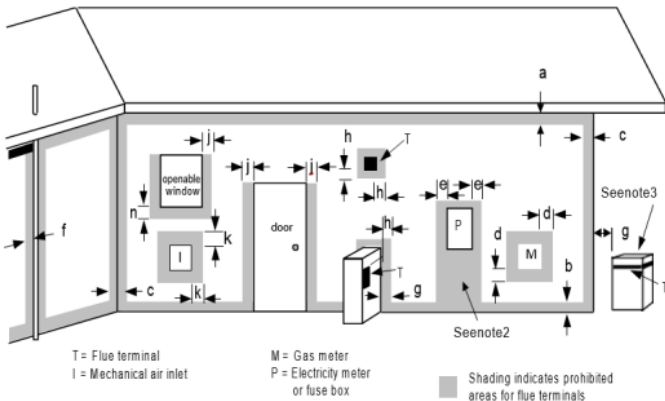
## 4.0. Flue System

### 4.1 Installation clearance

Any flue installation must comply with the minimum flue clearance diagram and table below:

#### Minimum Flue Clearances.

Extract from AS5601/AG601-2002 5.13.6.5 Fig 5.3



† - unless appliance is approved for closer installation

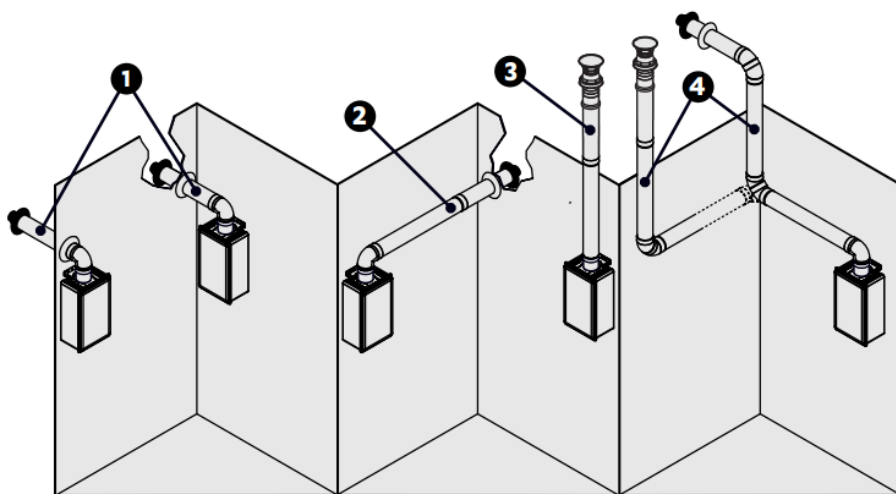
**NOTES:**

- 1 All distances are measured to the nearest part of the terminal.
- 2 Prohibited area below electricity meter or fuse box extends to ground level.
- 3 See Clause 5.13.6.6 for restrictions on a flue terminal under a covered area.
- 4 See Appendix J, Figures J2(a) and J3(a), for clearances required from a flue terminal to an LP Gas cylinder. A flue terminal is considered to be a source of ignition.
- 5 For appliances not addressed above, approval shall be obtained from the Authority.

Ref.	Item	Min. clearances (mm) Fan assisted
a	Below eaves, balconies and other projections:	
	• Appliances up to 50 MJ/h input	200
	• Appliances over 50 MJ/h input	300
b	From the ground, above a balcony or other surface †	300
c	From a return wall or external corner †	300
d	From a gas meter (M) (see 4.7.11 for vent terminal location of regulator)	1000
e	From an electricity meter or fuse box (P)	500
f	From a drain pipe or soil pipe	75
g	Horizontally from any building structure = or obstruction facing a terminal	500
h	From any other flue terminal, cowl, or combustion air intake †	300
j	Horizontally from an openable window, door, non-mechanical air inlet, or any other opening into a building with the exception of sub-floor ventilation:	
	• Appliances up to 150 MJ/h input	300
	• Appliances over 150 MJ/h input up to 200 MJ/h input	500
	• Appliances over 200 MJ/h input	1500
	• All fan-assisted flue appliances, in the direction of discharge	1500
k	From a mechanical air inlet, including a spa blower	1000
n	Vertically below an openable window, non-mechanical air inlet, or any other opening into a building with the exception of sub-floor ventilation:	
	• Space heaters up to 50 MJ/h input	150
	• Other appliances up to 50 MJ/h input	500
	• Appliances over 50 MJ/h input and up to 150 MJ/h input	1000
	• Appliances over 150 MJ/h input	1500

## 4.2 Flueing Options

The Rinnai I Series boiler must be installed with a suitable flue system, the use of a coaxial flue to provide air for combustion and an exhaust pipe for combustion products is recommended, this system allows several flue configurations to be achieved as shown below:



1. Direct Horizontal Flue
2. Extended Horizontal flue
3. Straight Vertical Flue
4. Custom Flue

## 4.3 Maximum Flue Length

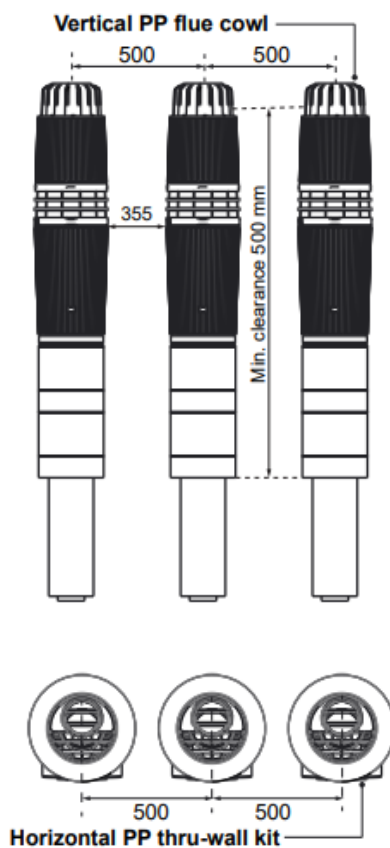
Based on using a  $\varnothing 60/100\text{mm}$  flue the maximum recommended flue length for the I Series boiler is 20m of straight flue, each  $90^\circ$  bend is equal to 3m, and each  $45^\circ$  bend is equal to 1.1m. The table below provides a quick reference for the suitable flue configuration:

**Flueing table showing maximum flue length and maximum number of bends:**

		Flue length (m)																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Number of $90^\circ$ Bends	0																				
	1																				
	2																				
	3																				
	4																				

## 4.4 Distance Between Flues

Where multiple appliances are installed together on the same site the minimum distance between each flue terminal must not be less than 500mm:



## 4.5 Appliance Connection:

The flue connection spigot on the boiler is suitable for an 80/125mm flue. To allow 60/100mm flue systems to be used, a flue adapter is required, these are available for both vertical and horizontal connections:

**Vertical starter adapter**



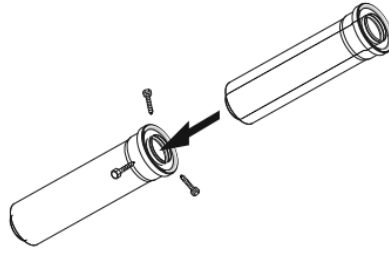
**Horizontal starter adapter**



Insert the male end of the adapter into the boiler before fitting or measuring out any flue parts. Secure the adapter to the boiler with self-tapping screws.

## 4.6 Flue Connections:

All flue connections must be fully inserted to ensure an airtight seal. It is also recommended to secure all connections with 4 x 12.5mm self-tapping screws to prevent any accidental disconnections:



## 4.7 UV Protection:

Only the terminal section (black coloured) of the flue terminals is suitable for exposure to UV, the white flue sections are not intended to be installed outside and it is recommended that the flue is installed in a way that prevents the white sections of the flue needing to be run externally.

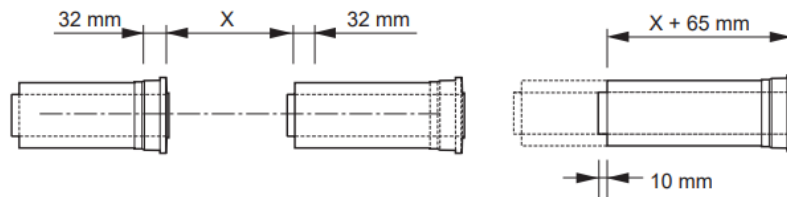
Where running the white section of the flue outside cannot be prevented the flue should be painted, wrapped, or clad in a suitable material to provide UV protection.

## 4.8 Cutting to Size:

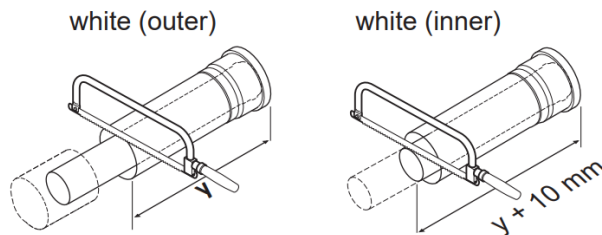
The flue terminals and extensions can be trimmed to length as required to achieve the flue length needed.

When trimming the flue to length please consider the following:

1. The insertion depth of the flue system is 32mm, this means that when two parts are joined together the effective length is reduced by 64-65mm:



2. The inner pipe of the flue must always be 10mm longer than the outer pipe, always measure and cut the outer layer first and then measure and cut the inner layer allowing for 10mm additional length:

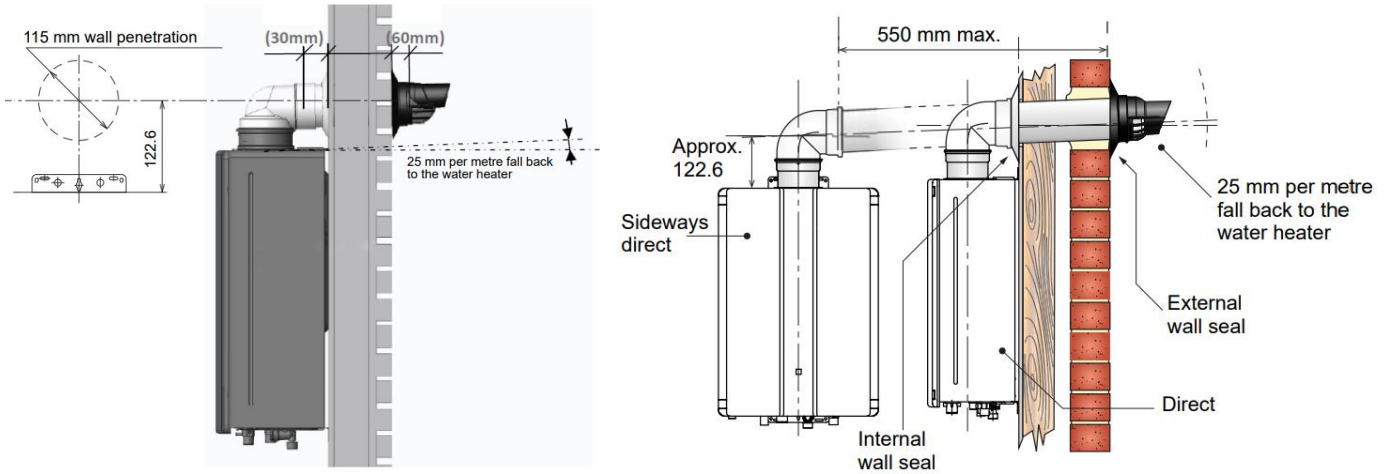


3. Deburr the edges of both pipes after cutting to permit easy joining of sections and prevent the seals from being damaged.



## 4.9 Back to Wall Flue:

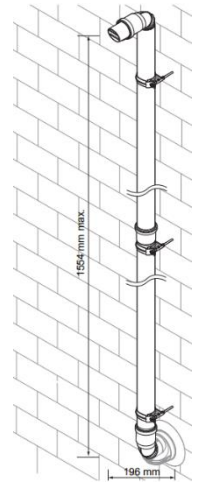
Where the boiler is mounted directly on the inside of an external wall (total wall thickness to be 95-550mm) the horizontal flue penetration can be made directly above the boiler as shown in the detail below:



## 4.10 Plume Kit:

Where the horizontal terminal termination is not suitable or preferred a plume kit can be added externally to the terminal to allow the exhaust to be positioned up to 1.5m above the terminal location:

- The flue terminal must be compliant with the locations shown in the AS/NZS 5601.1 diagram and table in section 4.1.
- The plume kit counts as 2 bends for the maximum flue length table.
- The terminal should face the same direction on the same wall as the air intake.
- To create a shorter plume kit either use the 1m connecting pipe or trim this to length (only trim the flue from the externally chamfered end).



## 4.11 Penetrations and External Seals:

The flue penetration should be formed in a way that permits the removal or replacement of the flue in the future. For a wall flue penetration in a new construction project, it is recommended that a suitable sleeve is fitted in the wall for the flue terminal to be inserted through at a later stage.

The horizontal flue terminal is supplied with an external wall seal, use this to seal the flue to the external surface of the wall and ensure this prevents the ingress of moisture.

The vertical flue terminal is supplied without any seals, a suitable roof penetration sealing product (i.e. dectite) should be used to seal the flue. Ensure the roof seal is applied under the flue UV protection (black coloured section).



**Do not install the flue with any section joins in an inaccessible area (i.e. within a wall, or inaccessible roof cavity).**

#### 4.12 Flue Clamps:

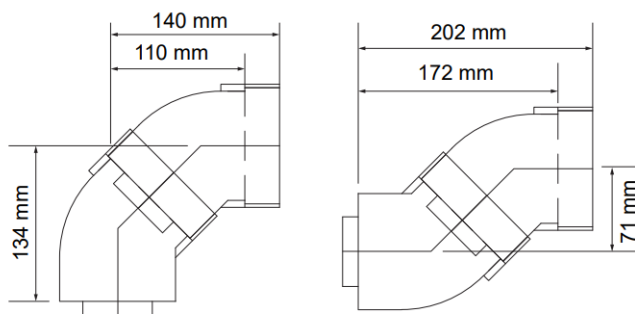
As required the flue should be supported in place with clamps or brackets, some flue parts are supplied with brackets but where more bracketing is required additional clamps can be purchased. Each section of flue should be supported.



#### 4.13 Flue Elbows:

As required the flue can be re-routed with 45° or 90° bends, the inclusion of these bend will reduce the total flue length that can be used as per the table in section 4.3, a 90° flue transition reduces the maximum length by 3m, a 45° flue transition reduces the maximum length by 1.1m.

The flue bends are supplied as a pair of 45° elbows that can be used together to create a 90° bend, or a flue offset as shown below:



#### 4.14 Flue Parts Available:

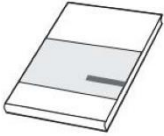
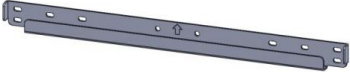
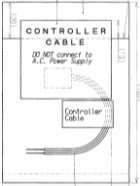
Central Heating New Zealand stocks a complete range of flue accessories for the installation of these boilers, refer to the list below (or our website for an up-to-date list):

Description	Product Code	Parts Included
Horizontal Kit	BRFLHCD	Boiler adapter, horizontal terminal, internal and external wall seals, lubricant.
Vertical Terminal Kit	BRFLVCD	Boiler adapter, vertical terminal, UF protector, flue clamp, lubricant.
90° Bend	BRFL90CD	2x 45° bends
Extension	BRFLXCDCH	1m length of flue, flue clamp.
Bracket	BRFLC	Flue clamp and mounting plate
Internal wall seal	BRFLISC	White wall plate for covering internal penetration.
Plume Kit	BRFLXCDPK	Plume dispersal terminal kit with 1m extension

## 5.0 Accessories:

### 5.1 Supplied:

The following accessories are supplied in the packaging with the boiler:

Part Description	Part Image
Boiler Manual (supplied separate)	
Mounting Bracket (see section 3.3)	<b>WALL MOUNTING BRACKET</b> 
Remote Controller Cable (for DHW remote) <b>Note: supplied loose in box, please pay attention not to discard with packaging</b>	

### 5.2 Optional:

Several optional accessories are available to support the installation of these boilers. The need for these accessories will be dependent on the system type, please contact Central Heating New Zealand if you are unsure or require further information.

