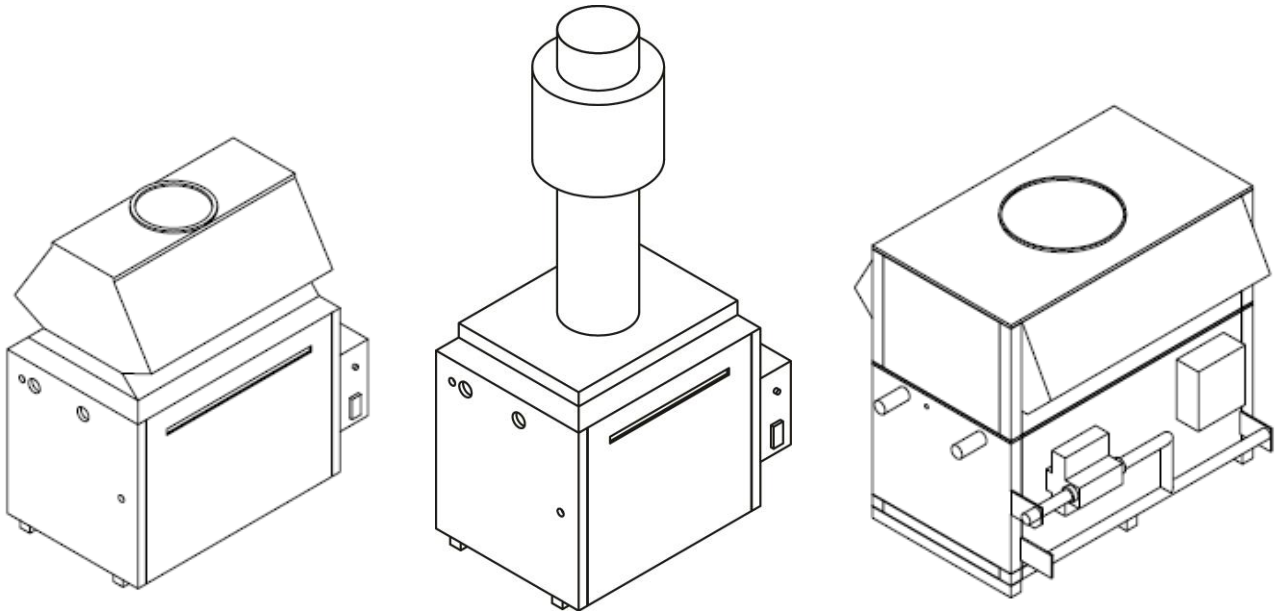


Owner's Guide and Installation Instructions



Raypak Water Heaters



| | <i>Models</i> | | <i>Types</i> |
|--------|---------------|-------|-------------------|
| B0538 | B0992* | B0972 | NCO, NCM, *PCM |
| B0658* | B1182 | B1142 | |
| B0768 | B1292 | B1242 | |
| B0868 | B1412* | B1362 | |
| | B1722 | B1662 | |
| | B1922* | B1852 | |
| | B2214 | B2004 | |
| | B2634 | B2404 | |
| | B3164 | B2804 | |
| | B3694 | B3304 | |
| | B4224 | B3804 | |

This water heater must be installed and serviced by a qualified person.
This water heater must be certified in accordance with AS3814 before being brought into service
Please leave this guide with a responsible officer.

**Notice to Victorian Customers from the
Victorian Building Authority**

**This water heater must be installed by a licensed person as required by
The Victorian Building Act 1993**

Only a licensed person will give you a Compliance Certificate, showing that the work complies with all the relevant standards. Only a licensed person will have insurance protecting their workmanship for 6 years. Make sure you use a licensed person to install this water heater and ask for your Compliance Certificate.

⚠ Warning: Upon completion of the installation and commissioning of the water heater, leave this guide with the householder or a responsible officer. **DO NOT** leave this guide inside of the cover of the water heater, as it may interfere with the safe operation of the water heater or ignite when the water heater is turned on.

Date of installation:

Model N°:

Serial N°:

Installed by:

Purchased from:

PATENTS

This water heater may be protected by one or more patents or registered designs.

® Registered trademark of Rheem Australia Pty Ltd.

™ Trademark of Rheem Australia Pty Ltd.

CONTENTS

HOUSEHOLDER OR RESPONSIBLE OFFICER – We recommend you read pages 6 to 12.

The other pages are intended for the installer but may be of interest

| | |
|---|----|
| Contents | 3 |
| Warranty | 4 |
| Raypak Water Heater Warranty – Australia Only | 4 |
| About Your Water Heater | 6 |
| How Your Water Heater Works | 9 |
| Save A Service Call | 10 |
| Regular Care | 12 |
| Installation..... | 13 |
| Connections – Plumbing..... | 17 |
| Connections – Electrical | 26 |
| Location Of Controls | 39 |
| Safety Precautions..... | 40 |
| Commissioning | 41 |
| Operating The Water Heater | 44 |
| Component Checks & Adjustment Procedures | 45 |
| Temperature Control..... | 49 |
| Service Procedures | 57 |
| Water Supplies | 58 |
| Dimensions and Technical Data..... | 59 |

WARRANTY

RAYPAK WATER HEATER WARRANTY – AUSTRALIA ONLY

RAYPAK WATER HEATER MODELS B0538-B4224

1. THE RHEEM WARRANTY – GENERAL

- 1.1 This warranty is given by Rheem Australia Pty Limited ABN 21 098 823 511 of 1 Alan Street, Rydalmere New South Wales.
- 1.2 Rheem offer a trained and qualified national service network who will repair or replace components at the address of the water heater subject to the terms of the Rheem warranty. Rheem Service, in addition can provide preventative maintenance and advice on the operation of your water heater. The Rheem Service contact number is available 7 days a week on 131031 with Service personnel available to take your call from 8am to 8pm daily (hours subject to change).
- 1.3 For details about this warranty, you can contact us on 131031 or by email at warrantyenquiry@rheem.com.au (not for service bookings)
- 1.4 The terms of this warranty and what is covered by it are set out in sections 2 and 3 and apply to water heaters manufactured after 1st February 2015.
- 1.5 If a subsequent version of this warranty is published, the terms of that warranty and what is covered by it will apply to water heaters manufactured after the date specified in the subsequent version.

2. TERMS OF THE RHEEM WARRANTY AND EXCLUSIONS TO IT

- 2.1 The decision of whether to repair or replace a faulty component is at Rheem's sole discretion.
- 2.2 If you require a call out and we find that the fault is not covered by the Rheem warranty, you are responsible for our standard call out charge. If you wish to have the relevant component repaired or replaced by Rheem, that service will be at your cost.
- 2.3 Where a failed component or cylinder is replaced under this warranty, the balance of the original warranty period will remain effective. The replacement does not carry a new Rheem warranty.
- 2.4 Where the water heater is installed outside the boundaries of a metropolitan area as defined by Rheem or further than 25 km from either a regional Rheem branch office or an Accredited Rheem Service Agent's office, the cost of transport, insurance and travelling between the nearest branch office or Rheem Accredited Service Agent's office and the installed site shall be the owner's responsibility.
- 2.5 Where the water heater is installed in a position that does not allow safe or ready access, the cost of that access, including the cost of additional materials handling and/or safety equipment, shall be the owner's responsibility. In other words, the cost of dismantling or removing cupboards, doors or walls and the cost of any special equipment to bring the water heater to floor or ground level or to a serviceable position is not covered by this warranty.
- 2.6 This warranty only applies to the original and genuine Rheem water heater in its original installed location and any genuine Rheem replacement parts.
- 2.7 The Rheem warranty does not cover faults that are a result of:
 - a) Accidental damage to the water heater or any component (for example: (i) Acts of God such as floods, storms, fires, lightning strikes and the like; and (ii) third party acts or omissions).
 - b) Misuse or abnormal use of the water heater.
 - c) Installation not in accordance with the Owner's Guide and Installation Instructions or with relevant statutory and local requirements in the State or Territory in which the water heater is installed.
 - d) Connection at any time to a water supply that does not comply with the water supply guidelines as outlined in the Owner's Guide and Installation Instructions.
 - e) Repairs, attempts to repair or modifications to the water heater by a person other than Rheem Service or a Rheem Accredited Service Agent.
 - f) Faulty plumbing or faulty power supply.
 - g) Failure to maintain the water heater in accordance with the Owner's Guide and Installation Instructions.
 - h) Transport damage.
 - i) Fair wear and tear from adverse conditions (for example, corrosion).
 - j) Cosmetic defects.
- 2.8 Subject to any statutory provisions to the contrary, this warranty excludes any and all claims for damage to furniture, carpet, walls, foundations or any other consequential loss either directly or indirectly due to leakage from the water heater, or due to leakage from fittings and/ or pipe work of metal, plastic or other materials caused by water temperature, workmanship or other modes of failure.
- 2.9 If the water heater is not sized to supply the hot water demand in accordance with the guidelines in the Rheem water heater literature, any resultant fault will not be covered by the Rheem warranty.