#### 5.2.1 Expansion vessel kit:

The Rinnai I Series boilers do not include an internal expansion vessel and an external expansion vessel is required for all installations. A suitable expansion vessel can be purchased separately from Central Heating New Zealand and integrated into the heating pipe work during the installation, the recommended size for the expansion vessel can be found from the table below:

System kW	Estimated System Volume (L)	Expansion Vessel Required	CHNZ Product Code
10	65	5L	EV5L
15	98	6L	EV6L
20	130	8L	EV8L
25	163	12L	EV12L
30	195	12L	EV12L
35	228	18L	EV18L



**The expansion vessel should be installed on the flow side of the boilers heating connections, this is contradictory to normal practice to install an expansion on the return of the boiler but is required due to the arrangement of the boiler's internal components.**

### 5.2.2 Pressure Gauge:

The Rinnai I Series boiler is not fitted with an integral pressure gauge, the pressure is monitored by an internal pressure sensor, but a pressure gauge should be installed in the system pipe work. The recommended gauge is the 0 to 6 Bar, 50mm FAR pressure gauge (PRESSGAU): available at Central Heating New Zealand.



Refer to the schematics in section 5.2.9 for the proposed location.

### 5.2.3 Drain & Fill Valve:

The Rinnai I Series boiler does not include an internal filling loop or valve; the drain and fill point must be installed in the system pipe work, and this is recommended to be located under the boiler.



For filling and draining the 15mm drain/fill tap (DRAINTAP15) available at Central Heating New Zealand is recommended:

For added ease of system filling and commissioning the FAR 15mm Automatic filling valve (VFILL) can be included in the system and this will negate the requirement to install the pressure gauge mentioned in section 5.2.2:

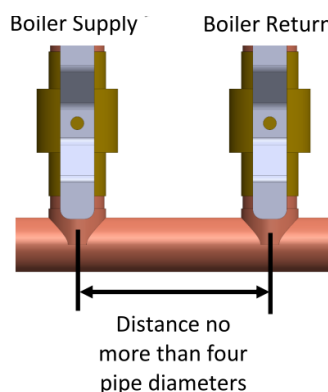


	<p><b>The filling connection between the boiler filling valve and mains water should not be made as a permanent connection. A flexible hose should be used to connect the boiler filling valve to the mains water that is removed after system filling is complete. If a permanent connection is required a suitable back flow prevention device must be used.</b></p>
--	--

### 5.2.4 Low Loss Header & Secondary Circulation Pump:

For central heating systems that have a heating load of greater than 20kW the boilers integral circulation pump is likely not able to provide sufficient heating flow, in this situation it is recommended that the boiler and heating system are separated with a low loss header and a secondary circulation pump is added to the system.

The low loss header can be made locally by the installer during the installation, this is achieved by connecting the boilers flow and return connections together into a common 25mm NB pipe under the boiler, the spacing of the boiler flow and return connections onto this pipe should be no more than 4x pipe diameters (100mm):



The secondary circuit should then have a suitable circulation pump added to provide the required pumping power for the system. The Rinnai I Series boiler can provide up to 35kW of heating to the central heating system, for most central heating systems the required pump pressure to deliver the heating load would be less than 50kPa, the recommended circulation pump to provide 50kPa of pump pressure with 35kW of energy (25L/min) is the Wilo RS 25/7-3 pump (WILORS25-70) which is stocked by Central Heating New Zealand:



 **The pump should be installed with pump unions (PEG657030) and isolation valves (VB1MF) on both sides for ease of installation and maintenance.**

#### 5.2.5 Air Vent:

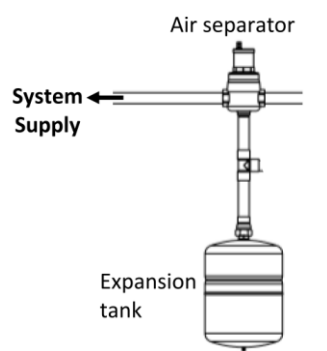
The Rinnai I Series boiler is fitted with an air vent integrated into the circulation pump, but external air vents must be fitted at all high points in the system to permit the removal of air. The FAR 15mm air vent (VAAV) and air vent non return valves (VAAVN) are recommended and these are stocked by Central Heating New Zealand:



To provide more optimal removal of air from the system the inclusion of a FAR Deaerator (FARDEAR1) on the outlet of the boiler will ensure all air is quickly removed from the system, the hot water out of the boiler is where air bubbles will form more prominently, and the air separator will quickly remove these from the system:






The lower port connection on the bottom of the deaerator can also provide an easy location to connect the expansion vessel into the system:





### 5.2.6 Boiler Isolation Valves:

The inlet and outlet boiler connections for both the central heating circuit and DHW circuit should be fitted with isolation valves for ease of installation and maintenance, all these connections are 3/4" and the recommended valves are shown in the table below:

Boiler Connection	Recommended Valve/s	Valve Image
Heating flow	3/4" swivel type heating tap (BXCKHT or BXCKHT90)	
Heating Return	3/4" ball valve with integrated filter (VBALLFTVL34)	
Gas supply	3/4" swivel type gas tap (BXCKGT or BXCKGT90)	
DHW Valves	3/4" Supplied by others Valve size and type to suit installers preference.	

## 5.2.7 Boiler Fitting KIT

Central Heating New Zealand has amalgamated some of the key components and fittings mentioned above into a convenient kit specific for the I-Series boiler. Both angled and straight options are available depending on the installation configuration.

Description	CHNZ Code:	Valve Image
Straight Fitting KIT	BRIFS	
Right Angle Fitting KIT	BRIFA	

### 5.2.8 Bypass Valve:

The Rinnai I Series boiler does not have an integral heating bypass valve, for most system installations an external differential pressure bypass valve is recommended to improve the circulation through the boiler and life of the circulation pump. The recommended valve for this purpose is Danfoss 25mm bypass valve (VDIFFHYD2) which is stocked by Central Heating New Zealand:



### 5.2.9 Dirt Separator:

To maintain a clean system and healthy boiler it is recommended to add a magnetic dirt separator on the heating return before the boiler, this will ensure easy and complete removal of all system contaminants ensuring the boilers circulation pump and heat exchanger are protected from blockages and damage. The recommended dirt separator is the Fernox TF1 filter (FXTF1) which is stocked by Central Heating New Zealand:



The Fernox TF1 filter can be installed in either horizontal or vertical sections of pipe work making installation easy, and the integrated drain can replace the need to install an additional drain as mentioned in section 5.2.3.

### 5.2.10 External Air Sensor:

To improve the efficiency of the boiler an outdoor air sensor can be added to the boiler to reduce the flow temperature as the outside air temperature increases. To enable this functionality a suitable external sensor with a 10kOHM and 25°C NTC thermistor must be connected to the boiler.

The recommended sensor for this is the outdoor air sensor stocked by Central Heating New Zealand (BXOS).

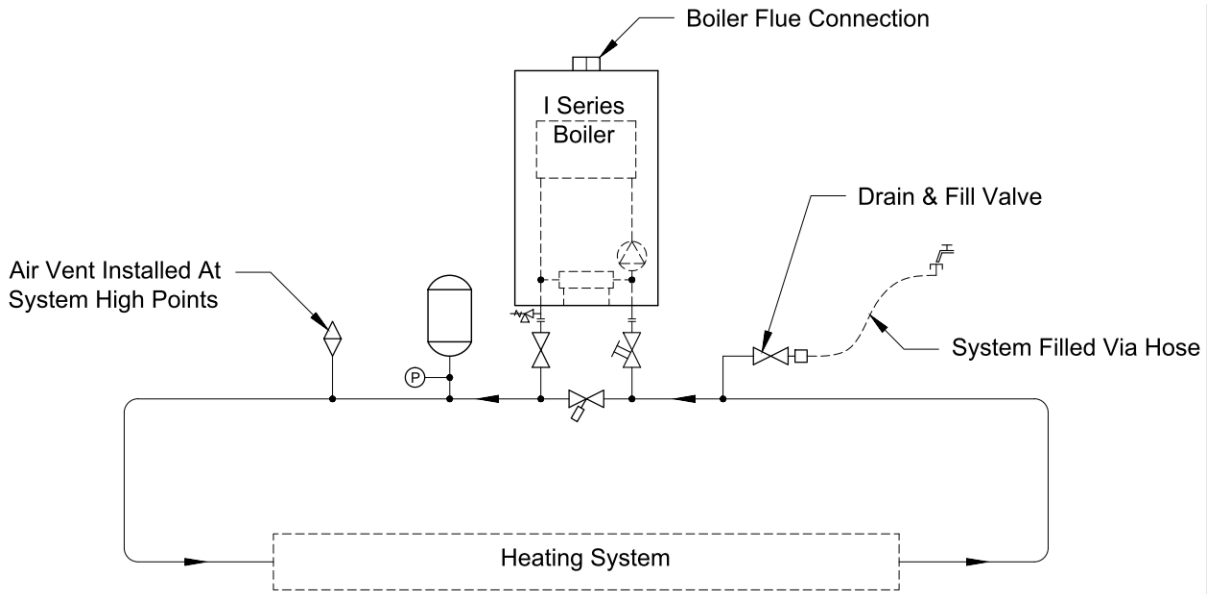


The sensor should be located on a south facing wall of the home below the eave away from any vents to ensure the reading is accurate and not impacted by the sun or other heat sources. The sensor should then be wired back to the boiler. Refer to section 8.6, parameters available via boiler display for available settings.

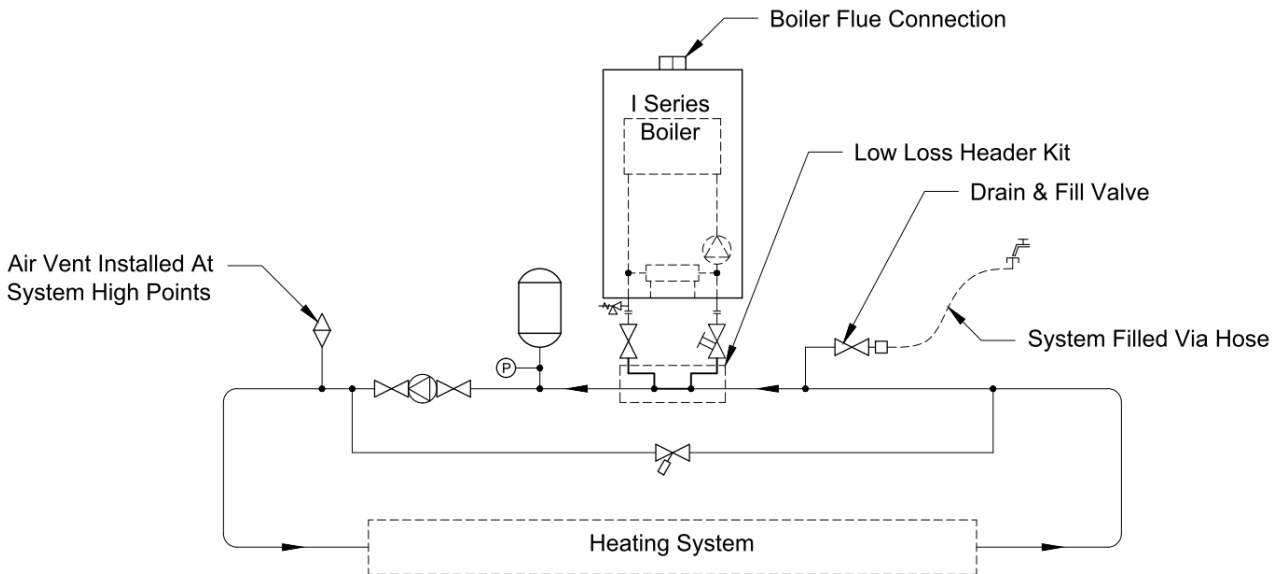


### 5.2.11 Typical System Schematics:

Below a schematic for a basic central heating system is shown, this is a simple single zone system where no additional circulation pump is needed (heating load >20kW):



For systems with a heating load greater than 20kW an additional circulation pump will be required, the system schematic shows the layout for a basic single zone system with the inclusion of a secondary circulation pump:

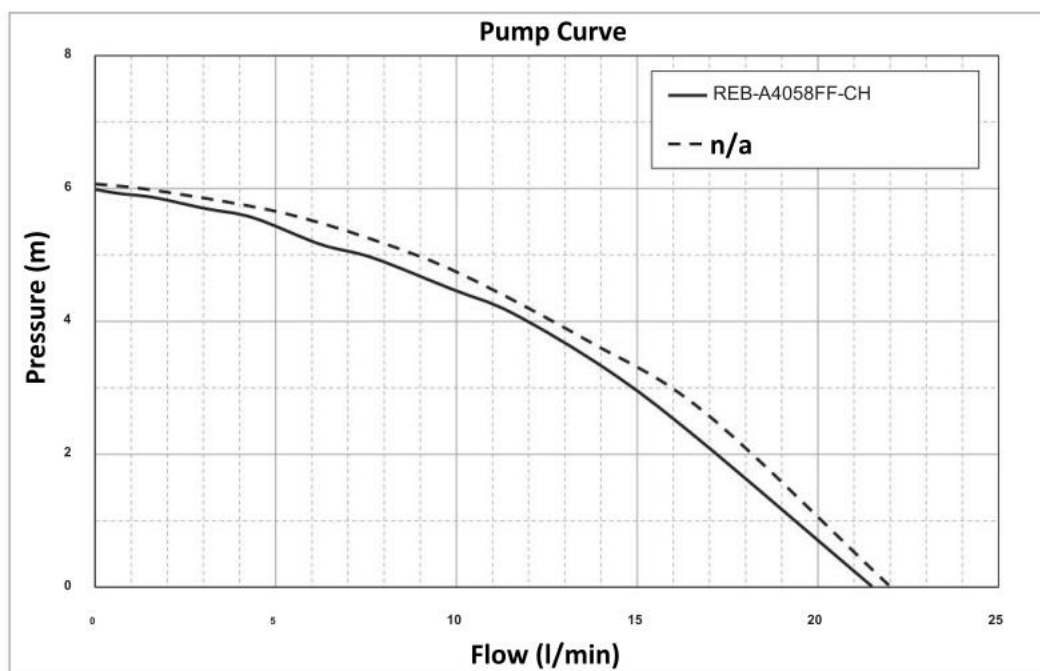


The key below explains the symbols used in the above schematics:

Key		

## 6.0 Circulation Pump:

The boiler's internal circulation pump curve is shown below:



The pump head available from the internal circulation pump is suitable for providing sufficient flow for systems with a heating requirement up to 20kW (3m head available @ 14l/min). For system with higher pump requirements and/or heating requirements greater than 20kW the boiler should be hydraulically separated from the system and an additional circulation pump added to the system (see sections 5.2.4 and 5.2.10).

The hydraulic separation of the boiler can be achieved by creating a suitable low loss header as specified in section 5.2.4 or by using a small buffer tank. The most suitable solution will be dependent on the system arrangement, installation space available, and installer preference.

For any systems designed by Central Heating New Zealand's engineering team the abilities of the internal circulation pump will be factored into the design and where required an additional circulation pump and hydraulic separation device included in the system design.

## 7.0 Commissioning

 **This section of the manual is intended for the installer.**

This boiler must be commissioned by a licensed professional. A trained and qualified professional must install the appliance, inspect it, and leak test the boiler before use. The warranty will be voided due to any improper installation.

Boiler commissioning is a procedure used after boiler installation to ensure the system and boiler are installed and set up correctly and boiler is safe for operation.










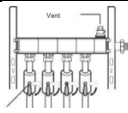



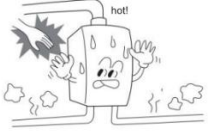


**Failure to properly commission the boiler as described in this section may result in unreliable and unsafe burner operation and reduced component life.**



### IMPORTANT

- The Fan will operate when power is initially provided to perform a safety check on the boiler.
- The boiler and its isolation gas valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 3.5 kPa
- Before the boiler is fired for the first time:
  - Ensure the boiler and system are fully de-aerated
  - Purge the gas line between the gas meter and boiler
  - Prime the pump (as described in this section)

### 7.1 Before Starting the Boiler:

	Read this manual in full and familiarize yourself with the commission steps prior to starting the appliance.	
	Confirm the correct gas type is being used and that the gas installation is correct and safe.	
	Check the power supply is connected correctly.	
	Check the water pressure is correct and that the system and appliance is free from leaks and air. Maintain a system fill pressure when cold of 1.0 – 1.5 Bar.	
	Confirm the flue installation is correct with no blockages or misaligned sections and that the boiler has an uninterrupted supply of air for combustion	
	While the boiler is operating the pipes will be very hot, take care to prevent burns or unintended access.	
	Do not store any flammable items on or around the boiler	

## 7.2 Filling & Flushing:

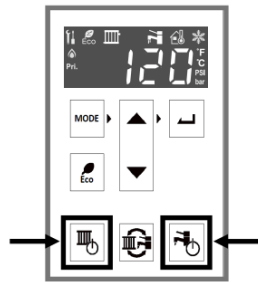


Do not fill the boiler unless permanent power is available. Freeze protection is not available if the boiler is not flushed & filled and supplied with power and gas.

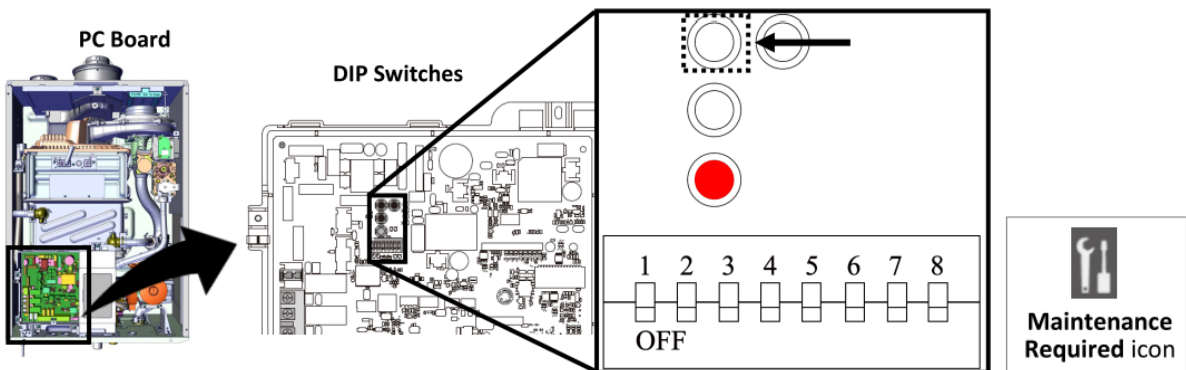
- 1- Ensure all boiler components are installed correctly
- 2- Open the air vent inside the boiler
- 3- Power on the boiler
- 4- Open the fill valve on the filling circuit.
- 5- Check the pressure on the controller and/or pressure gauge. Fill the boiler to a minimum of 1.4 bar water pressure and a maximum of 2 bar water pressure.
- 6- An E430 diagnostic code will be present until the boiler senses at least 0.9 bar water pressure
- 7- Check the heating system for leaks
- 8- Begin the deaeration process shown in the next section (Deaeration process)

## 7.3 Deaeration Process:

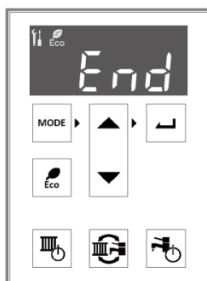
- 1- Confirm all heat emitters and pumps are connected to the piping system and are open.
- 2- Ensure the boiler is filled to a minimum of 1.3 bar water pressure and a maximum of 2.0 bar water pressure.
- 3- Remove the boiler front panel by removing the four screws that secure the panel.



- 4- On the PC Board, press and hold the top, left black button shown below. The **Maintenance Required** icon on the controller display will appear and initiate the deaeration process.



- 5- The deaeration process takes approximately 15 minutes for completion. After 15 minutes the display will show "End" (see below image). The commissioning process is complete.



- 6- On the PC Board, press the top left black button again to resume normal operation mode.
- 7- Operate the domestic hot water or central heating to ensure the boiler operates correctly.
- 8- On confirming that all air has been vented from the system close all vents in the boiler and piping system.

## 7.4 Bypass Deaeration:

Deaeration is an effective method of purging air from the boiler after the system has been filled or serviced. While the boiler is running the deaeration process, the **Maintenance Required** icon (see below image) appears on the controller display.



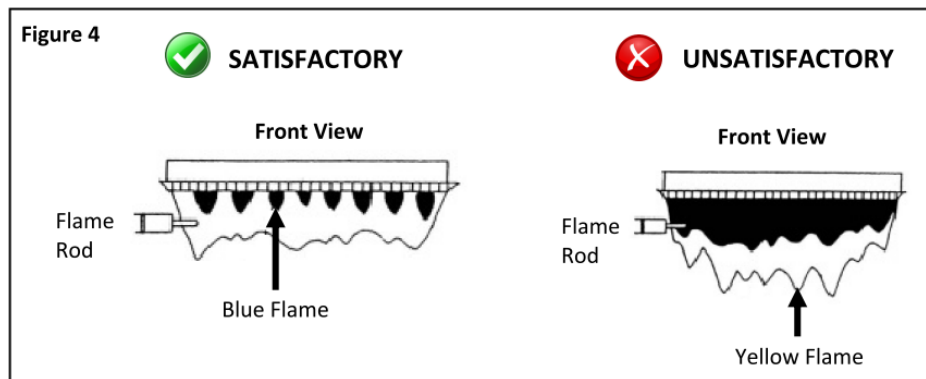
Do not bypass deaeration during commissioning or if the system pressure has dropped below 0.9 bar. If there is any chance that air has entered the system, deaeration is critical to prevent damage to the boiler.



***DO NOT** bypass the deaeration program during commissioning or if any part of the system has been opened or disconnected. Failure to properly deaerate the boiler and system may result in damage to the boiler, which is not covered by the boiler warranty.*

## 7.5 Check Operation

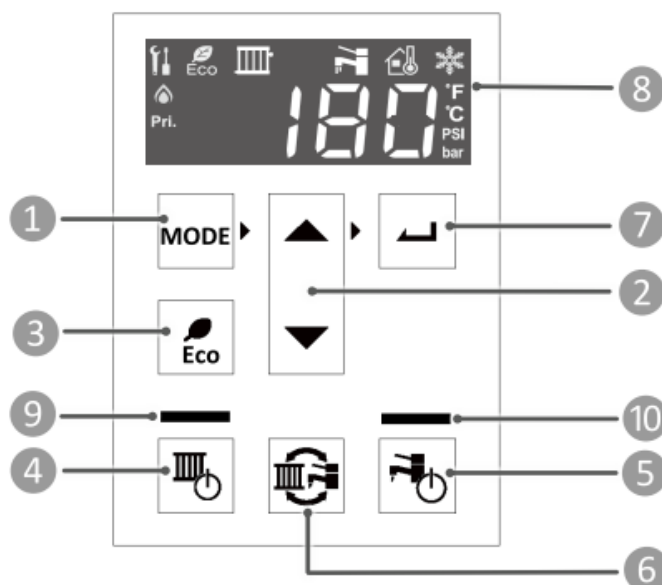
- 1- Check the normal operation sequence:
  - a. When you press the ON/OFF button, the LED display will illuminate, the combustion fan will begin to run if water is flowing, and the spark will ignite the main burner.
  - b. This boiler has an automatic ignition system. When the main burner has lit, the flame symbol for “in use” will glow red and the spark will stop.
- 2- Visual inspection of flame:
  - c. Check that the burner flames are operating normally. The flame can be seen through the circular window above the burner. When operating normally, the burner flame should burn evenly over the entire surface. The flame should be clear, blue, and stable. A yellow flame is abnormal, and maintenance is required (figure 4).



3- Reinstall the boiler front panel using the four screws to secure it.

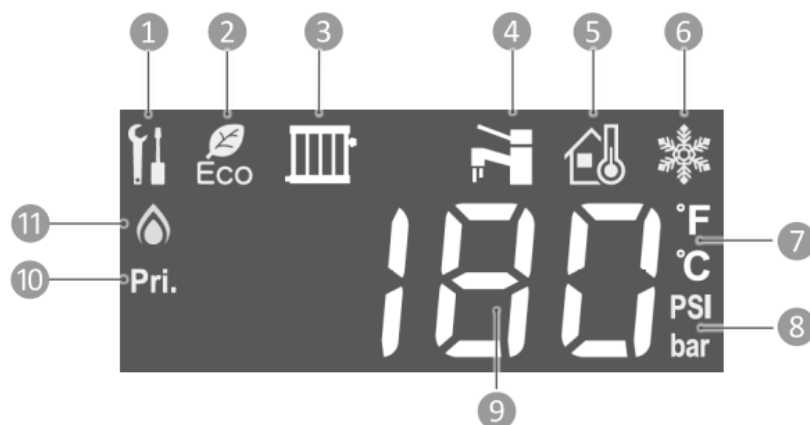
## 8.0 Operation:

### 8.1 Control Panel



- 1- **MODE**: select various boiler settings.
- 2- **UP/DOWN ARROWS**: Scrolls through available menu options including adjusting the temperature.
- 3- **ECO**: Selects Eco or Comfort operation mode.
- 4- **CENTRAL HEATING (CH)**: From the factory, this option is turned off by default. The boiler runs off thermostat inputs on the control board. Adjustments must be made by a trained and qualified professional for this mode to operate correctly.
- 5- **DOMESTIC HOT WATER (DHW) ON**: Press to run the boiler in Domestic Hot Water mode.
- 6- **SWITCHING OPERATION MODE**: Press to change the display between DHW and CH for temperature setting.
- 7- **SELECT BUTTON**: Press to select the option in the display window.
- 8- **DISPLAY WINDOW**: Display boiler status information. *See Display Window section for more information*
- 9- **CH BUTTON LED**: When the LED light above the CH button is illuminated, CH mode is active.
- 10- **DHW BUTTON LED**: When the LED light above the DHW button is illuminated, DHW mode is active.

## 8.2 Display Window



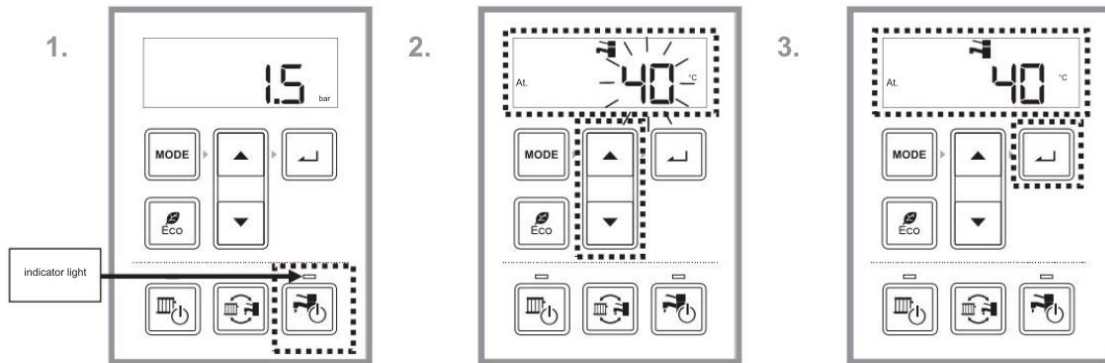
- 1- **MAINTENANCE MODE ICON:** Appears when the boiler is in Parameter Settings Mode, Deaeration Mode, Performance Data Mode, Error History Mode, etc.
- 2- **ECO SETTING ACTIVE:** Eco maintains temperature in the primary heat exchanger to provide quicker delivery of hot water to fixtures.
- 3- **CENTRAL HEATING MODE ACTIVE**
- 4- **DOMESTIC HOT WATER ACTIVE**
- 5- **OUTDOOR TEMPERATURE SENSOR CONNECTED**
- 6- **FREEZE PROTECTION ACTIVE**
- 7- **UNIT OF MEASUREMENT FOR TEMPERATURE**
- 8- **UNIT OF MEASUREMENT FOR PRESSURE**  
**Note:** Pressure and temperature are alternately displayed on the controller.
- 9- **SET POINT TEMPERATURE, CURRENT TEMPERATURE OR CURRENT PRESSURE, AND DIAGNOSTIC INFORMATION**  
**Note:** Pressure and temperature are alternately displayed on the controller.
- 10- **PRIORITY CONTROL**
- 11- **“IN USE” LIGHT IS RED**(boiler has fired and is running)

## 8.3 Basic Settings

### 8.3.1 Domestic Hot Water Temperature Setpoint

To adjust the domestic hot water setpoint, follow the steps below.

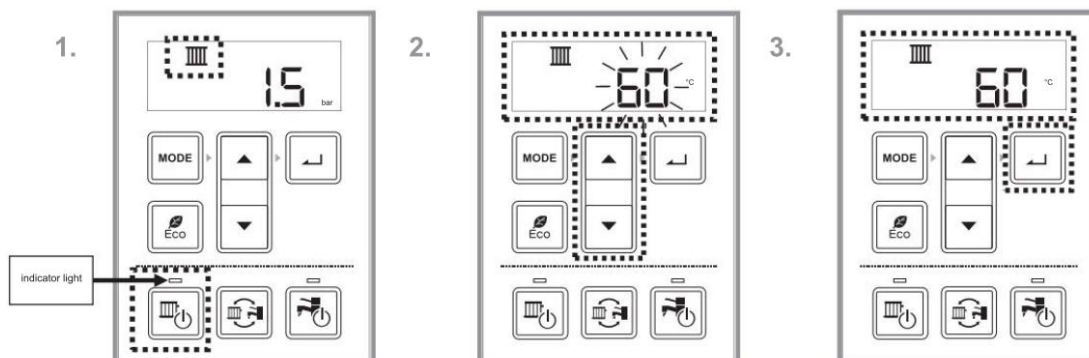
- 1- If the indicator light above the DHW button is **not** illuminated, press the DHW button. If the LED is illuminated, proceed to step 2.
- 2- Adjust the temperature with the **up** and **down** arrows until the desired temperature is displayed. Note, you may also need to press the **switch operation mode** button to ensure the tap symbol is displayed on the screen.
- 3- Press the **select** button to confirm the temperature. The hot water set point will be displayed for a few seconds before returning to standby.



### 8.3.2 Central Heating Temperature Setpoint

To adjust the central heating temperature setpoint, please follow the steps below.

- 1- Press the switch operation mode button until the radiator symbol appears on the screen.
- 2- Adjust the temperature with the up and down arrows until the desired temperature is displayed.
- 3- Press the select button to confirm the temperature. The heating set point will be displayed for a few seconds before returning to standby mode.





### 8.3.3 Domestic Hot Water Operation Modes

Domestic Hot Water Comfort modes are settings that would either supply quicker delivery of hot water fixtures or save energy in the boiler operation.

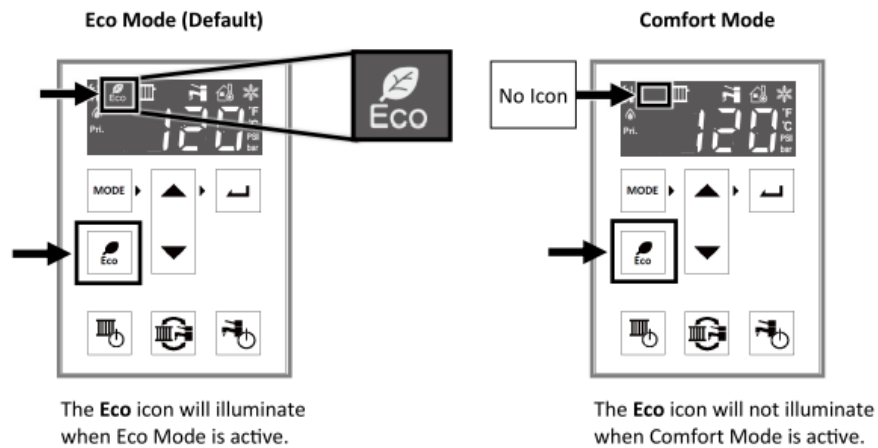
- **Eco Mode (default) (Eco icon illuminates)**

The boiler operates and produces hot water; however, it will not maintain the primary heat exchanger temperature for quicker hot water production. This selection saves some energy but requires a longer time to provide hot water to the hot water fixtures.

- **Comfort Mode (Eco icon does not illuminate)**

The boiler maintains the primary heat exchanger temperature to quickly deliver hot water to the plate exchanger. This selection provides the quickest delivery of hot water to hot water fixtures but uses more energy.

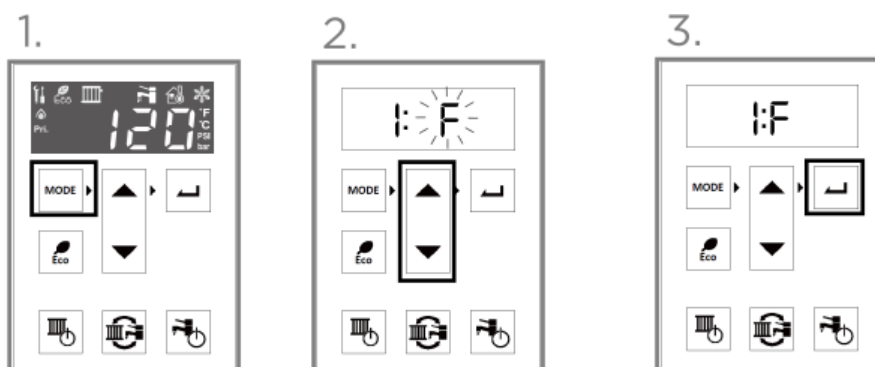
By default, Eco mode is enabled (turned on). To enable (turn on) comfort mode, press the **Eco** button on the controller.