3. WHAT IS COVERED BY THE RHEEM WARRANTY FOR THE WATER HEATERS DETAILED IN THIS DOCUMENT

3.1 Rheem will repair or replace a faulty component of your water heater if it fails to operate in accordance with its specifications as follows:

| What components are covered | The period in which the fault must appear in order to be covered | What coverage you receive |
|------------------------------|--|--|
| All components | Year 1 | Repair and/or replacement of the faulty component, free of charge, including labour. |
| Heat Exchanger / Tube Bundle | Years 2 to 5 | Replacement heat exchanger or tube bundle, free of charge. Installation and repair labour costs are the responsibility of the owner. |

4. ENTITLEMENT TO MAKE A CLAIM UNDER THIS WARRANTY

- 4.1 To be entitled to make a claim under this warranty you need to:
- a) Be the owner of the water heater or have consent of the owner to act on their behalf.
 - b) Contact Rheem Service without undue delay after detection of the defect and, in any event, within the applicable warranty period.
- 4.2 You are **not** entitled to make a claim under this warranty if your water heater:
- a) Does not have its original serial numbers or rating labels.
 - b) Is not installed in Australia.

5. HOW TO MAKE A CLAIM UNDER THIS WARRANTY

- 5.1 If you wish to make a claim under this warranty, you need to:
- a) Contact Rheem on 131031 and provide owner's details, address of the water heater, a contact number and date of installation of the water heater or if that's unavailable, the date of manufacture and serial number (from the rating label on the water heater).
 - b) Rheem will arrange for the water heater to be tested and assessed on-site.
 - c) If Rheem determines that you have a valid warranty claim, Rheem will repair or replace the water heater in accordance with this warranty.
- 5.2 Any expenses incurred in the making of a claim under this warranty will be borne by you.

6. THE AUSTRALIAN CONSUMER LAW

- 6.1 Our goods come with guarantees that cannot be excluded under the *Australian Consumer Law*. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure.
- 6.2 The Rheem warranty (set out above) is in addition to any rights and remedies that you may have under the *Australian Consumer Law*.

Note: Every care has been taken to ensure accuracy in preparation of this publication. No liability can be accepted for any consequences, which may arise as a result of its application

RHEEM AUSTRALIA PTY LTD, A.B.N. 21 098 823 511, www.rheem.com.au

RAYPAK AUSTRALIA PTY LTD A.B.N. 65 078 743 414

For Service Telephone 131 031 AUSTRALIA or 0800 657 335 NEW ZEALAND

ABOUT YOUR WATER HEATER

WATER HEATER APPLICATION

This water heater is designed for the purpose of heating potable water or hydronic heating applications. Its use in an application other than this may shorten its life.

MODEL TYPE

Congratulations for choosing a Raypak® water heater. Raypak water heaters are suitable for either indoor or outdoor installation depending on the model chosen.

The operation of the water heater depends on the application. Typically for hot water applications a water heater with 'On/Off' operation will be installed. For mechanical heating or process applications a water heater with 'modulating' operation will be installed.

A limited range of models suitable for use on propane gas is available. These are supplied with modulating gas valves only and are suitable for use in hot water applications as well as mechanical heating or process applications.

A spare 850 kPa (125 PSI) pressure relief valve is supplied inside the water heater casing for use in mains pressure water heating applications. The fitted 415 kPa (60 PSI) pressure relief valve should be removed and the higher pressure rating valve installed before the water heater is operated in domestic hot water applications.

HOW HOT SHOULD THE WATER BE?

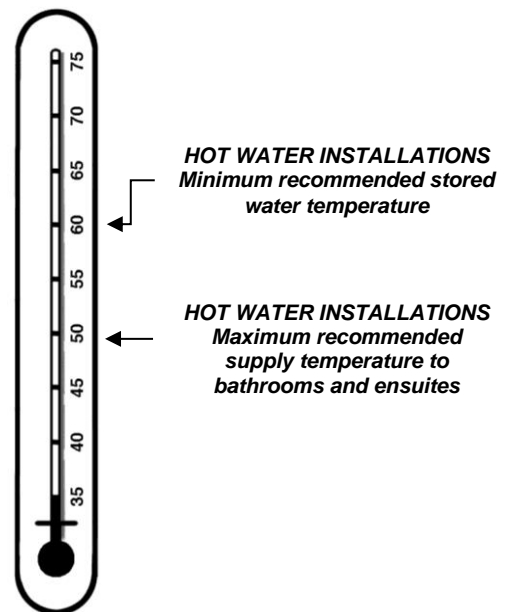
The water heater features an adjustable electronic thermostat, which allows the most suitable temperature for the application to be chosen.

To meet the requirements of the National Plumbing Standard the temperature of the stored water for hot water applications must not be below 60°C.

HOTTER WATER INCREASES THE RISK OF SCALD INJURY

This water heater can deliver water at temperatures which can cause scalding. Check the water temperature before use, such as when entering a shower or filling a bath or basin, to ensure it is suitable for the application and will not cause scald injury.

We recommend and it may be required by regulations that an approved temperature limiting device be fitted into the hot water piping to the bathroom and ensuite when this water heater is installed. This will keep the water temperature below 50°C at the bathroom and ensuite. The risk of scald injury will be reduced whilst still allowing hotter water to the kitchen and laundry.



TEMPERATURE ADJUSTMENT

The electronic thermostat temperature will have been set by the installer to suit the application, adjustment should not be required. Consult your installer before making any adjustment to the electronic thermostat settings.

GENERAL WARNINGS

⚠ Warning: This water heater is only intended to be operated by persons who have the experience or the knowledge and the capabilities to do so. This water heater is not intended to be operated by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge.

⚠ Warning: Children should be supervised to ensure they do not interfere with the water heater.

⚠ Warning: The water heater uses 240 Volt AC electrical power for operation of the control systems. The removal of the access cover(s) will expose 240 V wiring. Covers must only be removed by an authorised or qualified person.

SAFETY

For your safety do not operate this water heater before reading this instruction booklet.

This water heater is supplied with an electronic thermostat, high limit thermostat and a pressure relief valve. These devices must not be tampered with or removed. The water heater must not be operated unless each of these devices is fitted and is in working order.

Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. For assistance or additional information consult your Raypak distributor, qualified installer, or Rheem® Service agent.

The warranty can become void if relief valves or other safety devices are tampered with or if the installation is not in accordance with these instructions.

- DO NOT store **flammable or combustible materials** near the water heater. Flammable liquids (such as petrol), newspapers and similar articles must be kept well away from the water heater and the draught diverter or flue terminal.
- DO NOT use **aerosols, stain removers and household chemicals** near the water heater whilst it is working. Gases from some aerosol sprays, stain removers and household chemicals become corrosive when drawn into a flame.
- DO NOT store **swimming pool chemicals, household cleaners, etc.**, near the water heater.
- DO NOT place anything on top of the water heater or in contact with the flue terminal. Ensure the flue terminal is not obstructed in any way at any time.
- DO NOT use Propane / Butane gas mixtures in a Propane model. A Propane model is designed to operate on Propane only. The use of Propane / Butane mixture, such as automotive LPG fuel, in a Propane model is unsafe and can cause damage to the water heater.
- DO NOT operate with panels, covers or guards removed from the water heater.
- DO NOT enclose this water heater (applies to external installations only).



Do not use the water heater if any part has been under water. Immediately call Rheem Service or Accredited service Agent to arrange for an inspection.

TO TURN ON THE WATER HEATER

⚠ Warning: If you smell gas do not attempt to turn on the water heater.

- Fill the system with water (refer to [“To Fill the Water Heater”](#) on page 44).
- Open the gas isolation valve fully at the inlet to the water heater.
- Switch on the electrical supply at the water heaters isolation switch. **NOTE:** If the water heater is correctly installed, this will also activate the circulating pump.

The water heater will operate automatically when a call for heat occurs.

WHAT TO DO IF YOU SMELL GAS?

- DO NOT try to light any gas appliance.
- DO NOT touch any electrical switch.
- TURN OFF the gas supply at the gas meter immediately, call your gas supplier or licensed gasfitter.

NOTE: Some gases are heavier than air and it may be necessary to check for gas leaks at floor level.

TO TURN OFF THE WATER HEATER

If it is necessary to turn off the water heater:

- Switch off the electrical supply at the water heaters isolation switch. **NOTE:** If the water heater is correctly installed, this will also shut down the circulating pump.
- Close the gas isolation valve at the inlet to the water heater.
- Close the cold water isolation valve at the inlet to the water heater.
- Close the isolation valves on the cold and hot water branches to shut down an individual water heater in a bank (water heating applications only).

HOW DO I KNOW IF THE WATER HEATER IS INSTALLED CORRECTLY?

Installation requirements are detailed in the “[Installation](#)” section on pages [13](#) to [17](#). The water heater must be installed:

- by a qualified person, and
- in accordance with the installation instructions, and
- in compliance with Standards AS/NZS 3500.4, AS 5601 or AS/NZS 5601.1, as applicable under local regulations, and all local codes and regulatory authority requirements.
- In New Zealand, the installation must also conform to NZS 5261, as applicable under local regulations, and the New Zealand Building Code.

DOES THE WATER CHEMISTRY AFFECT THE WATER HEATER?

The water heater is suitable for most public water supplies, however some water chemistries may have detrimental effects on the water heater, its components and fittings. Refer to “[Water Supplies](#)” on page [58](#).

If you are in a known harsh water area or you are not sure of your water chemistry, have your water checked against the conditions described on page [58](#).

HOW LONG WILL THE WATER HEATER LAST?

The water heater is supported by a manufacturer’s warranty (refer to “[Warranty](#)” on page [63](#)). There are a number of factors that will affect the length of service the water heater will provide. These include but are not limited to the water chemistry, the water pressure, the water temperature (inlet and outlet) and the water usage pattern. Refer to “[Precautions](#)” on page [8](#).