### 8.3.4 Units of Measurement

To change the units of measurements appearing on the boiler display, follow the steps below. Standard units for metric units' system are **°C** and **bar**.

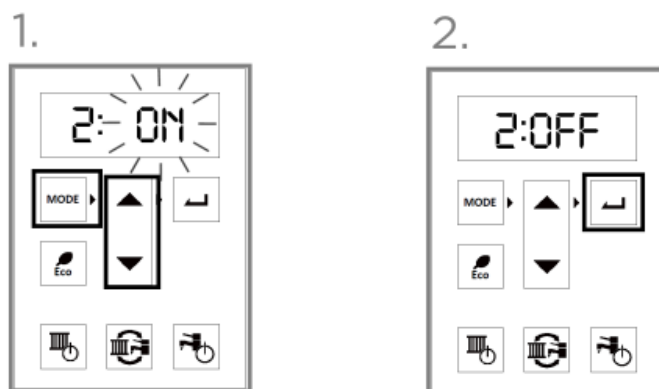
- 1- Press the **Mode** button.
- 2- Press **Up** or **Down** arrows to select a unit.
- 3- Press the **Select** button.



### 8.3.5 Control Panel Sound

To turn the control panel sound on or off, follow the steps below.

- 1- Press the **Mode** button twice. **2: ON** should appear on the display. Press the **Up** or **Down** arrows to select ON or OFF.
- 2- Press the **Select** button.



### 8.3.6 Child Lock

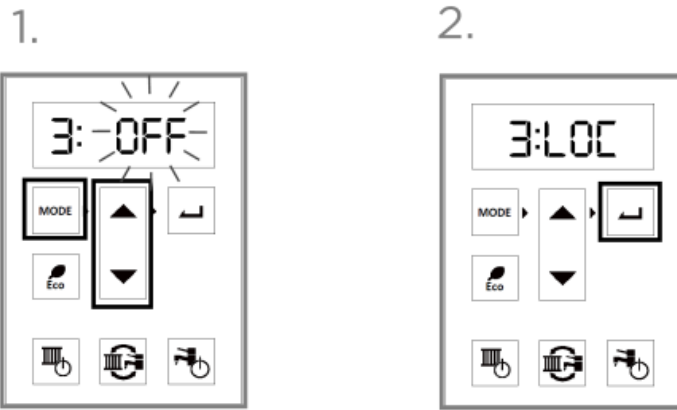
To enable/disable the child lock function, please follow the steps below.

- When Child Lock Mode is enabled, the only function available is to turn off Central Heating (by pressing the **Central Heating** button on the controller); this occurs only if DIP switch 2 is set to the ON position. See section “8.5.1 PC Board DIP Switches” for more information)
- If using multiple controllers, Child lock can be set only on the controller that has priority.
- If a button is pressed when the Child Lock function is engaged, “LOC” will be displayed on the controller.



- 1- Press the **Mode** button three times. **3: OFF** should appear on the display. Press the **UP** or **Down** arrows to select:
  - OFF – Child Lock OFF
  - LOC – Child Lock ON

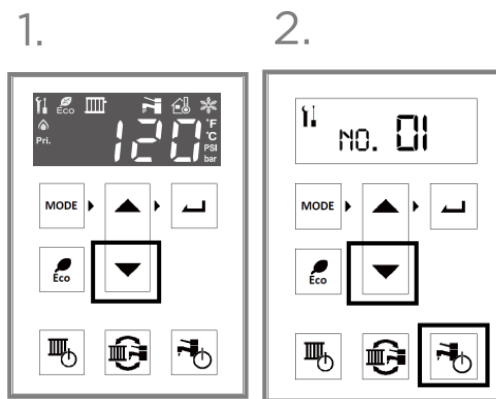
2- Press the **Select** button



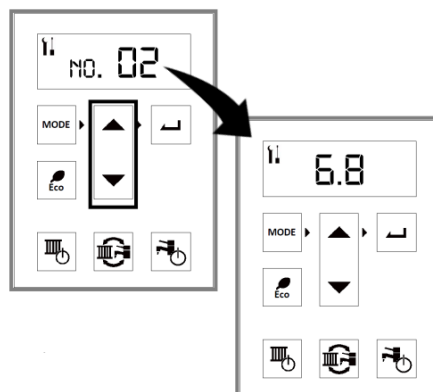
### 8.3.7 Performance Data

To view performance data, follow the steps below.

- 1- Press and hold the ▼ (Down) button for two seconds.
- 2- While continuing to hold the ▼ (Down) button, press and hold the **Domestic Hot Water** button (press and hold both buttons down at the same time).

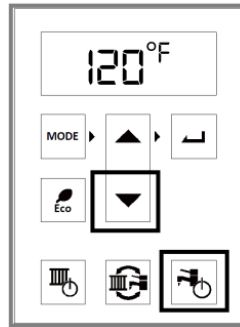


- 3- Use the ▲ (Up) and ▼ (Down) buttons to scroll to the desired performance data number described in the **Performance Data Table** in this section. The data for the performance number automatically appears in the display.



- 4- To exit Performance data: While continuing to hold the ▼ (Down) button, press and hold the **Domestic Hot Water** button (press and hold both buttons down at the same time).

4.



### 8.3.7.1 Performance Data Table

**→ IMPORTANT**

Unit of measurement (°F/°C, PSI/bar, and GPM/LPM) will vary depending on unit of measure selection.

#	DATA	UNIT
01	Water Pressure	PSI/bar
02	Water Flow Rate	x0.1 GPM/LPM
03	Supply Temperature	°F/°C
04	Return Temperature	°F/°C
05	Freeze Protection Temperature	°F/°C
06	Exhaust Temperature	°F/°C
07	Outgoing Temperature	°F/°C
08	Inlet Temperature	°F/°C
10	Heat Exchanger Outlet Temperature	°F/°C
11	Fan Frequency	Hz
13	Water Flow Control Position	0=Mid, 1=Open, 2=Closed
14	Bypass Flow Control Position	Degrees of Opening
15	3-Way Valve Control Position	0=Mid, 1=DHW, 2=CH
16	3-Way Valve Control Cycles	x100

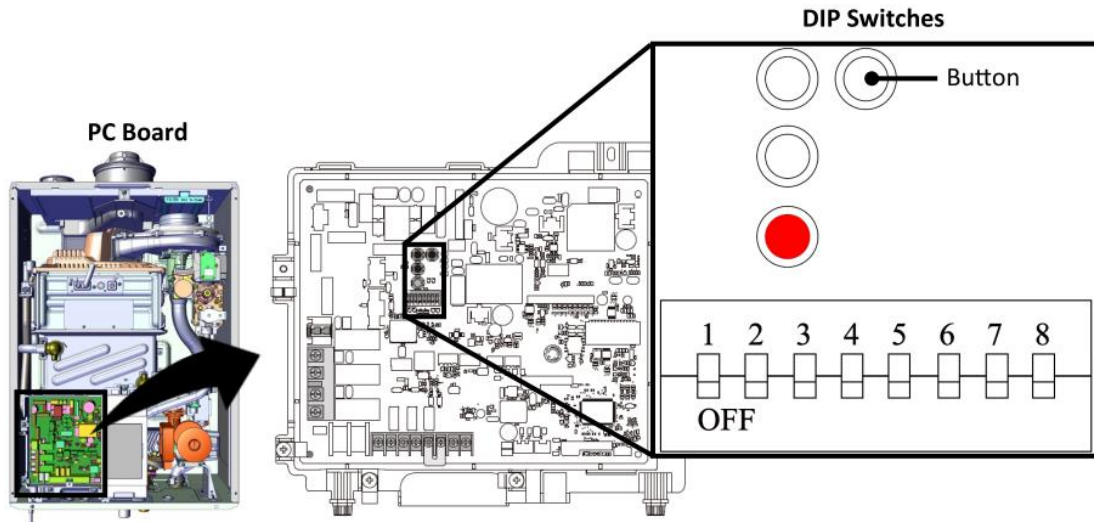
#	DATA	UNIT
17	Venturi Position	0=Closed, 1=Open
18	Venturi Cycles	x100
20	Pump Cycles	x100
21	Pump Hours	x10 Hours
22	Pump for Boiler	0=OFF, 1=ON
23	Pump for System (Pump 1)	0=OFF, 1=ON
24	Pump for System (Pump 2)	0=OFF, 1=ON
31	Outdoor Temperature	°F/°C
32	Additional Controllers Connected	*
40	Energization Hours	x100 Hours
41	Combustion Hours	x10 Hours
42	Combustion Cycles	x100
43	Combustion Hours (DHW)	x10 Hours
44	Combustion Cycles (DHW)	x100
45	Commissioning Cycles	x1

## 8.4 Forced Hi/Low Fire Modes

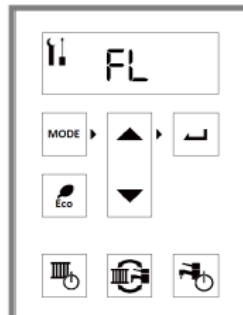


This section should be performed by a licensed professional.  
Consumers should never attempt any action that they are not qualified to perform.

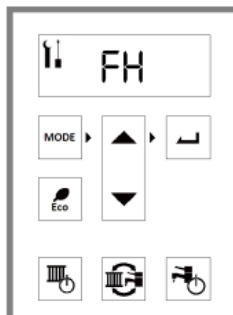
- 1- Remove the boiler's front panel by removing the four screws that secure the panel.
- 2- Locate the PC Board (lower left side of unit)
- 3- Press and hold the right-side, black button.



- 4- The controller displays **FL** (the boiler is now in forced low fire condition)



- 5- Press the right-side, black button again. The controller now displays **FH** (the boiler is now in forced high condition).

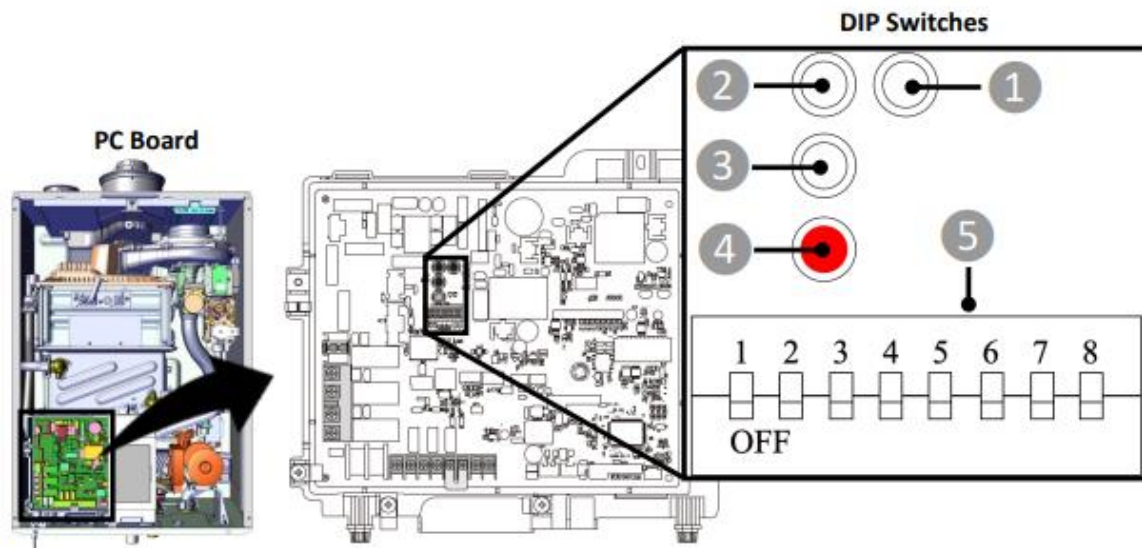


- 6- To enter back into normal operation, press the right-side, black button. The controller now displays normal operation mode.

## 8.5 Parameters and Features accessible via PCB

### 8.5.1 Accessing the PCB / DIP Switches

To access the PCB, remove the boiler's front panel by removing the four screws that secure the panel in place. Locate the buttons and DIP switches using the diagram below.



Item #	Description	Function	Notes
1	Button 1	Forced high fire/low fire	Refer to Commissioning section 8.4 (combustion)
2	Button 2	Deaeration function	Refer to Commissioning section 7.3 (deaeration)
3	Button 3	Data transfer mode	Used when replacing PCB. Refer to instructions with replacement part.
4	Button 4 (red button)	Enable parameter changes from display	Refer to section 8.6, parameters accessible via boiler display
5	DIP switches	DIP switch settings	Refer to DIP switch chart below

## 8.5.2 DIP Switch Settings Reference Chart

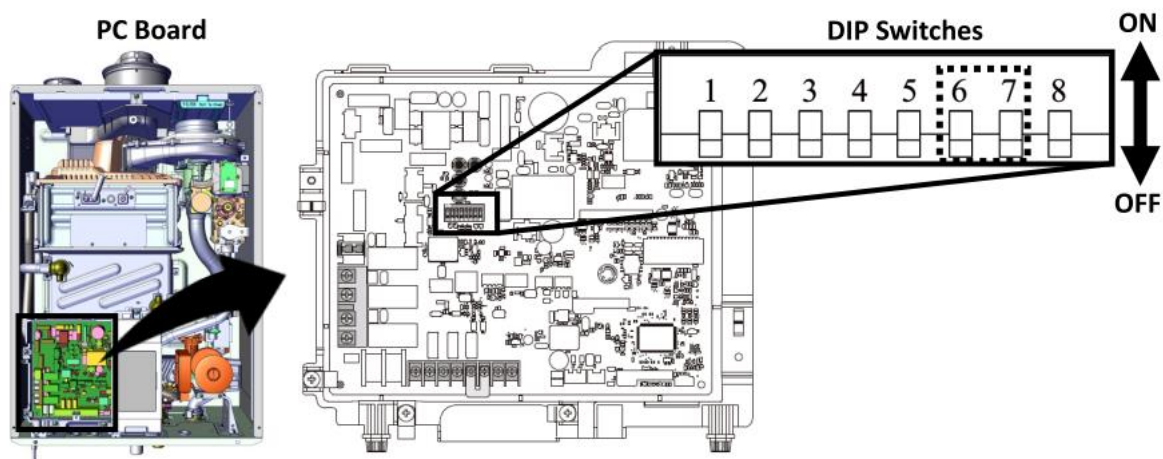
Dip Switch number	Function	Description	OFF (Default)	ON
1	Outdoor Temperature Sensor	Enables or Disables the Outdoor Temperature.	Outdoor Temperature Sensor not in use	Outdoor Temperature Sensor in use
2	Thermostat Usage	Changes the method in which the boiler is controlled, cycles between external thermostat or boiler control panel.	<b>Central Heating ON</b> button used (control panel). Boiler fires based on return water temperature	External Thermostat used
3	DHW Recirculation	Enables the DHW recirculation function for Pump 2 connection	Pump 2 connection enabled for second CH zone pump.	DHW recirculation ON (Pump 2 connection for DHW recirculation pump).
4	Simultaneous Central Heating and Domestic Hot Water	Enables simultaneous operation between Central Heating and Domestic Hot Water.	Domestic Hot Water Priority (Heating OR hot water)	Simultaneous Central Heating and Domestic Hot Water permitted.
5	Gas Valve Solenoid	Shuts down the integrated solenoid gas valve manually	Normal Operation	Fixed Closed (prevents boiler operation)
6	Altitude Setting	Sets the appropriate elevation of the boiler installation	Depends on altitude (See altitude section 8.5.3 for specific values)	
7	Altitude Setting			
8	Vent Type Selection	Not used in NZ ( <b>do not alter</b> )	N/A	N/A



### 8.5.3 Altitude settings

Depending on where the boiler is installed, it may be required to adjust the altitude setting. To complete this, please follow the below.

- 1- Remove the boiler's front panel by removing the four screws that secure the panel.
- 2- Locate the PC Board (lower left side of unit) (see below image).
- 3- Locate the DIP switches on the PC Board (see below image).
- 4- Adjust DIP switches 6 and 7 to on or off based on the altitude settings in the table below.