PRECAUTIONS

Where damage to property can occur in the event of the water heater leaking, the water heater must be installed in a safe tray. Construction, installation and draining of a safe tray must comply with AS/NZS 3500.4 and all local codes and regulatory authority requirements.

The water heater must be maintained in accordance with the Owner’s Guide and Installation Instructions. Refer to “[Regular Care](#)” on page [12](#).

If this water heater is to be used where an uninterrupted hot water supply is necessary for your application or business you should ensure that you have redundancy within the hot water system design. This should ensure the continuity of hot water supply in the event that this water heater was to become inoperable for any reason. We recommend you seek advice from your plumber or specifier about your needs and building redundancy into your hot water supply system.

SERVICING

For peak performance it is suggested that the water heater be serviced by your nearest Rheem Service Department or Accredited Service Agent prior to the winter period where light to medium hot water usage occurs, and six monthly where medium to heavy usage occurs (refer to “[Regular Care](#)” on page [12](#)).

⚠ Warning: Servicing of a gas water heater must only be carried out by authorised personnel.

HOW YOUR WATER HEATER WORKS

The water heater consists of a gas burner, a combustion chamber lined with refractory tiles and a heat exchanger made of finned copper tubes. Hot flue gases from the burner pass between the fins on the heat exchanger tubes and heat is transferred first to the fins and then by conduction into the water. Baffles are placed between the tubes to control the flow of the hot flue gases to ensure efficient operation of the water heater. The refractory tiles insulate the combustion chamber to minimise heat loss and protect the surroundings from the temperature of the burner flames. The gas supply to the burner is controlled by an electronic thermostat which senses the water temperature.

Automatic safety controls are fitted to the water heater:

- to ensure safe ignition of the gas whenever there is a call for heating;
- to continuously monitor the burner flame; and
- to prevent excessive temperatures or pressures in the water system.

MAINS PRESSURE

In water heating applications, the water heater is designed to operate in conjunction with one or more hot water storage tanks which are normally connected directly to the mains water supply. If the mains water supply pressure in your area exceeds the value shown in the [“Pressure Specifications”](#) table on page 16 or exceeds the specified maximum inlet pressure for the storage tanks, a pressure limiting valve must be fitted.

In mechanical and process heating applications, the system pressure must not exceed the value shown in the [“Pressure Specifications”](#) table on page 16.

ELECTRONIC THERMOSTAT (ON/OFF MODELS)

On/Off models are fitted with an ICPlus 902 electronic thermostat that operates the gas control by switching its power on and off so that a constant temperature is maintained. The electronic thermostat is mounted on the control panel of the water heater and the protective over temperature cut out (high limit thermostat) is mounted inside the lower front cover of the water heater.

There is no need to switch the water heater off when it is not in use. The electronic thermostat is fully automatic and only allows the gas control to open when the burner requires gas for heating.

The electronic thermostat has a number of parameters that are programmed during manufacture. To adjust the parameter settings refer to [“Temperature Adjustment – On/Off Models \(ICPlus 902 Electronic Thermostat\)”](#) on page 49.

⚠ Warning: Advice should be sought from your local Raypak representative prior to altering any electronic thermostat values other than the set point or differential.

ELECTRONIC THERMOSTAT (MODULATING MODELS)

Water heaters with modulating operation are fitted with an RWF55 electronic thermostat. The electronic thermostat is mounted on the control panel of the water heater and the protective over temperature cut out (high limit thermostat) is mounted inside the lower front cover of the water heater. This type of thermostat is used where the system load is variable e.g. Mechanical Heating. The RWF55 electronic thermostat will cycle the burner from full fire to 30% and then off.

There is no need to switch the water heater off when it is not in use. The electronic thermostat is fully automatic and only allows the gas control to open when the burner requires gas for heating.

The electronic thermostat has a number of parameters that are programmed during manufacture. To adjust the parameter settings refer to [“Temperature Adjustment – Modulating Models \(RWF55 Electronic Thermostat\)”](#) on page 53.

⚠ Warning: Advice should be sought from your local Raypak representative prior to altering any electronic thermostat parameters other than the set point or differentials.

BURNER IGNITION

The water heater incorporates an automatic burner ignition system and an automatic pilot burner. The pilot burner ignites the main burner gas when the electronic thermostat determines a need for heating.

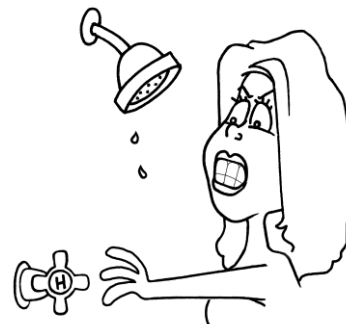
Both On/Off and modulating models have a spark generator that begins operating when power is applied and any external controls (if installed) call for the water heater to operate. At the same time a valve opens to supply gas to the pilot burner. After successful ignition of the pilot flame has been detected, the valves open to supply gas to the main burner when the electronic thermostat determines that a call for heating is required. If the pilot fails to ignite within 5 seconds, the ignition system will lock out.

SAVE A SERVICE CALL

Check the items below before making a service call. You will be charged for attending to any condition or fault that is not related to manufacture or failure of a part.

NOT ENOUGH HOT WATER (OR NO HOT WATER)

- **Is the electricity switched on?**
Inspect the isolation switch adjacent to the water heater and ensure the isolation switch is turned on.
- **Is there a time clock on the power supply?**
Check the settings on the time clock to ensure they are suitable to enable heating when required.
- **Is the ignition system 'locked out'?**
Reset the water heater. Refer to "[Water Heater Not Operating](#)" on page 10.
- **Is a code displayed on the electronic thermostat?**
Check the LED display on the electronic thermostat (refer to the diagnostic features for the relevant electronic thermostat installed as detailed on page 10).
- **Are you using more hot water than you think?**
Are outlets (especially the showers) using more hot water than you think? Very often it is not realised the amount of hot water used, particularly when showering. Carefully review the hot water usage. Have your plumber fit a flow control valve to each shower outlet to reduce water usage.
- **Pressure relief valve running**
Is the relief valve discharging too much water? (Refer to "[Pressure Relief Valve Running](#)" on page 11).
- **Electronic thermostat temperature setting**
Ensure the electronic thermostat temperature setting (set point) is appropriate. You may choose to have your installer adjust the temperature setting upwards to gain additional hot water capacity.
⚠ Warning: Hotter water increases the risk of scald injury.
- **Water heater size**
Do you have the correct size water heater for your requirements? The sizing guide in the Raypak sales literature and on the Rheem website (www.rheem.com.au) suggests average sizes that may be needed.



WATER HEATER NOT OPERATING

If the system water temperature is abnormally low, the ignition system may have 'locked out'. A lockout condition is indicated by the reset button being illuminated. If this occurs, the ignition system can be reset as follows:

- Note: there will be a delay of at least 5 minutes before the heater will restart to allow for the escape of any unburnt gas which may be present from a previous failed ignition attempt. Pressing the reset button before 5 minutes has elapsed will have no effect.
- Press and hold the reset button for approximately 1 second (the reset button light should extinguish).

If the water heater still fails to operate, call your nearest Rheem Service Department or Accredited Service Agent to arrange for an inspection.

DIAGNOSTIC FEATURES OF ICPLUS 902 ELECTRONIC THERMOSTAT

On/Off models incorporate an ICPlus 902 electronic thermostat. In the event of a temperature sensor fault occurring, a code will be shown on the thermostat display to diagnose the fault.

| Code | Fault |
|------|--|
| E1 | Water temperature sensor open or short circuited |

DIAGNOSTIC FEATURES OF RWF55 ELECTRONIC THERMOSTAT

Modulating models incorporate an RWF55 electronic thermostat. In the event of a temperature sensor fault occurring, a code will be shown on the thermostat display to diagnose the fault.

| Upper window (red) | Lower window (green) | Fault |
|--------------------|----------------------|--|
| 9999 (flashing) | Current set point | Water temperature sensor open circuited |
| -1999 (flashing) | Current set point | Water temperature sensor short circuited |
| 9999 (flashing) | tA | Outdoor compensation temp sensor open circuited |
| -1999 (flashing) | tA | Outdoor compensation temp sensor short circuited |

BURNER WILL NOT LIGHT

- **Is there gas to the water heater?**
Check the gas isolation valve on the gas supply line is open.
- **Is there a normal gas supply to the rest of the premises?**
Try lighting another gas appliance. If there is no gas call your gas provider.
- **Is the ignition system ‘locked out’?**
Try resetting the water heater. Refer to [“Water Heater Not Operating”](#) on page 10.
- **Has the High Limit Thermostat tripped?**
The manual reset protective over temperature cut out (high limit thermostat) will shut down the water heater in the event of a fault with the temperature control or water flow. When the system water temperature has cooled sufficiently, the high limit reset lever can be operated to restart the water heater (refer to [“High Limit Thermostat”](#) on page 39). Should frequent resetting be necessary, call your nearest Rheem Service Department or Accredited Service Agent.

PRESSURE RELIEF VALVE RUNNING

- **Normal Operation**
It is normal and desirable that the pressure relief valve allows a small quantity of water to escape during the heating cycle. However, if the discharge is deemed excessive (more than 2% of hot water used), there may be another problem.
- **Continuous dribble**
Try gently raising the easing lever on the pressure relief valve for a few seconds (refer to [“Pressure Relief Valve”](#) on page 12). This may dislodge a small particle of foreign matter and clear the fault. Release the lever gently.

Note: propane modulating models are factory fitted with a 415 kPa (60 PSI) pressure relief valve and may be replaced with the supplied 850 kPa (125 PSI) relief valve for use in mains pressure hot water applications.
- **Steady flows for long period (often at night)**
This may indicate the mains water pressure sometimes rises above the designed pressure of the water heater. Ask your installing plumber to fit a pressure limiting valve.

⚠ Warning: Never replace the pressure relief valve with one of a pressure rating greater than 850 kPa.

EXPANSION CONTROL VALVE RUNNING

If an expansion control valve is fitted in the cold water line to the water heater (refer to [“Cold Water Connection Plumbing Diagram”](#) on page 17) it may discharge a small quantity of water instead of the pressure relief valve on the water heater. The benefit is that energy is conserved as the discharged water is cooler.

HIGH GAS BILLS

Should you at any time feel your gas account is too high, we suggest you check the following points:

Is the relief valve running excessively? (Refer to [“Pressure Relief Valve Running”](#) on page 11).

Are outlets (especially the showers) using more hot water than you think? (Refer to [“Not Enough Hot Water”](#) on page 10).

Is there a leaking hot water pipe, dripping hot water tap, etc? Even a small leak will waste a surprising quantity of hot water and gas. Replace faulty tap washers, and have your plumber rectify any leaking pipe work.

Consider recent changes to your hot water usage pattern and check if there has been any increase in tariffs since your previous account.

Is there excessive heat loss from the building? Check there are no large uncovered windows or excessive draughts and that ceiling insulation is installed. Hot water piping should be well lagged (insulated) to reduce heat loss.

IF YOU HAVE CHECKED ALL THE FOREGOING AND STILL BELIEVE YOU NEED ASSISTANCE, PHONE YOUR NEAREST RHEEM SERVICE DEPARTMENT OR ACCREDITED SERVICE AGENT

REGULAR CARE

PRESSURE RELIEF VALVE

The pressure relief valve is located in the in/out header of the water heater and is essential for its safe operation. It is possible for the pressure relief valve to release a little water through the drain line during each heating period. This occurs as the water is heated and expands by approximately 1/50 of its volume.

Continuous leakage of water from the pressure relief valve and its drain line may indicate a problem with the water heater (refer to [“Pressure Relief Valve Running”](#) on page 11).

⚠ Warning: Never block the outlet of the pressure relief valve or its drain line for any reason.

Operate the easing lever on the pressure relief valve once every six months. **It is very important you raise and lower the lever gently.**

⚠ Warning: Failure to do this may result in the water heater cylinder failing.

⚠ Warning: Exercise care to avoid any splashing of water, as water discharged from the drain line will be hot. Stand clear of the drain line's point of discharge when operating the valve's lever.

If water does not flow freely from the drain line when the lever is lifted, then the water heater must be checked; phone Rheem Service or their nearest Accredited Service Agent to arrange for an inspection.

The pressure relief valve should be checked for performance or replaced at intervals not exceeding 5 years, or more frequently in areas where there is a high incidence of water deposits (refer to [“Water Supplies”](#) on page 58).

EXPANSION CONTROL VALVE

In many areas, including South Australia, Western Australia and scaling water areas, an expansion control valve is fitted to the cold water line to the water heating system. The expansion control valve may discharge a small quantity of water from its drain line during the heating period instead of the pressure relief valve on the water heater.

Operate the easing lever on the expansion control valve once every six months. **It is very important you raise and lower the lever gently.** The expansion control valve should be replaced for performance or replaced at intervals not exceeding 5 years, or more frequently in areas where there is a high incidence of water deposits.

STORAGE TANKS (IF FITTED)

Refer to the owners guide and installation instructions supplied with the storage tank for details on regular care required.

SERVICING

⚠ Warning: Servicing of a gas water heater must only be carried out by authorised personnel.

For peak performance it is suggested that the water heater be serviced by your nearest Rheem Service Department or Accredited Service Agent prior to the winter period where light to medium hot water usage occurs, and six monthly where medium to heavy usage occurs.

If Servicing is performed once a year, conduct the [“Annual Service Procedure”](#). If servicing is performed at six monthly intervals, rotate between the [“Annual Service Procedure”](#) and [“Six Monthly Service Procedure”](#)

Only genuine replacement parts should be used on this water heater.

Six Monthly Service

Refer to [“Service Procedures”](#) on page 57.

Annual Service

Refer to [“Service Procedures”](#) on page 57.

Five Year Service

Refer to [“Service Procedures”](#) on page 57.

INSTALLATION

THIS WATER HEATER IS NOT SUITABLE FOR DIRECT POOL HEATING

INSTALLATION STANDARDS

This water heater must be installed in compliance with the Plumbing Code of Australia (PCA).

Warning: – This water heater may deliver water at high temperature. Refer to the Plumbing Code of Australia, local requirements and these installation instructions to determine if additional delivery temperature control is required.

Warning: – For continued safety of this appliance, it must be installed, operated and maintained in accordance with the manufacturer's instructions.

The water heater must be installed by a qualified person, and:

- in accordance with the installation instructions, and
- in compliance with Standards AS/NZS 3500.4, AS 5601 or AS/NZS 5601.1, as applicable under local regulations, and all local codes and regulatory authority requirements.
- In New Zealand the installation must also conform to NZS 5261, as applicable under local regulations, and the New Zealand Building Code.
- The water heater must be commissioned and certified in accordance with AS3814.

PACKAGING AND INSTALLATION KIT

All packaging materials must be removed from the water heater prior to its installation. This includes the removal of the shipping pallet.

On propane models a spare 850 kPa (125 PSI) pressure relief valve is supplied inside the water heater casing for use in mains pressure water heating applications. This must be removed from the heater (and installed if required) before the water heater is operated.

WATER HEATER APPLICATION

This water heater is designed for the purpose of heating potable water or hydronic heating applications. Its use in an application other than this may shorten its life.

If this water heater is to be used where an uninterrupted hot water supply is necessary for the application or business, then there should be redundancy within the hot water system design. This should ensure the continuity of hot water supply in the event that this water heater was to become inoperable for any reason. We recommend you provide advice to the system owner about their needs and building backup redundancy into the hot water supply system.

Check the water heater is suitable for the gas type available. The gas type is marked on the side panel near the gas connection entry and is also shown on the water heaters rating label.

READ THESE INSTRUCTIONS IN FULL

INSPECTION OF EQUIPMENT

Check the water heater and associated equipment for any damage. **DO NOT INSTALL OR OPERATE ANY WATER HEATER THAT HAS BEEN DAMAGED. ANY ADDITIONAL DAMAGE OR FAULTS CAUSED BY UNAUTHORISED START UP MAY NOT BE COVERED BY WARRANTY.**

WATER HEATER LOCATION

This water heater is supplied for outdoor or indoor installation only (depending on the model). Whether located outdoor or indoor, the position of the water heater should be chosen with safety and service in mind. Make sure people (particularly children) will not touch the flue outlet. The flue terminal must be clear of obstructions and shrubbery.

Clearance must be allowed for servicing of the water heater. The water heater must be accessible without the use of a ladder or scaffold. Make sure the pressure relief valve lever is accessible and the entire front panel and burner assembly can be removed for service. Remember you may have to remove the entire water heater later for servicing.

You must be able to read the information on the rating label.

The installation must comply with these installation instructions and with the requirements of AS/NZS 3500.4, AS/NZS 3000, AS 5601 or AS/NZS 5601.1, AS 3814 and all local codes and regulatory authority requirements. In New Zealand, the installation must conform to NZS 5261 Code of Practice for Installation of Gas Burning Appliances and the New Zealand Building Code.

The water heater must not be installed in an area with a corrosive atmosphere where chemicals are stored or where aerosol propellants are released. Remember the air may be safe to breathe, but when it goes through a flame, chemical changes take place which may attack the water heater.

The water heater must be mounted on a level fire proof base such as a concrete slab, concrete plinth, steel plate etc. Water heaters must NOT be installed on carpeting.

The front of the water heater must not be obstructed by any gas or water piping, electrical conduits, etc.

SAFE TRAY

Where damage to property can occur in the event of the water heater leaking, the water heater must be installed in a safe tray. Construction, installation and draining of a safe tray must comply with AS/NZS 3500.4 and all local codes and regulatory authority requirements. AS/NZS 3500.4 also has particular requirements when a safe tray must be installed.

FIRE RESISTANT MATERIALS

Fire resistant materials should comply with the requirements of AS 5601 or AS/NZS 5601.1 Appendix C. If in doubt, seek advice from your material supplier or your local regulator.

CLEARANCES

The distances set out in the following table should be observed.

| Minimum Clearances from: | Non Combustible materials (mm) | | Combustible Materials (mm) | |
|--------------------------|--------------------------------|------------------|----------------------------|------------------|
| | 538 - 1922 | 2004 - 4224 | 538 - 1922 | 2004 - 4224 |
| Rear | 150 ¹ | 300 ¹ | 600 ¹ | 600 ¹ |
| Water Side | 600 ² | 600 | 600 | 600 |
| Front | 750 | 1200 | 750 | 1200 |
| Non Water Side | 600 ² | 600 | 600 | 600 |
| Ceiling | 1200 | 1200 | 1200 | 1200 |

Notes:

¹ For External units, if the unit is to be installed in front of wall, ESV inspectors will require the outer rim of the cowl to be 1 metre from the wall.