ALTITUDE	DIP Switch 6	DIP Switch 7
0-750 m	OFF	OFF
751-1500 m	ON	OFF



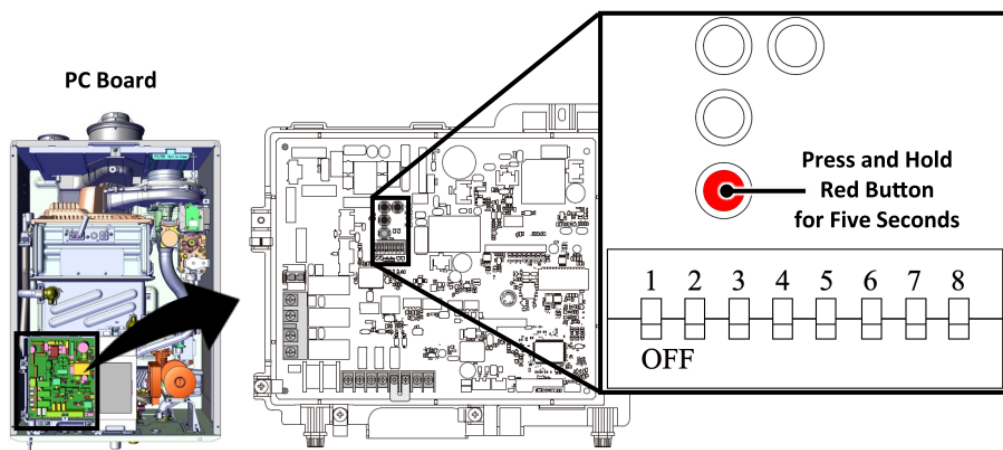
When a DIP switch is adjusted, it is not necessary to adjust the gas pressure setting for high altitude.

## 8.6 Parameters & Features accessible via boiler display.

### 8.6.1 How to access parameters on the boiler display

To access the parameters available on the boiler display, please complete the below steps.

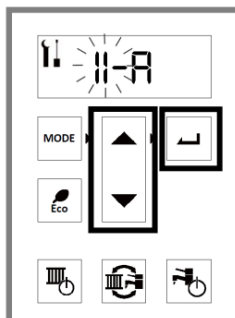
- 1- Remove the boiler's front panel by removing the four screws that secure the panel.
- 2- Locate the PCB (Lower left side of unit)
- 3- Locate the red button on the PCB
- 4- Press and hold the red button for five seconds



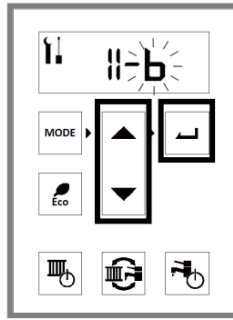
- 5- Press the **Mode** button on the controller



- 6- Press the ▲ (Up) or ▼ (Down) arrows to select a parameter setting number. Then, press the Select button.



- 7- Press the ▲(Up) or ▼(Down) arrows to change the selection for the setting number (such as 11-A or 11-b)  
Then, press the **Select** button on the controller



- 8- To exit parameter settings and enter normal operation mode, press either the red button on the PC Board or the **Mode** button on the controller.

### 8.6.2 Parameter Settings Table

Parameter Number	Setting Description	Selection			
		A	B	C	D
00	Pressure indication on the Control Panel	Yes	No		
	The current pressure will cycle on the controller display. If an external pressure gauge is present, it is permissible to change the setting to “No.”				
01	Outdoor Reset Curve	Curve 1	Curve 2	Curve 3	Curve 4
	This parameter is available when Dip Switch 1 is in the <b>ON</b> position. Select the proper curve from below. See section 8.6.3 Outdoor Reset Control for more information. <b>Curve 1:</b> Standard fan coils, high efficiency fan coils, radiators. <b>Curve 2:</b> Underfloor Heating. <b>Curve 3:</b> High temperature fan coil or undersized low level fan coil. <b>Curve 4:</b> Custom curve based on customer input.				
02	Boost	No	30 Minutes	60 Minutes	
	This parameter is available when Dip Switch 1 is in the <b>ON</b> position. Boost Mode increases the CH set temperature above the outdoor reset curve target when the boiler has been running on an unusually long call for heat.				

03	Maximum <b>Outdoor Temperature</b> the Boiler will Fire in CH Mode.	No Maximum	25°C		
	This parameter is available when DIP switch 1 is in the <b>ON</b> position. This sets the maximum outdoor temperature the boiler will fire in CH mode. This can prevent the boiler from firing in warm outdoor temperatures.				
10	Maximum DHW Set Point Temperature	60°C	49°C		
	This selects the maximum DHW set point temperature. When set to 60°C, it is required to use a mixing /tempering valve to prevent scalding				
11	Time diverter valve stays in DHW position (Only relevant in DHW priority mode, when DIP switch 3 and 4 is in the 'OFF' position)	3 Minutes	10 Seconds		
	This selects the length of time the 3-way valve will stay in the DHW position after using DHW even if a CH demand is present. While the 3-way valve is in the DHW position, this allows quicker delivery of hot water.				
12	DHW Recirculation	Dedicated Return	Crossover Valve		
	This parameter is available when DIP switch 3 is in the ON position. This sets the DHW recirculation piping mode. In most systems, this should be set to 'Dedicated Return'				
13	DHW Recirculation with Timer Relay Input	Yes	No		
	This parameter is available when DIP switch 3 is in the ON position. This enables an external timer to control the DHW recirculation to correspond to customer needs more directly. This should be set to 'No' for most circumstances.				
14	CH temperature limitation during Simultaneous Operation	Yes	No		
	This parameter is available when DIP switch 3 or 4 is in the 'ON' position. This enables the CH temperature setting to be limited during simultaneous DHW and CH operation. This can prevent unintentionally supplying high temperature water to low temperature CH applications. During simultaneous operation. When selecting 'NO' limitation, the flow temperature may be up to 82°C <b>regardless of the temperature set on the boiler.</b> ensure that the CH system and heating application is designed for high temperature.				

15	3-way valve position during simultaneous operation	Normal	Additional CH		
	<p>This parameter is available when DIP switch 3 or 4 is in the ON position.</p> <p>This adjusts the 3-way valve position to open the CH side more when the flow of the CH side is reduced due to DHW demand. This may restrict the DHW capacity.</p>				
16	Limescale (LC) Check	Available	No detection		
	<p>This setting enables the boiler to check for limescale conditions in the DHW side of the plate heat exchanger. When detecting lime scale, an LC error code will appear on the display. Once limescale is removed by flushing the plate heat exchanger, the code will disappear.</p>				
17	Adjust DHW Temperature Setting	0°C	1°C	2°C	3°C
	<p>This setting enables the DHW output temperature to be adjusted without adjusting the set point temperature to make up for system temperature losses</p>				
40	Linked Operation between CH Pump 1 and 2	No	Yes (linked together)		
	<p>This parameter enables linked operation between the CH Pump 1 and 2. For example, when T/T (thermostat) is active, both pump 1 and 2 are ON. The T/T wire must be connected to the T/T1 connection.</p> <p>When it is desired to utilize DHW Recirculation via DIP switch 3, this parameter will not be available. The DIP switch must be in the OFF position for this parameter to be enabled. This setting is primarily for an application that requires two pumps for one zone, such as in use with an injection loop or similar system.</p>				
41	Linked Operation between Main Boiler Pump and CH Pump 1	No	Yes (Linked together. If selected, hydraulic separation is required)		
	<p>This parameter is only in use when DIP switch 2 is in the ON position.</p> <p>This enables the linked operation between the main boiler pump and CH Pump 1. For example, when the main pump is on, pump 1 is also on. When DIP switch 2 is in the OFF position, the pumps are automatically linked.</p>				

42	Main Pump Runs when the Target Temperature is Achieved.	Continuously	Intervals		
	This selects the mode of the main pump running when the target setpoint is achieved. This setting alters whether the pump runs on intervals to reduce operation, or continuously runs to reduce wait time between re-ignition. Intervals are 10 minutes ON and 30 minutes OFF.				
43	External Pump Runs When the Setpoint Temperature is Achieved	Same as Main Pump	Does Not Run		
	This selects the mode of the external pump(s) running when the target setpoint is achieved. The setting dictates whether the external pump will stop running to reduce pump operation time or operates the same as the main pump to enable remaining heat from the heat exchanger to be delivered to the system.				
44	External Pump Runs When Frost Protection is in Operation	Does not Run	Same as Main Pump (hydraulic separation required)		
	This selects how the external pump operates when frost protection is in operation. The setting dictates whether the external pump will stop running to reduce pump operation time or operates the same as the main pump to enable the boiler to deliver remaining heat to the system. The temperature of the water being delivered to the system may not be as warm as desired with this setting 'ON'.				
45	Frost Protection Level	Default	When boiler is installed in a warm room		
	Selecting 'B' will prevent the boiler from operating in frost protection mode more than absolutely necessary.				
46	The differential Temperature from ceasing fire to reignition i.e. how far the temperature can drop before firing again (based on return thermistor).	Normal	Quick		
	<b>CH flow temp setpoint (flow temperature the boiler is set to run at)</b>	<b>Temperature Drop</b>			
	75-82°C	15°C	8°C		
	30-74°C	8°C	5°C		
47	Off time after the boiler has reached setpoint temperature in CH mode	Normal (3 minutes)	Quick (10 seconds)		
	This selects the time in which the boiler will not be able to reignite for CH after the burner has shutdown. This setting is to prevent frequent ON/OFF operation (cycling)				
49	Boiler shutdown based on high return water temperature.	Yes	No		
	This setting determines whether the boiler will shut down at high return water temperatures. This is to decrease the off-cycle time even though the return temperature is warm.				

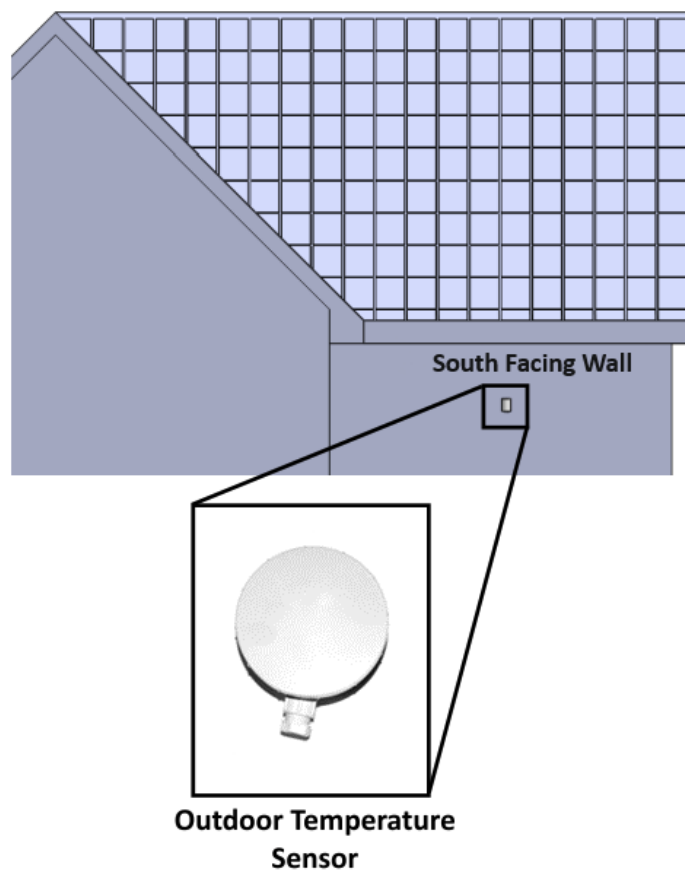
A0	Gas Type	Natural Gas	LPG		
	For selecting gas type when conducting gas conversion				

### 8.6.3 Outdoor Reset Control

Outdoor reset is built-in function to help maximize the efficiency of the boiler. The design of this function is to adjust the target temperature of the boiler relative to the outdoor ambient temperature via the four outdoor reset curve options included in the boiler parameters. The outdoor ambient temperature is observed via the outdoor temperature sensor.

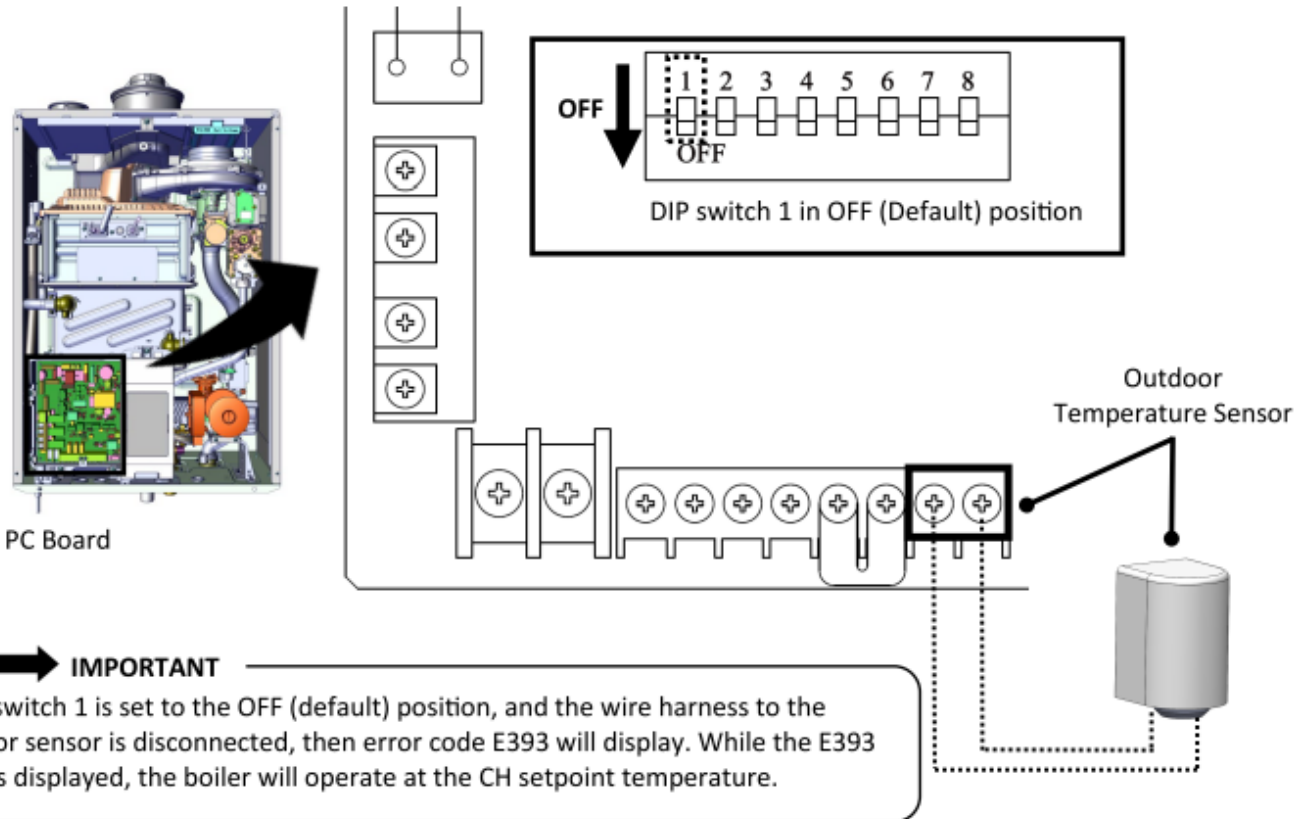
#### 8.6.3.1 Outdoor Temperature Sensor

The outdoor temperature sensor should be mounted on a South facing wall of the house below an eave to avoid direct sunlight (to prevent obtaining a false reading of the outdoor temperature). The sensor should also be mounted away from any vent, duct, or other device that may create an artificial heat source. The sensor should then be wired back to the outdoor temperature sensor terminal on the boiler. Refer to the following sections for more information.



### 8.6.3.2 Weather compensation

1. Remove the boiler's front panel by removing the four screws that secure the panel.
2. Locate the PC Board (lower left side of unit).
3. Connect the outdoor sensor to the terminals shown below using minimum 18 AWG wiring to the two terminals provided in the enclosure.
4. Locate the DIP switches on the PC Board (see below). Ensure that DIP switch 1 is in the OFF (Default) position (this ensures the boiler will operate based on the outdoor temperature).
5. Set parameters 01 - 03 as appropriate for your application (see Parameter Settings Table for more information).



### 8.6.3.3 Weather Compensation Temperature Guidelines

Below are some typical target temperatures for various heat emitters. These are basic guidelines, if you are unsure check with the heating design engineer.