²The minimum clearance shown on the compliance plate is 300mm, however a minimum clearance of 600mm is required for service access.

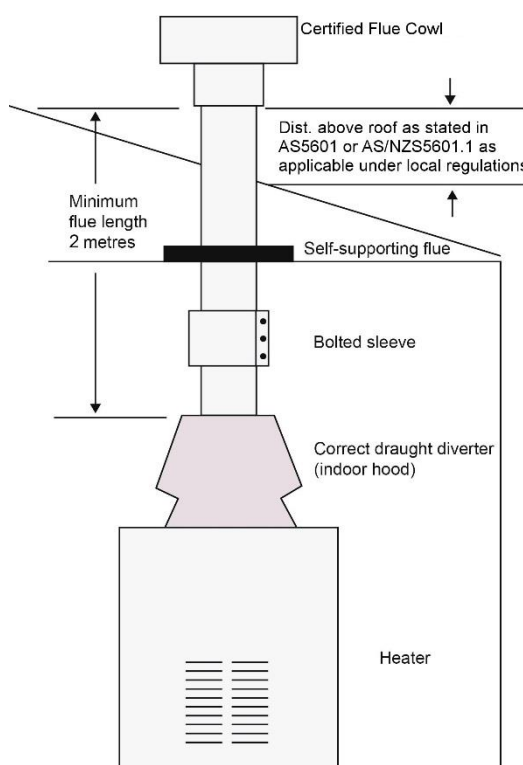
The normal water heater design is with the water pipe entry from the left hand side. For servicing purposes allow the required clearance as shown in the table in front of the water heater for burner tray removal.

INDOOR INSTALLATION

The correct draught diverter must be fixed to the top of the water heater (models 507 – 1922) and connected to a properly constructed flue to discharge the combustion products outside the building. The flue must be self-supporting and not impose a load on the water heater. Use a slip joint or similar to allow for disconnection and to enable the water heater top panel and/or draught diverter to be removed for servicing. There must be a vertical rise of 600 mm from the draught diverter before changing direction. The flue design and installation must comply with AS/NZS 5601 or AS/NZS 5601.1.

NOTE: Reduction of the flue diameter or alteration to the draught diverter may void the water heater warranty.

The water heater is to be installed at ground or floor level and must stand vertically upright. There are also special requirements in AS/NZS 5601 or AS/NZS 5601.1 for water heaters installed in a garage, an enclosed space or other locations. Remember all local authorities have regulations about putting water heaters into roof spaces.



COMBUSTION / VENTILATION AIR

Indoor model water heaters must be installed in a protective enclosure or properly constructed plant room with adequate ventilation in accordance with AS 5601 or AS/NZS 5601.1.

Ideally ventilation shall be via two permanent openings DIRECTLY to outside, one at an upper level and one at low level. Refer to AS 5601 or AS/NZS 5601.1 for ventilation requirements and calculations.

NOTE: The minimum dimension of any opening shall be 6 mm.

⚠ Warning: Air supply to the area where the water heater is installed must not be affected by mechanical exhaust vents such as kitchen or bathroom fans, spa blowers, etc. Mechanical exhaust vents may create a negative pressure in the area where the water heater is installed and can become a hazard by causing asphyxiation, explosion or fire.

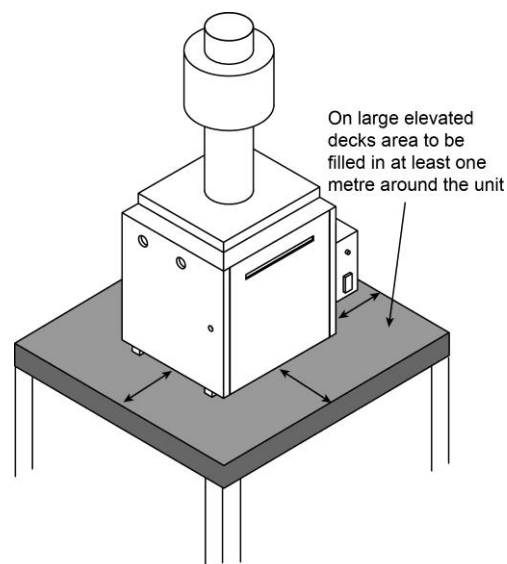
OUTDOOR INSTALLATION

The normal water heater design is with the water pipe entry from the left hand side. For servicing purposes allow the required clearance in front of the water heater for burner tray removal (refer to “Clearances” on page 14). The water heater must NOT be installed inside any roofed structure or under eaves, roof overhangs, or pool decks.

When installing the water heater on a raised base, the base material MUST be solid and filled in a distance of 1 metre all around the water heater (e.g. if steel mesh decking is used, a suitable plate material must be installed to fill in the perforations) to prevent excessive drafts entering the water heater from underneath.

The following distances extracted from the Australian Gas Installations Standard AS 5601 or AS/NZS 5601.1 must be observed:

- At least 500 mm between the top of the flue terminal and the eaves.
- At least 1 500 mm horizontally between the flue terminal and the edge of any opening into the building, measured horizontally.
- At least 500 mm between the flue terminal and a return wall or external corner, measured horizontally along the wall.
- At least 1 500 mm below any openable window.
- At least 500 mm between the flue terminal and a fence, wall or other obstruction facing the terminal.

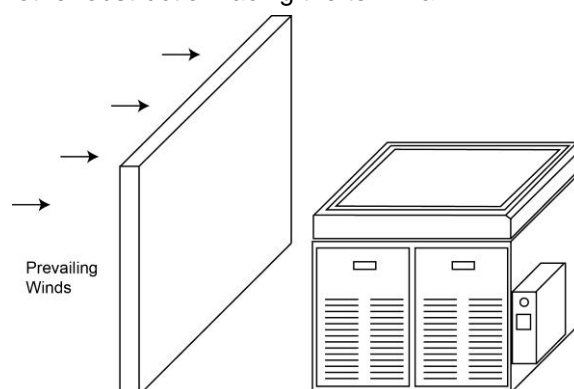


HIGH WIND CONDITIONS

In areas where high winds occur, it may be necessary to:

- Locate the water heater a minimum of one (1) metre away from high vertical walls.
- Install a wind break to protect the water heater from the prevailing winds (this may be required on more than one side).

Note: For added wind protection, all Raypak outdoor models 538 ~ 4224 come standard with a ‘high wind top’.



COLD WATER SUPPLY

Water Heating Applications

Where the cold water supply pressure exceeds that shown in the “Pressure Specifications” table on page 16, an approved pressure limiting valve is required and should be fitted as shown in the “Cold Water Connection Plumbing Diagram” on page 17.

Mechanical/Process Heating Applications

A cold water feed regulator (Pressure Reducing Valve) should be installed on the cold water make up line. The minimum water pressure should be as shown in the “Pressure Specifications” table on page 16. Backflow prevention in accordance with AS/NZS 3500.1 may be required.

Pressure Specifications

| Operation Type | On/Off | Modulating |
|--|------------------------|--------------------------|
| Relief Valve Setting | | |
| Water Heating (kPa) | 850 (700) ¹ | 850 (700) ^{1 3} |
| Mechanical Heating (kPa) | - | 415 |
| Expansion Control Valve (ECV²) Setting | | |
| Water Heating (kPa) | 700 (550) ¹ | 700 (550) ^{1 3} |
| Mechanical Heating (kPa) | - | - |
| Minimum Supply Pressure | | |
| System water temperatures up to 65°C (kPa) | 70 | 70 |
| System water temperatures above 65°C (kPa) | 120 | 120 |
| Maximum Supply Pressure | | |
| without ECV ² fitted | | |
| Water Heating (kPa) | 680 (550) ¹ | 680 (550) ^{1 3} |
| Mechanical Heating (kPa) | - | 330 |
| with ECV ² fitted | | |
| Water Heating (kPa) | 550 (450) ¹ | 550 (450) ^{1 3} |
| Mechanical Heating (kPa) | - | - |

¹ Figures in brackets are to be used if a Wilson stainless steel storage tank is utilised in the system.

² Expansion control valve is not supplied with the water heater.

³ An 850 kPa relief valve can be fitted to modulating water heaters when used in water heating applications.

TANK WATER SUPPLY

If the water heater is supplied with water from a tank supply and a pressure pump system is not installed, then the height to the bottom of the supply tank must be as specified in the table shown opposite.

| Minimum Tank Height | |
|--------------------------------------|-----------|
| System water temperatures up to 65°C | 7 metres |
| System water temperatures above 65°C | 12 metres |

HOT WATER DELIVERY (WATER HEATING APPLICATIONS)

This water heater can deliver water at temperatures which can cause scalding.

It is necessary and we recommend that a temperature limiting device be fitted between the water heating system and the hot water outlets in any ablution and public areas such as bathrooms, ensuites or public amenities, to reduce the risk of scalding. The installing plumber may have a legal obligation to ensure the installation of this water heater meets the delivery water temperature requirements of AS/NZS 3500.4 so that scalding water temperatures are not delivered to a bathroom, ensuite, or other ablution or public area.