**Note:** If temperatures lower than 40°C are necessary, a mixing valve may be needed in the system.

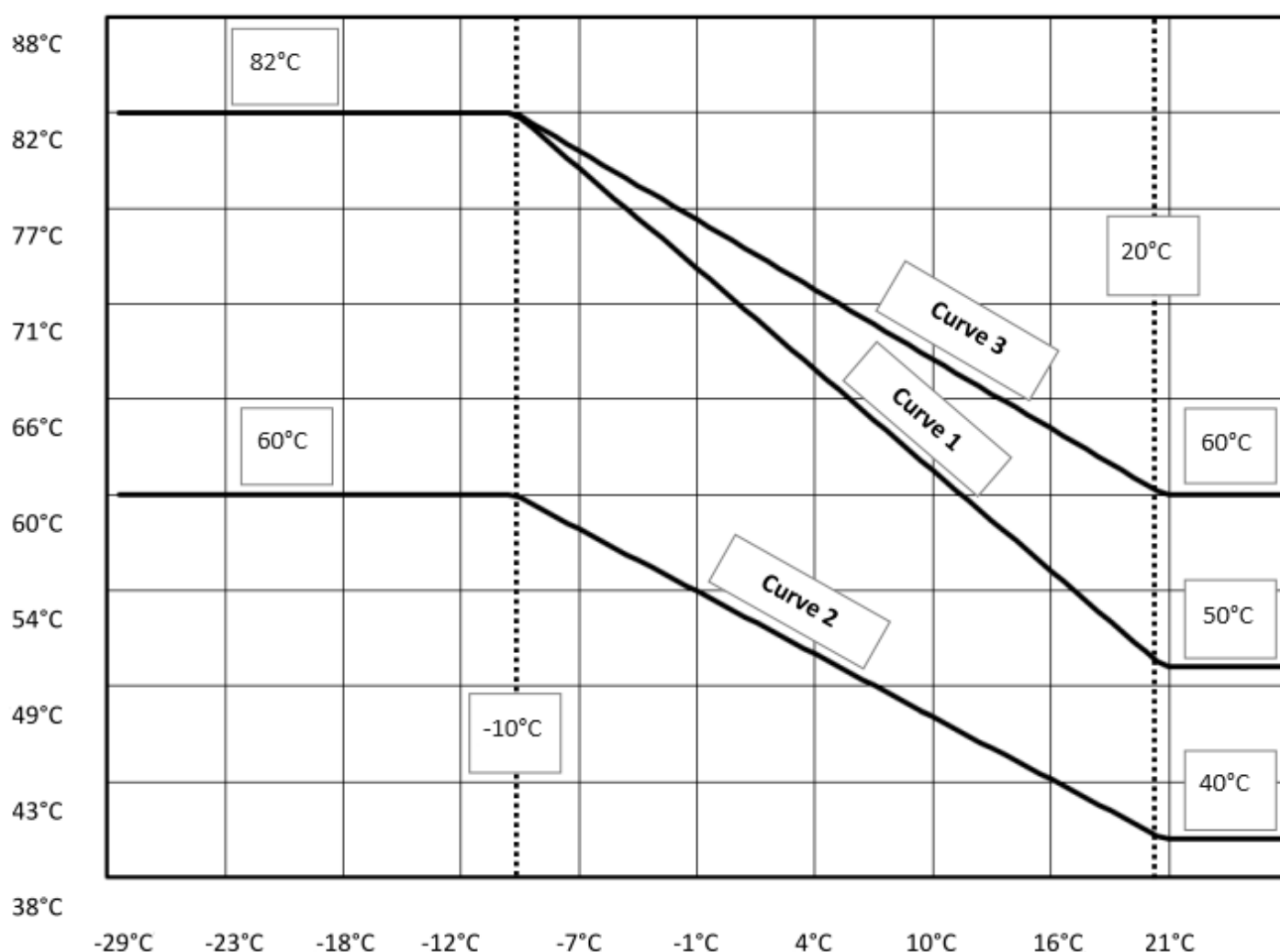
Type of Heat Emitter	Frequent minimum supply temperature	Frequent maximum supply temperature
Fan Coils	48 - 60°C	60 - 82°C
Radiators	32 - 48°C	60 - 82°C
Underfloor Heating	38 - 48°C	48 - 65°C



### 8.6.3.4 Weather Compensation Curves

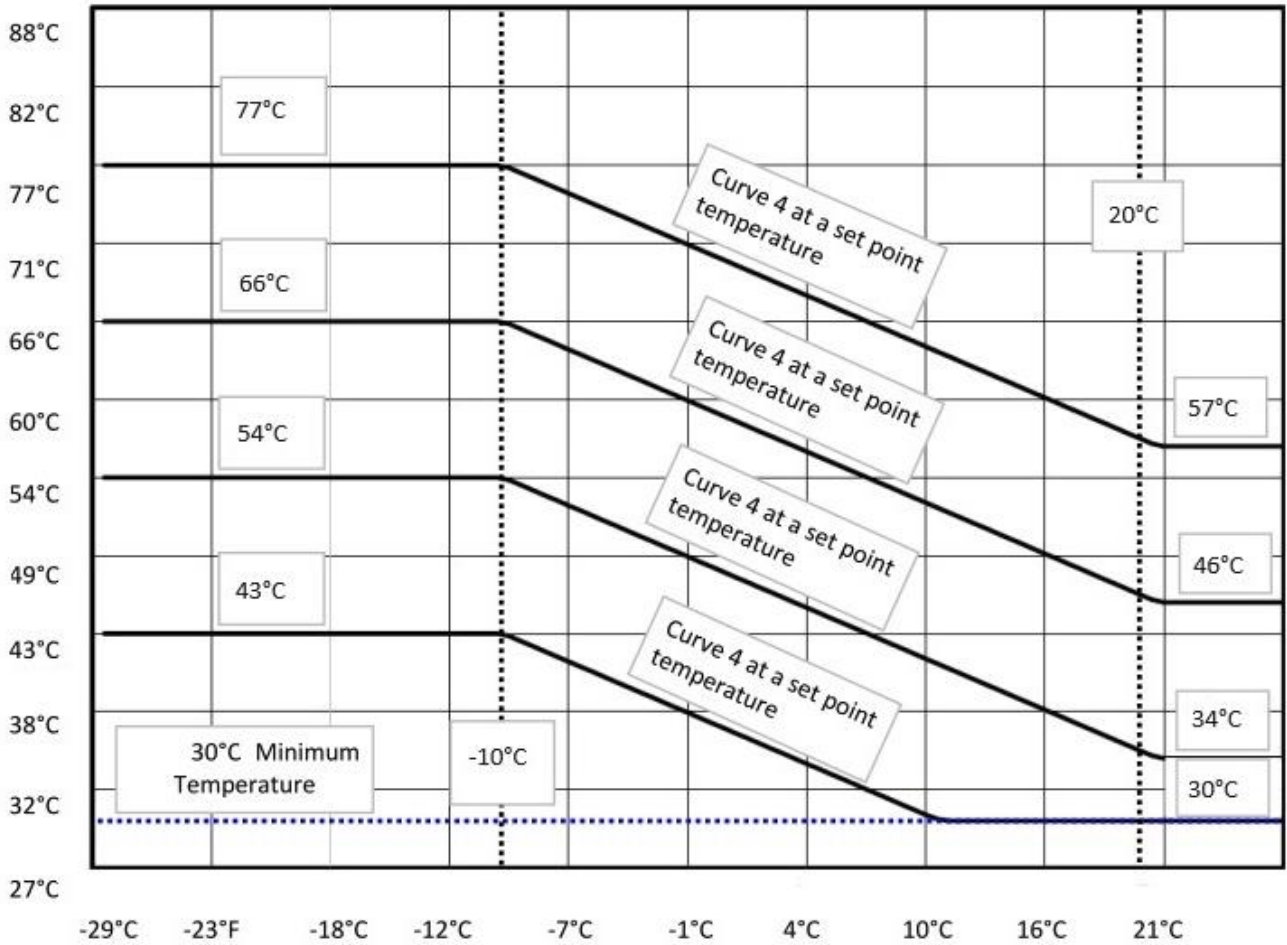
The boiler has four outdoor compensation heating curves, which are different target temperature lines dependent on the outdoor temperature. The selected curve should be based off the type of heat emitter and the target temperature desired. The heating curves are described below.

Curve Number	Heat Emitter	Maximum supply temperature at -10°C outdoor temperature	Minimum supply temperature at 20°C outdoor temperature
1 (default)	Standard fan coil, high efficiency fan coil, cast iron or panel radiators	82°C	50°C
2	Underfloor heating	60°C	40°C
3	HT fan coil or undersized low level fan coil	82°C	60°C
4	Custom curve based on customer input (see graph curve 4)	Setting temperature on the controller	Setting temperature on the controller (20°C)



## Curve 4

Curve 4 is a custom curve based on the target setpoint temperature of the boiler the customer selects. The maximum temperature is the target temperature. The minimum temperature is 20°C lower than the target temperature with a minimum of 30°C. See example curves below.



## Select Compensation Curve

To select the desired weather compensation curve, access the parameters (as shown in section “8.6.1 Parameter Settings) and select parameter 01. Then, select the desired curve.

Parameter Number	Setting Description	Selection			
		A	B	C	D
01	Weather Compensation Curve	1	2	3	4

## 8.7 Fault Codes and Diagnostics

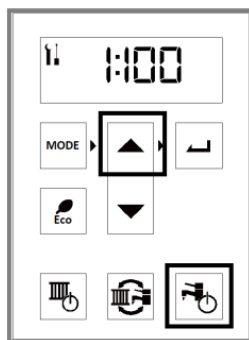


Some of the checks below should be performed by a licensed professional. Consumers should never attempt any action that they are not qualified to perform.

### 8.7.1 Display Diagnostic Codes

To display diagnostic codes, follow the steps below.

- 1- Press and hold the **Domestic Hot Water** button for two seconds, and then the ▲ (Up) button (hold both buttons at the same time).
- 2- The last nine maintenance codes display and flash one after the other.
- 3- To exit diagnostic codes and return the boiler to normal operation, press, and hold the Domestic Hot Water button for two seconds, and then the ▲ (Up) button (hold both buttons at the same time).



### 8.7.2 Reset Diagnostic Codes

To reset diagnostic codes, either the **Central Heating** or **Domestic Hot Water** button on the control panel will be blinking. Press the button to reset the code.

#### ▶ IMPORTANT

- Diagnostic codes that occur during DHW operation may be able to reset by turning off the faucet.
- Some diagnostic codes may not reset by pressing the CH or DHW buttons. If this is the case, contact your service provider for troubleshooting assistance.

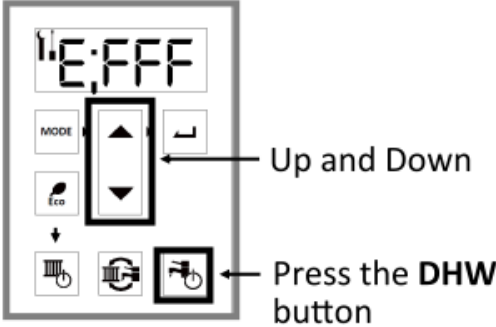
### 8.7.3 Diagnostic Codes

Code	Symptom	Cause/Troubleshooting
021	Continuous DHW	<ul style="list-style-type: none"> <li>✓ This code will display when DHW is in continuous operation for extended periods of time.</li> <li>✓ Ensure there are no open taps</li> <li>✓ Ensure there are no leaks in fixtures or the plumbing system</li> </ul>
100	Air supply or exhaust blockage/condensate trap is full	<ul style="list-style-type: none"> <li>✓ Fan current initial check error</li> <li>✓ Ensure condensate line and trap is not blocked</li> <li>✓ Ensure internal air filters is clean with no obstruction</li> <li>✓ Ensure high altitude setting is set properly (see High Altitude Setting).</li> <li>✓ Ensure combustion air and exhaust vents are not blocked and the approved venting materials are being used.</li> <li>✓ Ensure either the exhaust ring or intake cap is removed properly.</li> <li>✓ Ensure vent length is within limits.</li> <li>✓ Check fan for debris and ensure wheel turns freely.</li> <li>✓ Verify fan check valve is not stuck between fan casing and burner body.</li> </ul>
110	No Ignition (unit not turning on)	<ul style="list-style-type: none"> <li>✓ Ignition Error.</li> <li>✓ Check that the gas is turned on at the boiler, gas meter.</li> <li>✓ If the unit is installed in an LPG system, ensure that there is gas in the tank.</li> <li>✓ Bleed all air from the gas lines.</li> <li>✓ Check the ground wire for the PC Board.</li> <li>✓ Ensure the flame rod wire is connected.</li> <li>✓ Ensure the igniter is operational.</li> <li>✓ Ensure the venting is installed in accordance with this manual.</li> <li>✓ Check that the surface of the electrode and flame rod are clean.</li> <li>✓ Check gas solenoid valves for open or short circuits.</li> <li>✓ Verify gas orifice (nozzle) installed is correct for the gas system the unit is installed in.</li> <li>✓ Check flame rod voltage to ground during ignition.</li> </ul>
120	Flame Failure	<ul style="list-style-type: none"> <li>✓ Boiler has flame failure.</li> <li>✓ Check that the gas is turned on at the boiler, gas meter.</li> <li>✓ If the unit is installed in an LPG system, ensure that there is gas in the tank.</li> <li>✓ Ensure the venting is installed in accordance with this manual.</li> <li>✓ Ensure the flame rod wire is connected.</li> <li>✓ Ensure the gas type and inlet gas pressure are correct.</li> <li>✓ Bleed all air from the gas lines.</li> <li>✓ Check the ground wire to the PC Board.</li> <li>✓ Check flame rod voltage to ground during ignition.</li> </ul>
140	Heat Exchanger Overheat	<ul style="list-style-type: none"> <li>✓ Overheat switch is tripped.</li> <li>✓ Measure the resistance of the Overheat Switch.</li> <li>✓ Check the heat exchanger surface for hot spots which may indicate blockage due to scale buildup.</li> <li>✓ Ensure the boiler pump is not locked up.</li> <li>✓ Ensure that all the valves in the CH circuit are open.</li> <li>✓ Ensure the boiler and CH circuit does not have a freezing condition.</li> </ul>

		<ul style="list-style-type: none"> <li>✓ The surface of the heat exchanger may turn to a black colour as stainless steel is tempered even in normal conditions. This does not indicate an abnormal condition.</li> <li>✓ Check for damage on the exhaust, seal, and venting.</li> <li>✓ Ensure the parameter A0 corresponds to the gas type the unit is installed in.</li> <li>✓ Ensure the gas orifice (nozzle) is the proper orifice (nozzle) for the gas type in use.</li> <li>✓ Ensure deaeration has been performed.</li> </ul>
150	Venturi Control	<ul style="list-style-type: none"> <li>✓ Venturi operation error.</li> <li>✓ Ensure the venturi motor is operating correctly.</li> <li>✓ Replace the gas valve assembly.</li> </ul>
161	High Outgoing Temperature	<ul style="list-style-type: none"> <li>✓ Safety shutdown because DHW outgoing temperature is too hot.</li> <li>✓ Check sensor wiring for damage of outgoing thermistor.</li> <li>✓ Measure resistance of outgoing thermistor.</li> <li>✓ Ensure the gas valve has no damage and the orifice (nozzle) is installed correctly.</li> <li>✓ Replace the gas valve assembly.</li> </ul>
170	Venturi Blockage	<ul style="list-style-type: none"> <li>✓ Check the venturi and silencer for blockage.</li> <li>✓ Before resetting this error, check if the condensate drain is block and if the venting is connected properly.</li> </ul>
190	Electrical Grounding	<ul style="list-style-type: none"> <li>✓ Secondary circuit ground fault.</li> <li>✓ Check all electrical components for electrical short.</li> </ul>
250	Condensate Pump (Accessory)	<ul style="list-style-type: none"> <li>✓ Boiler will operate for 60 seconds.</li> <li>✓ Confirm wire connections and harnesses are good.</li> <li>✓ Ensure the condensate reservoir is empty and condensate pump is operational.</li> </ul>
341	Inlet Thermistor	<ul style="list-style-type: none"> <li>✓ Check sensor wiring for damage.</li> <li>✓ Measure the resistance of the sensor.</li> <li>✓ Replace if necessary.</li> </ul>
353	Supply Thermistor	<ul style="list-style-type: none"> <li>✓ Check sensor wiring for damage.</li> <li>✓ Clean the surface of the sensor.</li> <li>✓ Measure the resistance of the sensor.</li> <li>✓ Check the return thermistor.</li> <li>✓ Replace if necessary.</li> </ul>
321	Outgoing Thermistor	<ul style="list-style-type: none"> <li>✓ Check sensor wiring for damage.</li> <li>✓ Clean sensor of any scale buildup present.</li> <li>✓ Measure the resistance of the sensor.</li> <li>✓ Replace if necessary.</li> </ul>
331	Heat Exchanger Thermistor	<ul style="list-style-type: none"> <li>✓ Check sensor wiring for damage.</li> <li>✓ Measure the resistance of the sensor.</li> <li>✓ Replace if necessary.</li> </ul>

310	Freeze Protection Thermistor	<ul style="list-style-type: none"> <li>✓ Check sensor wiring for damage.</li> <li>✓ Measure the resistance of the sensor.</li> <li>✓ Replace if necessary.</li> </ul>
380	Exhaust Thermistor	<ul style="list-style-type: none"> <li>✓ Check sensor wiring for damage.</li> <li>✓ Clean the surface of the sensor.</li> <li>✓ Measure the resistance of the sensor.</li> <li>✓ Check the return thermistor.</li> <li>✓ Replace if necessary.</li> </ul>
363	Return Thermistor	<ul style="list-style-type: none"> <li>✓ Check sensor wiring for damage.</li> <li>✓ Measure the resistance of the sensor.</li> <li>✓ Replace if necessary.</li> </ul>
393	Outdoor Thermistor	<ul style="list-style-type: none"> <li>✓ Ensure that DIP switch 1 is set to the appropriate position.</li> <li>✓ Check sensor wiring for damage.</li> <li>✓ Measure the resistance of the sensor.</li> <li>✓ Replace if necessary.</li> </ul>
400	Pressure Sensor	<ul style="list-style-type: none"> <li>✓ Check sensor wiring for damage.</li> <li>✓ Measure the voltage of the sensor.</li> <li>✓ Replace if necessary.</li> </ul>
430	High/Low Water Pressure	<ul style="list-style-type: none"> <li>✓ If the water pressure is too low, add water into the system until at least 0.9 bar is observed.</li> <li>✓ Ensure there are no leaking components in the CH system.</li> <li>✓ If the pressure is too high, adjust the pressure to a maximum of 2 bar.</li> <li>✓ Ensure the pressure relief valve and water fill are working correctly.</li> <li>✓ Ensure deaeration has been performed.</li> </ul>
520	Solenoid Valve Circuit	<ul style="list-style-type: none"> <li>✓ Check the flame rod and wire for damage.</li> <li>✓ Close the gas shut off valve installed near the boiler.</li> <li>✓ Ensure the flame rod and wire are not wet.</li> <li>✓ Check the output from the PC Board to the solenoid gas valve.</li> <li>✓ If the output from the PC Board is abnormal, replace the PC Board.</li> <li>✓ If the output from the PC Board is normal, replace the gas control.</li> </ul>
540	High Exhaust Temperature	<ul style="list-style-type: none"> <li>✓ Check the exhaust thermistor wiring for damage.</li> <li>✓ Clean the surface of the thermistor.</li> <li>✓ Measure the resistance of the exhaust thermistor.</li> <li>✓ If the sensor has been replaced and the error still appears, check the return thermistor.</li> <li>✓ If the boiler is used in a hard water area, flush the DHW plate heat exchanger.</li> <li>✓ Check the exhaust duct, seal, and venting for damage.</li> </ul>
610	Combustion Fan	<ul style="list-style-type: none"> <li>✓ Check the motor wire harness for loose or damaged connections.</li> <li>✓ Measure resistance and voltage of motor wire harness.</li> <li>✓ Ensure the combustion fan spins freely.</li> </ul>
631	DHW Recirculation Pump	<ul style="list-style-type: none"> <li>✓ Ensure the DHW recirculation matches the Parameter 12 setting.</li> <li>✓ Ensure the dedicated return line is properly installed.</li> <li>✓ Ensure the inlet water filter and bypass filter are clean and free of debris.</li> </ul>

		<ul style="list-style-type: none"> <li>✓ Ensure the DHW recirculation pump is connected to the DHW Pump Terminal.</li> <li>✓ Ensure the capacity of the recirculation pump is sized appropriately for the piping (DHW recirculation pump should be higher than 4.9 L/m).</li> <li>✓ Ensure air is removed from the recirculation line.</li> </ul>
640	Pump	<ul style="list-style-type: none"> <li>✓ Ensure pump is running correctly and is not jammed.</li> <li>✓ Ensure there is no air in the system.</li> <li>✓ Check all valves are open and no restrictions in system.</li> <li>✓ Replace pump if necessary.</li> </ul>
651	Water Flow Control	<ul style="list-style-type: none"> <li>✓ Measure the resistance values and voltage of the water flow control.</li> <li>✓ Ensure the harness and connector are not wet.</li> <li>✓ If the voltage from the PC Board is abnormal, replace the PC Board; otherwise, replace the water flow servo valve.</li> </ul>
661	Bypass	<ul style="list-style-type: none"> <li>✓ Measure the resistance values and voltage of the bypass servo valve.</li> <li>✓ Ensure the harness and connector are not wet.</li> <li>✓ If the voltage from the PC Board is abnormal, replace the PC Board; otherwise, replace the bypass servo valve.</li> </ul>
670	3-Way Valve	<ul style="list-style-type: none"> <li>✓ Check the CH system water quality.</li> <li>✓ Measure the resistance values and voltage of the 3-way valve control.</li> <li>✓ Replace the 3-way valve control device.</li> </ul>
681	Hot Water Supply Temperature Abnormality	<ul style="list-style-type: none"> <li>✓ If the DHW water temperature is higher than the set point temperature because the boiler bypass servo fails to close.</li> <li>✓ Measure resistance values and voltage of the bypass flow control.</li> <li>✓ Replace the bypass flow control device if needed; otherwise, check the inlet thermistor and heat exchanger thermistor wiring for damage.</li> <li>✓ Measure the resistance of the sensor.</li> <li>✓ Replace if needed.</li> <li>✓ Clean the sensor of any scale buildup present.</li> </ul>
700	PC Board	<ul style="list-style-type: none"> <li>✓ PC Board circuit error.</li> <li>✓ Replace PC Board.</li> </ul>
710	Solenoid Valve Circuit	<ul style="list-style-type: none"> <li>✓ Ensure Dip switch 5 on the PC Board is in the OFF position (default).</li> <li>✓ Ensure the gas control wire is not lose or damaged.</li> <li>✓ Replace the PC Board.</li> </ul>
720	Flame Rod	<ul style="list-style-type: none"> <li>✓ Check the flame rod and wire for damage.</li> <li>✓ Ensure the flame rod and wire are not wet.</li> <li>✓ If there is no issue with the flame rod or wiring, replace the PC Board.</li> </ul>
890	Freeze Issue	<ul style="list-style-type: none"> <li>✓ The boiler checks the heat exchanger temperature at the time of operation.</li> <li>✓ If the temperature is too low, an error will occur.</li> <li>✓ Check if there is freezing in the boiler or CH system.</li> </ul>
999	PC Board Mismatch	<ul style="list-style-type: none"> <li>✓ This code occurs when the PC Board and the internal logic do not match.</li> <li>✓ Check if the software versions of the board and operation board do not match.</li> </ul>

LC	Scale Buildup in Heat Exchanger	<ul style="list-style-type: none"> <li>✓ Flush the DHW plate heat exchanger.</li> <li>✓ The LC code will reset automatically when scaling is removed. If the LC code remains, check the DHW thermistor, flow sensor or boiler pump.</li> </ul>
FFF	Maintenance Indicator	<ul style="list-style-type: none"> <li>✓ This code is a placeholder in diagnostic code history indicating a service provider performed maintenance or service.</li> <li>✓ Enter this code after performing service by pressing and holding the Up button, then press and hold the Down button, and then press the DHW button simultaneously. FFF will appear on the display.</li> </ul>  <p>The diagram shows a control panel with a digital display at the top showing 'E:FFF'. Below the display are several buttons: 'MODE', 'Eco', and a 'DHW' button with a water tap icon. A box highlights the 'Up' and 'Down' arrow buttons, with an arrow pointing to them from the text 'Up and Down'. Another box highlights the 'DHW' button, with an arrow pointing to it from the text 'Press the DHW button'.</p>
No Code	Nothing happens when water flow is activated	<ul style="list-style-type: none"> <li>✓ Verify the minimum flow rate required to fire the boiler is seen.</li> <li>✓ Measure the resistance of the flow control sensor.</li> <li>✓ Clean the inlet water supply filter.</li> <li>✓ On new installations, ensure the hot and cold-water lines are not reversed.</li> <li>✓ Confirm the inlet water temperature is not too high.</li> <li>✓ Ensure the integrated boiler pump operates properly.</li> <li>✓ Ensure the DHW operation switch is on.</li> </ul>
No Code	Decreasing or Fluctuating DHW water flow volume	<ul style="list-style-type: none"> <li>✓ Ensure the gas pressure is proper.</li> <li>✓ Ensure the water pressure is proper.</li> <li>✓ Ensure the inlet water filter for DHW is clean.</li> <li>✓ Ensure there is not lime scale buildup present.</li> <li>✓ Ensure the vent and vent settings are properly set up.</li> <li>✓ If a DHW recirculation system is used, the DHW flow volume may vary slightly.</li> <li>✓ Ensure all air has been purged from the system.</li> <li>✓ Ensure the pump is set to speed 3.</li> <li>✓ During simultaneous CH and DHW operation mode, it is possible to see decreased DHW flow.</li> </ul>
No Code	Fluctuating DHW outgoing temperature	<ul style="list-style-type: none"> <li>✓ Ensure the gas pressure is proper.</li> <li>✓ Ensure the water pressure is proper.</li> <li>✓ Ensure the DHW thermistor, flow servo, and bypass servo are in good condition.</li> <li>✓ Ensure the inlet filter for DHW is clean.</li> <li>✓ If a DHW recirculation system is used, the DHW temperature may vary slightly.</li> <li>✓ Ensure all air is removed from the system.</li> </ul>
No Code	Boiler does not start heating with a heating demand present	<ul style="list-style-type: none"> <li>✓ Supply temperature or return temperature inside the boiler may be too hot.</li> <li>✓ Ensure the pump operates properly.</li> <li>✓ If there is a demand immediately after using DHW, wait at least three minutes for operation.</li> </ul>



No Code	The boiler does not operate with the CH button	<ul style="list-style-type: none"> <li>✓ If DIP switch is ON, CH operation (the light on the CH button is off) will operate via the room thermostat.</li> </ul>
No Code	DHW recirculation does not begin.	<ul style="list-style-type: none"> <li>✓ Ensure the DHW recirculation pump is connected to the DHW Pump terminal.</li> <li>✓ Ensure DIP switch 3 is ON.</li> <li>✓ Ensure the DHW recirculation plumbing type is set properly per Parameter 12.</li> <li>✓ Ensure the DHW recirculation with timer relay input is set properly per Parameter 13.</li> <li>✓ Ensure the wiring to the external timer is correct.</li> <li>✓ Ensure the external timer is ON, if in use.</li> <li>✓ The recirculation logic has an OFF interval after use.</li> </ul>
No Code	Simultaneous DHW and CH is not functional	<ul style="list-style-type: none"> <li>✓ Ensure DIP switch 4 is ON.</li> <li>✓ If CH set point temperature is lower than 60°C, it is not permitted (this includes outdoor reset temperature settings).</li> <li>✓ Ensure the DHW inlet temperature is not too hot.</li> <li>✓ Ensure the heating load for DHW and CH are within limits to handle both simultaneously.</li> </ul>
No Code	Cannot change the DHW set point temperature	<ul style="list-style-type: none"> <li>✓ When DHW is being produced, the temperature setting can only be adjusted between 37°C and 43°C.</li> </ul>
No Code	Supply temperature is different from the setting temperature on the controller	<ul style="list-style-type: none"> <li>✓ During outdoor sensor control, the supply temperature will vary dependent on the outdoor temperature.</li> <li>✓ During simultaneous operation of DHW and CH, the supply temperature for CH is based on DHW control.</li> </ul>
No Code	CH capacity is insufficient	<ul style="list-style-type: none"> <li>✓ Ensure the parameters are properly set for the installation.</li> <li>✓ During simultaneous operation of DHW and CH, flow volume to heating can be reduced.</li> </ul>
No Code	Pump or fan even with no demand	<ul style="list-style-type: none"> <li>✓ The boiler may start or operate the pump for freeze protection operation.</li> <li>✓ The pump may intermittently operate to prevent it from becoming stuck.</li> </ul>
No Code	Cannot turn off ECO mode	<ul style="list-style-type: none"> <li>✓ During DHW recirculation, ECO switch will always be on.</li> </ul>

## 9.0 Maintenance



- Maintenance is required to ensure safe operation of the boiler.
- The boiler must be inspected annually by a certified professional. Repairs and maintenance shall be performed by a certified professional. The professional must verify proper operation after servicing.
- Keep the boiler area clear and free from combustible materials, gasoline, and other flammable vapours and liquids.



- To protect yourself from harm, before performing maintenance,
  - Turn off the electrical power supply by unplugging the power cord or by turning off the electricity at the circuit breaker (The boiler controller does not control the electrical power)
  - Turn off the gas at the manual gas control valve, usually located immediately below the boiler.
  - Turn off the incoming water supply. This can be done at the isolation valve immediately below the boiler or by turning off the water supply to the building.

## 9.1 Owner Maintenance



If you encounter a problem that is difficult to solve, stop the operation and immediately contact a licensed professional.

### MONTHLY

#### Boiler area

- Verify the area is free of combustible materials, gasoline and other flammable vapours and liquids.
- Verify the area is clean from dust and obstructions
- Verify the air intake area is free of any contaminants listed in the boiler Installation and Operation Manual. Any contaminants in the boiler intake air vicinity must be removed. If they cannot be removed, contact a certified professional.

### MONTHLY

#### Piping

- Inspect all water, gas, and condensation piping for leaks. Look for signs of leaking lines or corrosion.
- Confirm the condensation line is not blocked. If a condensation drain pump is used, confirm the condensation drain pump operates correctly.

### MONTHLY

#### Venting

- Verify the boiler vent discharge and air intake is clean and free of obstructions.
- Check for leakage, damage, or deformation of venting.

### MONTHLY


#### Boiler

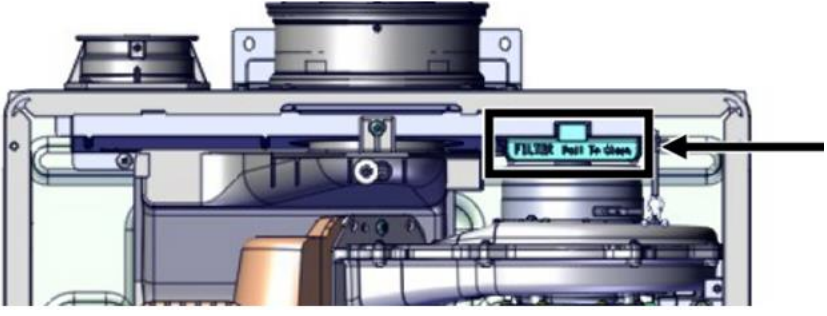
- Verify the boiler is free from any abnormal situations, such as diagnostic error codes, loud noises, leakage or other potential issues.
- Check that the pressure on the controller display indicates between 1 and 1.5 bar.