Where a temperature limiting device is installed adjacent to the hot water storage tanks, the cold water line to the temperature limiting device can be branched off the cold water line either before or after the isolation valve, pressure limiting valve and non return valve to the storage tanks. If an expansion control valve is required, it must always be installed after the non return valve and be the last valve prior to the water heating system.

If a pressure limiting valve is installed on the cold water line to the water heating system and the cold water line to a temperature limiting device branches off before this valve or from another cold water line in the premises, then a pressure limiting valve of an equal pressure setting may be required prior to the temperature limiting device.

REDUCING HEAT LOSSES (WATER HEATING APPLICATIONS)

The cold water line to and the hot water line from the storage cylinder must be insulated in accordance with the requirements of AS/NZS 3500.4. The insulation must be weatherproof and UV resistant if exposed.

Keep temperature settings down. Lower temperatures reduce heat losses and prolong storage cylinder life. Do not set the electronic thermostat set point above 70°C unless it is necessary. A time clock to control the electrical supply can be used to switch off the water heater during hours or days when it is not in use.

Energy consumption can be reduced by installing a remote thermostat and Economaster run on timer (supplied separately) to turn off the primary circulating pump after a short period of time when heating has been satisfied.

CONNECTIONS – PLUMBING

IMPORTANT: When installing a new water heater to an old or existing system, it is a requirement that the system and its equipment be thoroughly inspected and if necessary, drained and flushed with clean fresh water, before the new water heater is connected. Failure to do this may cause blockages and/or damage to the water heater which is not covered by warranty.

IF THERE IS ANY DOUBT ABOUT THE SYSTEM, DRAIN AND FLUSH AS A PRECAUTION.

CONNECTION SIZES

| Model | 538 | 658 | 768 | 868 |
|--------------------------|------|------|------|------|
| Inlet/Outlet Water | RC2½ | RC2½ | RC2½ | RC2½ |
| Relief Valve | RC¾ | RC¾ | RC¾ | RC¾ |
| Gas (Natural On/Off) | R1 | R1½ | R1½ | R1½ |
| (Natural Modulating) | R1 | R1 | R1½ | R1½ |
| Gas (Propane Modulating) | | R¾ | | |

| Model | 972/992 | 1142/1182 | 1242/1292 | 1362/1412 | 1662/1722 | 1852/1922 |
|--------------------------|---------|-----------|-----------|-----------|-----------|-----------|
| Inlet/Outlet Water | RC2½ | RC2½ | RC2½ | RC2½ | RC2½ | RC2½ |
| Relief Valve | | | | | | |
| On/Off Models | RC¾ | RC¾ | RC¾ | RC¾ | RC¾ | RC¾ |
| Modulating Models | RC¾ | RC¾ | RC¾ | RC¾ | RC1 | RC1 |
| Gas (Natural On/Off) | R1½ | R1½ | R1½ | R1½ | R2 | R2 |
| (Natural Modulating) | R1½ | R1½ | R1½ | R1½ | R2 | R2 |
| Gas (Propane Modulating) | R¾ | | | R1 | | R1½ |

| Model | 2004/2214 | 2404/2634 | 2804/3164 | 3304 | 3694 | 3804/4224 |
|----------------------|-----------|-----------|-----------|------|------|-----------|
| Inlet/Outlet Water | RC3 | RC3 | RC3 | RC3 | RC3 | RC3 |
| Relief Valve | | | | | | |
| On/Off Models | RC¾ | RC¾ | RC1 | RC1 | RC1 | RC1 |
| Modulating Models | RC1¼ | RC1¼ | RC1½ | RC1½ | RC1½ | RC1½ |
| Gas (Natural On/Off) | R2 | R2½ | R2½ | R2½ | R3 | R3 |
| (Natural Modulating) | R2 | R2½ | R2½ | R2½ | R3 | R3 |

All plumbing work must be carried out by a qualified person and in accordance with the National Plumbing Standard AS/NZS 3500.4 and local authority requirements.

All gas work must be carried out by a qualified person and in accordance with the Australian Gas Installations Standard AS 5601 or AS/NZS 5601.1, AS3814 and local authority requirements.

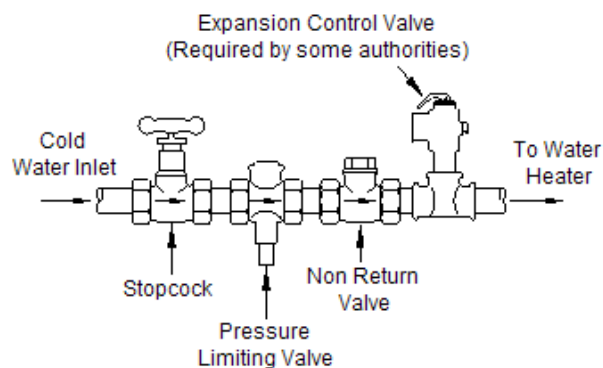
WATER INLET AND OUTLET

All pipe work must be cleared of foreign matter before connection and purged before attempting to operate the water heater. All olive compression fittings must use brass or copper olives. Use thread sealing tape or approved thread sealant on all other fittings.

An isolation valve and non return valve must be installed on the cold water line to the water heating system. An acceptable arrangement is shown in the diagram opposite for a water heating application.

A disconnection union must always be provided at the inlet and outlet on the water heater to allow for disconnection of the water heater.

Do not reduce the pipe work size and water heater water connections without allowing for friction loss which will occur. Low water flow will cause damage to the water heater and system components.



COLD WATER CONNECTION PLUMBING DIAGRAM

PIPE SIZING AND PUMP SELECTION

The pipe sizing for water heating and mechanical heating systems should be carried out by persons competent to do so, choosing the most suitable pipe size for each individual application. Reference to the technical specifications of the water heater and local regulatory authority requirements must be made.

The “[Pump Selection and Pipe Size](#)” table on page 18 provides indicative pipe and pump sizes between Raypak unit/s and storage tank/s for **typical water heating installations using storage tanks (DHW) up to a maximum set-point of 65°C**. The selection assumes a total of 20m of piping, i.e. flow AND return between Raypak heater and storage tanks and 20 x 90 degree bends including reverse return piping. Storage tank and water heater manifolding lengths are assumed to be same diameter as header pipe and therefore these lengths can be ignored in the determination of pipe size and pump selection. Pipe sizing has been carried out for a design velocity in the pipework of 1.2m/sec for a temperature rise between 15°C and 20°C.

| PUMP SELECTION AND PIPE SIZE | | | | | | | |
|------------------------------|----------|-------------|-----|---|---------|---------|---------|
| Model | Pump | Branch Size | | Minimum Manifold Header Size Required (mm) / Pump Speed | | | |
| | | inches | mm | 1 Unit | 2 Units | 3 Units | 4 Units |
| 538 | 32-80N | 2 | 50 | 50/3 | 65/3 | 80/3 | 100/3 |
| 658 | 32-80N | 2 | 50 | 50/3 | 80/3 | 80/3 | 100/3 |
| 768 | 40-60/2B | 2 | 50 | 50/2 | 80/2 | 100/2 | 100/2 |
| 868 | 40-60/2B | 2½ | 65 | 65/2 | 80/2 | 100/2 | 100/3 |
| 972/992 | 40-60/2B | 2½ | 65 | 65/3 | 80/3 | 100/3 | 125/3 |
| 1142/1182 | 50-120FB | 2½ | 65 | 65/1 | 100/1 | 100/1 | 125/1 |
| 1242/1292 | 50-120FB | 2½ | 65 | 65/1 | 100/2 | 125/2 | 125/2 |
| 1362/1412 | 50-120FB | 2½ | 65 | 65/1 | 100/2 | 125/2 | 125/1 |
| 1662/1722 | 50-120FB | 3 | 80 | 80/3 | 100/3 | 125/3 | 150/3 |
| 1852/1922 | 50-120FB | 3 | 80 | 80/3 | 100/3 | 125/3 | 150/3 |
| 2004/2214 | 50-120FB | 4 | 100 | 100/3 | 125/3 | 150/3 | 200/3 |
| 2404 | 50-120FB | 4 | 100 | 100/3 | 125/3 | 150/3 | 200/3 |
| 2634 | 50-120FB | 4 | 100 | 100/3 | 125/3 | 200/3 | 200/3 |
| 2804 | 80-120FB | 4 | 100 | 100/2 | 150/2 | 200/3 | 200/3 |
| 3164 | 80-120FB | 4 | 100 | 100/2 | 150/2 | 200/3 | 200/3 |
| 3304 | 80-120FB | 4 | 100 | 100/2 | 150/3 | 200/3 | 200/3 |
| 3694 | 80-120FB | 5 | 125 | 125/3 | 150/3 | 200/3 | |
| 3804 | 80-120FB | 5 | 125 | 125/3 | 150/3 | 200/3 | |
| 4224 | 80-120FB | 5 | 125 | 125/3 | 200/3 | | |

PUMP SELECTION MECHANICAL APPLICATIONS

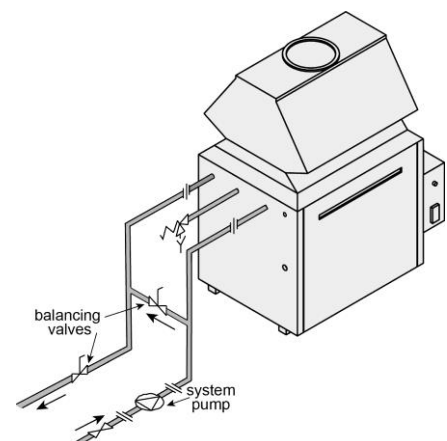
For the most efficient operation of the water heating system the circulating pump must be sized correctly.

The pump should be installed on the inlet to the water heater especially where the system water pressure is low.

Refer to the “[Water Flow Rate and Pressure Drop](#)” table on page 19 for the minimum and maximum flow rates for each model to determine the pressure loss through the water heater for the required temperature rise and add this to the other system pressure losses when sizing the pump.

Note: The flow rate must never be below the minimum stated in the “[Water Flow Rate and Pressure Drop](#)” table.

Where the water flow rate exceeds the maximum shown in the “[Water Flow Rate and Pressure Drop](#)” table, a bypass with a balancing valve must be installed to reduce the water flow through the water heater (refer to diagram above).



| WATER FLOW RATE AND PRESSURE DROP | | | | | | |
|-----------------------------------|-----------|-----|-----------|-----|-----------|-----|
| Model | 10°C Rise | | 15°C Rise | | 20°C Rise | |
| | l/sec | kPa | l/sec | kPa | l/sec | kPa |
| 538 | 2.87 | 6 | 1.91 | 3 | 1.43 | 3 |
| 658 | 3.58 | 10 | 2.39 | 4 | 1.79 | 3 |
| 768 | 4.06 | 14 | 2.71 | 6 | 2.03 | 4 |
| 868 | 4.66 | 22 | 3.11 | 8 | 2.33 | 5 |
| 972 | 5.26 | 27 | 3.5 | 12 | 2.63 | 7 |
| 992 | 5.38 | 29 | 3.58 | 12 | 2.69 | 7 |
| 1142 | 6.09 | 43 | 4.06 | 18 | 3.05 | 10 |
| 1182 | 6.31 | 44 | 4.22 | 18 | 3.17 | 11 |
| 1242 | 6.31 | 46 | 4.38 | 24 | 3.28 | 13 |
| 1292 | 6.31 | 47 | 4.54 | 24 | 3.4 | 15 |
| 1362 | 6.31 | 49 | 4.78 | 30 | 3.58 | 16 |
| 1412 | 6.31 | 49 | 5.02 | 30 | 3.76 | 18 |
| 1662 | 6.31 | 55 | 5.68 | 50 | 4.42 | 27 |
| 1722 | 6.31 | 55 | 5.68 | 50 | 5.54 | 30 |
| 1852 | 6.31 | 58 | 5.68 | 58 | 4.9 | 31 |
| 1922 | 6.31 | 58 | 5.68 | 58 | 5.14 | 39 |
| 2004 | 10.63 | 45 | 7.09 | 18 | 5.32 | 12 |
| 2214 | 12.06 | 48 | 8.04 | 20 | 6.03 | 12 |
| 2404 | 12.62 | 49 | 8.44 | 27 | 6.33 | 17 |
| 2634 | 12.62 | 49 | 9.56 | 29 | 7.17 | 18 |
| 2804 | 12.62 | 53 | 9.95 | 35 | 7.47 | 21 |
| 3164 | 12.62 | 50 | 11.47 | 38 | 8.6 | 23 |
| 3304 | 12.62 | 57 | 11.79 | 53 | 8.84 | 30 |
| 3694 | 12.62 | 54 | 12.62 | 54 | 10.03 | 30 |
| 3804 | 12.62 | 60 | 12.62 | 57 | 10.09 | 42 |
| 4224 | 12.62 | 57 | 12.62 | 57 | 11.47 | 42 |

Intermittent Pump Operation

For applications utilising intermittent pump operation, a run on timer is provided (modulating models only). For on/off models, an optional pump run on timer kit part number 56076874 must be fitted to the water heater to prevent nuisance tripping of the high limit thermostat due to residual heat build up in the heat exchanger. The timer should be set to allow the pump to operate (run on) for at least ten (10) minutes.

Minimum Pump Inlet Pressure

Circulating pumps require a minimum inlet pressure in order to operate without cavitation. For the minimum pressure requirements for Grundfos UPS series pumps, refer to the [“Minimum Pressure Requirements for Grundfos Series Pumps”](#) table on page 20. Minimum pressure requirements for TP series pumps depend on system characteristics and need to be calculated. Contact your pump supplier for more information.

| MINIMUM PRESSURE REQUIREMENTS FOR GRUNDFOS UPS SERIES PUMPS | | | | | | |
|---|---|--|------|------|------|------|
| Pump | Models | Minimum Inlet Head Required at Operating Temperature (m) | | | | |
| | | 75°C | 80°C | 85°C | 90°C | 95°C |
| UPS32-80N | 538,658 | 0.5 | 0.5 | 0.5 | 3.0 | 5.0 |
| UPS40-60/2B | 768,868,972,992 | 1.5 | 2.5 | 3.5 | 4.5 | 7.0 |
| UPS50-120FB | 1142,1182,1242,1292, 1362,1412,1662,1722,1852,1922, 2004, 2214, 2404,2634 | 4.0 | 5.0 | 6.0 | 7.0 | 9.0 |
| UPS80-120FB | 2804,3164,3304,3694,3804,4224 | 16.0 | 17.0 | 18.0 | 19.0 | 20.5 |

WATER HEATING

Where the water heater is supplied as part of a package, including the storage cylinder and pump, the installation must comply with the drawing provided. Failure to observe this requirement may result in ineffective hot water capacity or damage.

GAS INLET

The pipe work must be cleared of foreign matter before connection and purged at the union to the gas control or pressure regulator before attempting to light the water heater. If this procedure is not performed, a flame failure lockout may result on initial start-up.

An isolation valve and disconnection union must be installed to allow servicing and removal of the water heater. Refer to AS 5601 or AS/NZS 5601.1 for the correct pipe sizing.

⚠ Warning: Before pressure testing the gas supply system always isolate and disconnect the water heater after the isolating cock to prevent the risk of serious damage to the gas control or pressure regulator. Warranty does not cover damage of any nature resulting from failure to observe this precaution. Refer to the water heaters rating label for gas types and pressures.

The heater and its gas connection must be thoroughly leak tested before placing in operation. Use soapy water and a manometer to test for gas leaks. **DANGER!** Do not use an open flame to check for gas leaks.

CAUTION: Care is necessary when tightening fittings into the gas control or pressure regulator. The gas control or pressure regulator casting may crack if the fittings are over tightened. Cracked castings are not covered under warranty. Damaged gas controls and pressure regulators must be replaced.

COLD WATER SUPPLY / MAKEUP

All pipe work must be cleared of foreign matter before connection and purged before attempting to operate the water heater. All olive compression fittings must use brass or copper olives. Use thread sealing tape or an approved thread sealant on all other fittings.

Mechanical, Hydronic and Process Heating Applications

The pressure of the makeup supply must be controlled. This may be achieved by the use of a pressure limiting valve or a header tank which is designed to provide the correct operating pressure for the system.

Where the water heater is fitted with a 60 PSI relief valve, the maximum supply pressure setting must not exceed 330 kPa. The minimum inlet pressure is dependent on a number of factors including operating temperature, minimum inlet pressure for circulating pumps and system pressure losses.

Backflow prevention in accordance with AS/NZS 3500.1 may be required, please check with the local water supply authority for any local code requirements.

A suitably sized expansion vessel must be fitted to a closed heating system to prevent discharge of system fluid during the heating cycle.

Domestic Hot Water Applications

An isolation valve and non return valve must be installed on the cold water line to the system. An acceptable arrangement is shown in the [“Cold Water Connection Plumbing Diagram”](#) on page 17.

The cold water supply to a domestic water heating system must be fitted with a pressure limiting valve if the water supply pressure exceeds 80 % of the lowest rated relief valve in the system.

Note: A limited range of models suitable for use on propane gas is available. These are supplied with modulating gas valves only and are suitable for use in hot water applications as well as mechanical heating or process applications.

A spare 850 kPa (125 PSI) pressure relief valve is supplied inside the water heater casing for use in mains pressure water heating applications. The fitted 415 kPa (60 PSI) pressure relief valve should be removed and the higher pressure rating valve installed before the water heater is operated in domestic hot water applications.

The cold water supply pressure must be sufficient to provide adequate flow at the fixtures.

EXPANSION CONTROL VALVE

Local regulations may make it mandatory to install an expansion control valve (ECV) in the cold water line to the water heating system. In other areas, an ECV is not required unless the saturation index is greater than + 0.4 (refer to “Water Supplies” on page 58). However, an ECV may be needed in a corrosive water area where there are sufficient quantities of silica dissolved in the water.

The ECV must always be installed after the non-return valve and be the last valve installed prior to the water heater (refer to plumbing diagram shown above). A copper drain line must be run separately from the drain of the ECV.

RELIEF VALVE DRAIN

A copper drain line must be fitted to each relief valve (Pressure Relief and ECV if fitted) to carry the discharge clear of the water heater. Connect the drain line to the relief valve using a disconnection union. The pipe work from the relief valve to the drain should be as short as possible and fall all the way from the water heater with no restrictions. It should have no more than three right angle bends in it. Use DN20 pipe.

The outlet of the drain line must be in such a position that flow out of the pipe can be easily seen (refer to AS/NZS 3500.4) - but arranged so hot water discharge will not cause injury, damage or nuisance. The drain line must discharge at an outlet or air break not more than 9 metres from the relief valve.