## 9.2 Servicing Requirements



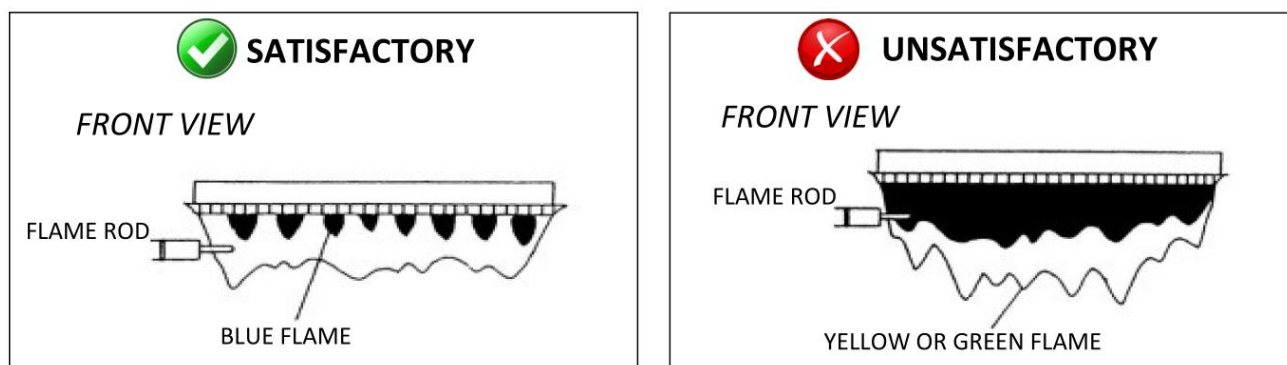
**Certified Professional Maintenance must be performed annually**

Area	Task
<b>Vent System</b>	<ul style="list-style-type: none"> <li>Inspect for blockages or damage</li> <li>Inspect vent screen or room air filter (if using) for debris and blockages. Clean if required.</li> </ul>
<b>Fans and Motors</b>	<ul style="list-style-type: none"> <li>Clean dust and dirt from fan and motor (motors are permanently lubricated and do not require lubrication).</li> </ul>
<b>Boiler display</b>	<ul style="list-style-type: none"> <li>Clean by using a soft, damp cloth. Do not use solvents.</li> </ul>
<b>Expansion vessels</b>	<ul style="list-style-type: none"> <li>Drop the system pressure and carry out an air pressure test on any expansion vessels on the system. Pre-charge should be set to 1 bar or equal to the water pressure of the system when cold.</li> </ul>
<b>Pressure</b>	<ul style="list-style-type: none"> <li>Confirm the pressure is within the proper range (between 1 and 1.5 bar while cold). If the pressure is lower than the specified range, add water until in the pressure is correct.</li> </ul>
<b>Pressure Relief Valve</b>	<ul style="list-style-type: none"> <li>Operate the pressure relief valve manually once a year. In doing so, it will be necessary to take precautions with regard to the discharge of potentially scalding hot water under pressure. Ensure discharge has a safe place to flow. Contact with your body or other property may cause damage or harm.</li> </ul> <p> <b>Testing the pressure relief valve should only be performed by a licensed professional. Water discharged from the pressure relief valve could cause severe burns instantly from scalds.</b></p>
<b>Central Heating Filter</b>	<ul style="list-style-type: none"> <li>If a dirt or magnetic filter is installed on the system, ensure this is checked and cleaned out.</li> </ul>
<b>DHW Filter</b>	<ul style="list-style-type: none"> <li>If the flow volume of domestic hot water is reduced, or if there are fluctuations in temperature, check and clean the filter located inside the isolation valve on the cold inlet of the boiler. Be sure to isolate the DHW pipes before carrying this out.</li> </ul>
<b>Condensation Trap</b>	<ul style="list-style-type: none"> <li>Check if the condensate trap contains sediment. To remove sediment, unplug the bottom of the condensate trap. Remove the sediment then return the plug. Do not use a wrench to tighten the condensate drain as this could cause damage.</li> </ul>
<b>Condensation Drain</b>	<ul style="list-style-type: none"> <li>Confirm the condensation drain line is not blocked</li> <li>Pour water down the condensate trap to ensure condensate runs clearly.</li> </ul>
<b>Flushing DHW plate Heat Exchanger</b>	<ul style="list-style-type: none"> <li>When the 'LC' code on the display appears frequently, the boiler is detecting lime scale accumulation. After flushing the plate heat exchanger, the 'LC' code should disappear. In hard water areas, it is recommended to flush the heat exchanger periodically.</li> </ul>
<b>Pump Lock prevention</b>	<ul style="list-style-type: none"> <li>Confirm the pump operates smoothly. The boiler operates pump lock operation at least once every 48 hours for all system pumps. If the pump is locked, rotate the cap on the front of the pump with a flat head screwdriver.</li> </ul>

<b>Water Quality</b>	<ul style="list-style-type: none"> <li>• Confirm the quality of the system water by checking for debris/dirt and measuring the levels of inhibitor present. If required, inhibitor should be added to the system.</li> <li>• DHW must be potable and free of contaminants. Replacement of components due to water quality damage is not covered under the warranty.</li> </ul>
<b>Frost Protection</b>	<ul style="list-style-type: none"> <li>• The boiler has a frost protection program that will protect the appliance from freezing providing the system is pressurised and power is on.</li> <li>• Additional frost protection for new or existing systems must use glycol that is specially formulated for this purpose. This includes inhibitors, which prevents the glycol from attacking the metallic components. The glycol should be for multi-metallic components.</li> </ul>
<b>Coastal area installations</b>	<ul style="list-style-type: none"> <li>• Installations located in or near coastal areas may require additional maintenance due to corrosive airborne ocean salt. If corrosion is observed on the body of the boiler, the boiler shall be inspected to ensure proper operation and repaired or replaced, if necessary.</li> </ul>
<b>Cleaning</b>	<ul style="list-style-type: none"> <li>• It is imperative that control compartments, burners, and circulating air passageways of the boiler be kept clean. Check burner flame for proper colour. Once ignited, the flame must cover the surface of the burner. The flame must burn with a clear, blue, stable flame. If the flame does not have this appearance, complete the following steps. <ul style="list-style-type: none"> <li>○ Turn off and disconnect electrical power. Allow to cool.</li> <li>○ Remove the front panel.</li> <li>○ Use a vacuum to remove dust from the main burner and fan blades. Do not use a wet cloth or spray cleaners on the burner. Do not use volatile substances such as benzene and thinners; they may ignite or fade the paint.</li> <li>○ Do not open the burner cabinet and touch the burner surface.</li> </ul> </li> </ul>
<b>Intake Filter</b>	<ul style="list-style-type: none"> <li>• To maintain optimum performance, periodically inspect the air filter.</li> <li>• If the air filter appears to have lint and/or dust build up, follow the cleaning procedure described below.</li> <li>• If the air filter appears damaged, contact your supplier to secure a replacement.</li> </ul> <p><b>Cleaning</b></p> <ul style="list-style-type: none"> <li>• Clean the air filter: With mild dish soap and a soft bristle brush, scrub the filter area of the air filter door. With clean water, rinse the soap off the filter.</li> <li>• Dry the air filter with a lint-free towel.</li> </ul> 

### 9.3 After Servicing: Visual Inspection of Flame

Verify proper operation after servicing. The burner must flame evenly over the entire surface when operating correctly. The flame must burn with a clear, blue, stable flame. See the parts breakdown of the burner for the location of the view ports. The flame pattern should be as shown in the images below:



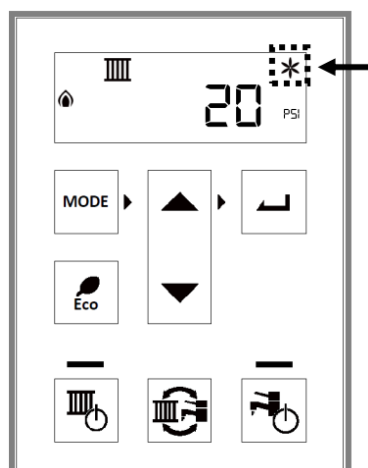
### 9.4 Freeze Protection Operation

When the boiler detects low outdoor ambient temperatures, the boiler will begin its freeze protection operation. The freeze protection operation can protect the boiler from freezing down to as low as  $-30^{\circ}\text{C}$  outdoor temperature.

When freeze protection is in operation, the pump may circulate water and/or the boiler may operate to prevent the boiler from freezing. Ensure power and gas are supplied to the boiler for freeze protection to function. The internal freeze protection will not necessarily prevent the system piping from freezing.

During freeze protection operation, the pressure and supply temperature will alternately display on the controller.

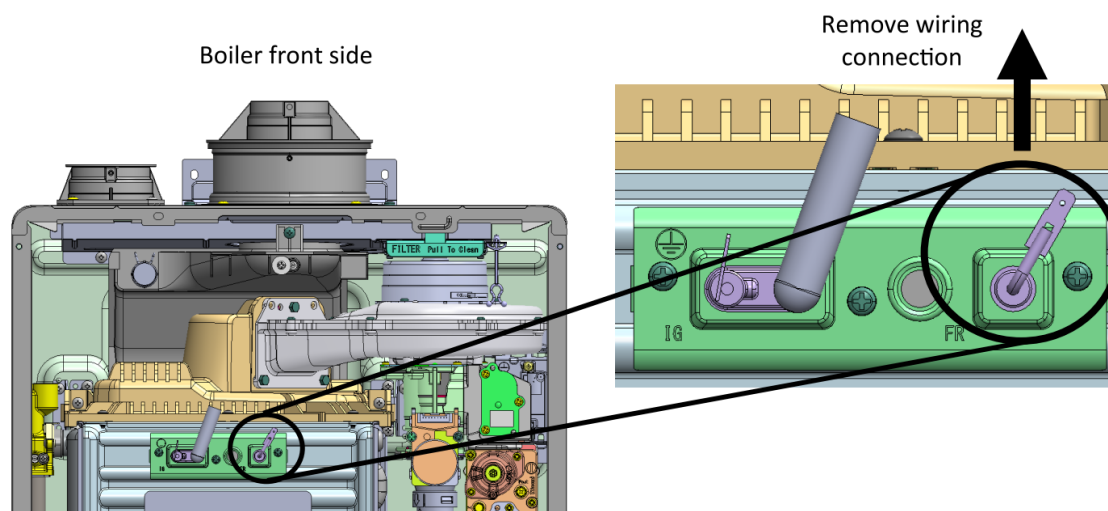
The icon for CH and DHW may alternate depending on the operation of the freeze protection sequence.



When the system needs to be shut down for extended periods of time, the boiler and all system piping should be drained. The power and gas supply should then be disconnected from the boiler. Freezing damage may occur if there is water remaining in the boiler or system piping. The plumbing lines should also be blown out via compressed air.

## 9.5 Test the Ignition Safety Shut Off Device

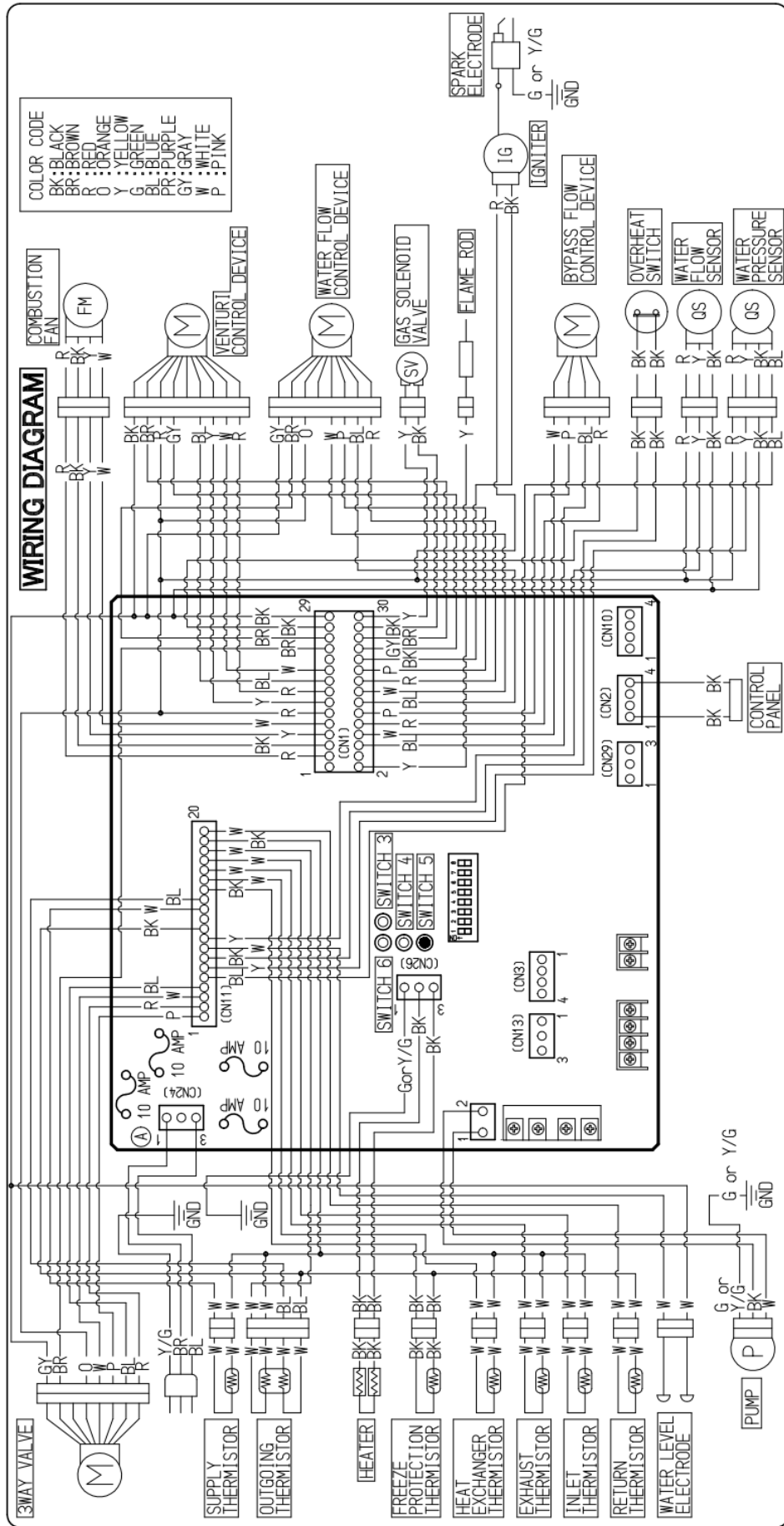
- 1- Ensure the boiler is not currently firing and the flame rod is not hot.
- 2- Remove the boiler front panel.
- 3- Disconnect the wiring connection from the flame rod (located on front of the boiler under the burner).



**Do not touch the inside of the wiring connection while it is disconnected.**

- 4- Place the boiler in operation by either calling for heat or turning on domestic hot water.
- 5- The boiler initiates one start-up attempt followed by multiple restart attempts. After the last start-up attempt, the boiler locks out and the gas valve shuts off. Code '110' appears on the controller display which indicates ignition system safety shut-off.
- 6- Reconnect the wiring connection to the flame rod. To reset the error, press the DHW button.
- 7- Replace the boiler front panel. The boiler may now go back into normal operation.

# 10.0 Wiring Diagram



## 11.0 Warranty

Our compliments for having chosen a Rinnai product. The standard Rinnai warranty does not affect the terms of the legal warranty on customer's good and relates to Rinnai products purchased. This product is warranted via Central Heating New Zealand (CHNZ) for a period of 5 Years subject to published conditions. Please refer to our terms & conditions in Central Heating NZ website for further details including criteria required to meet our warranty and relevant parts covered.

[www.centralheating.co.nz](http://www.centralheating.co.nz)

### WHAT IS COVERED?

The warranty covers any defects in materials when the product is installed and operated according to installation instructions, subject to the terms within this limited warranty document. This warranty applies only to products that are installed by a registered gas engineer. Improper installation may void the warranty. This warranty extends to the original purchaser and subsequent owners, but only while the product remains at the site of the original installation. The warranty only extends through the first installation of the product and terminates if the product is moved or reinstalled at a new location.

### WHAT WILL CHNZ DO?

CHNZ will repair or replace the product or any part or component that is defective in materials or workmanship, except as set forth below:

- **all repairs must be performed using genuine Rinnai parts.**
- **all repairs or replacements must be performed by a registered gas engineer.**

Replacement of the entire product or replacement of any parts may only be authorised by CHNZ. CHNZ does not authorise any person or company to assume for it any obligation or liability in connection with the replacement of a product or heat exchanger. If CHNZ determines that repair of a product is not possible, CHNZ will replace the product with a comparable product, at CHNZ's discretion. If a component or product returned to CHNZ is found to be free of defects in material or workmanship, or damaged by improper installation the warranty claim may be denied.

### HOW DO I GET SERVICE?

The system must be serviced annually to ensure warranty applies to the appliance. Please contact your installer to undertake the service. For warranty purposes, proof of date of purchase is required. You can show proof of purchase with a dated invoice contacting CHNZ aftersales on [03 659 0614](tel:036590614) or [0800 580 340](tel:0800580340)

### WHAT IS NOT COVERED?

This warranty does not cover any failures or operating difficulties due to accident, abuse, misuse, alteration, misapplication, acts of God, improper installation, improper maintenance or service, inadequate water quality, scale buildup, freeze damage or for any other causes other than defects in materials or workmanship. This warranty does not apply to any product whose serial number or manufacture date has been defaced. CHNZ is not liable for any special, incidental, indirect or consequential damages that may arise, including damage to person or property, loss of use, failure to install drain pan under unit, or any inconvenience. This warranty does not affect your statutory rights as defined by NZ laws.