In locations where water pipes are prone to freezing, the drain line must be insulated and not exceed 300 mm in length. In this instance, the drain line is to discharge into a tundish through an air gap of between 75 mm and 150 mm.

The drain lines from each relief valve can discharge into a common tundish. This also applies to the drain lines from each water heater in multiple installations.

⚠ Warning: As the function of the temperature pressure relief valve on this water heater is to discharge high temperature water under certain conditions, it is strongly recommended the pipe work downstream of the relief valve be capable of carrying water exceeding 93°C. Failure to observe this precaution may result in damage to pipe work and property.

PLUMBING CONNECTIONS

Domestic Hot Water Applications

For domestic hot water applications, one or more storage tanks are required.

- Install the storage tanks according to “Equa-flow® principles” (as described in the installation instructions supplied with the storage tanks and detailed on page 22) and the “Plumbing Diagrams” shown on page 23.
- Install the water heaters according to “Equa-flow® principles” (detailed on page 22) and the “Plumbing Diagrams” shown on page 23.
- Install the pump as detailed in the “Plumbing Diagrams” shown on page 23.

Note: A disconnection union must always be provided at the cold water inlet and hot water outlet on the water heater to allow for disconnection of the water heater.

Mechanical, Hydronic and Process Heating Applications

Refer to page 24.

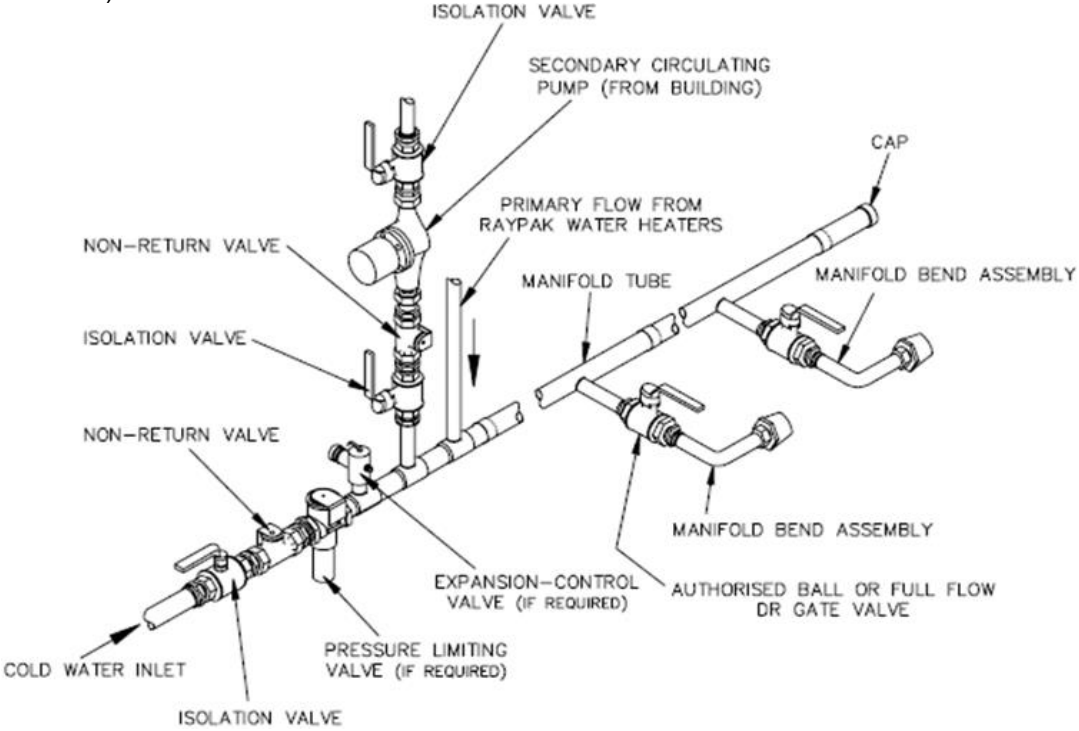
Closed Loop Water Source Heat Pump Applications

Refer to page 25.

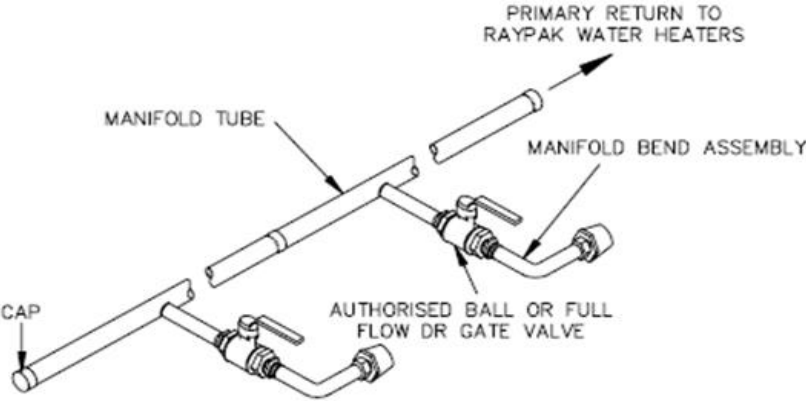
Equa-Flow® Principles

The principle of Equa-Flow® is to ensure the demand on each water heater, or storage cylinder in the bank is the same as any other. To achieve this, the following is necessary:

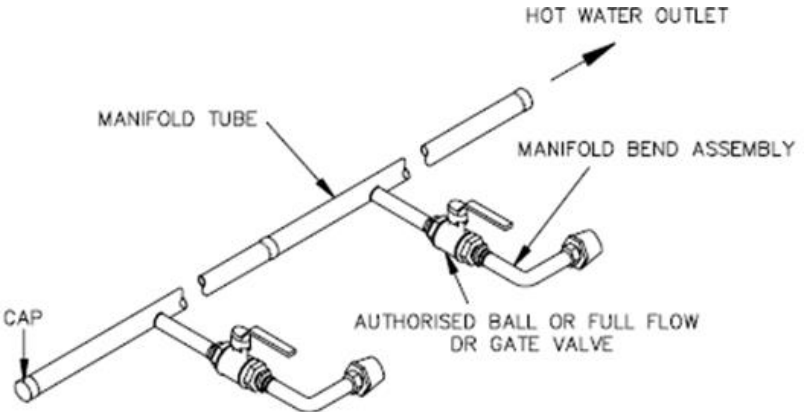
- 1. The **cold** water manifold (cold header assembly) must be designed to balance the flow to each unit i.e. each branch line must be the same diameter and length and be fitted with identical ball or gate valves (refer to diagram below).



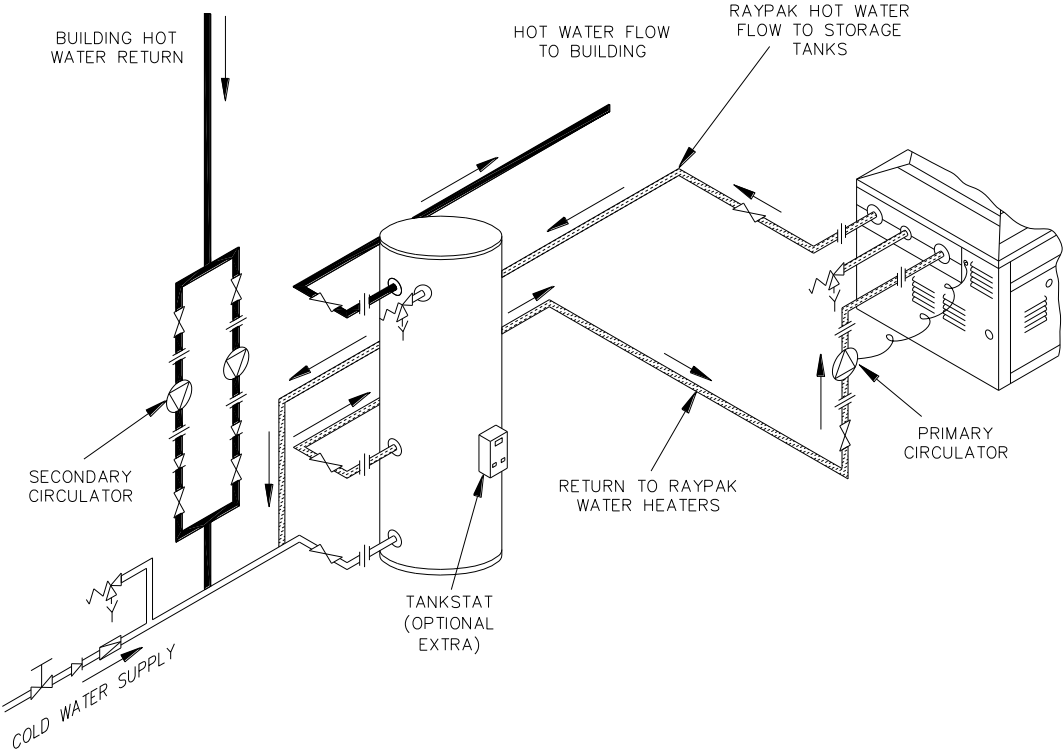
- 2. The **heating** water manifold (heating header assembly) must be designed to balance the flow from each unit i.e. each branch line must be the same diameter and length and be fitted with identical ball or gate valves (refer to diagram opposite).



- 3. The **hot** water manifold (hot header assembly) must be designed to balance the flow from each unit i.e. each branch line must be the same diameter and length and be fitted with identical ball or gate valves (refer to diagram opposite).



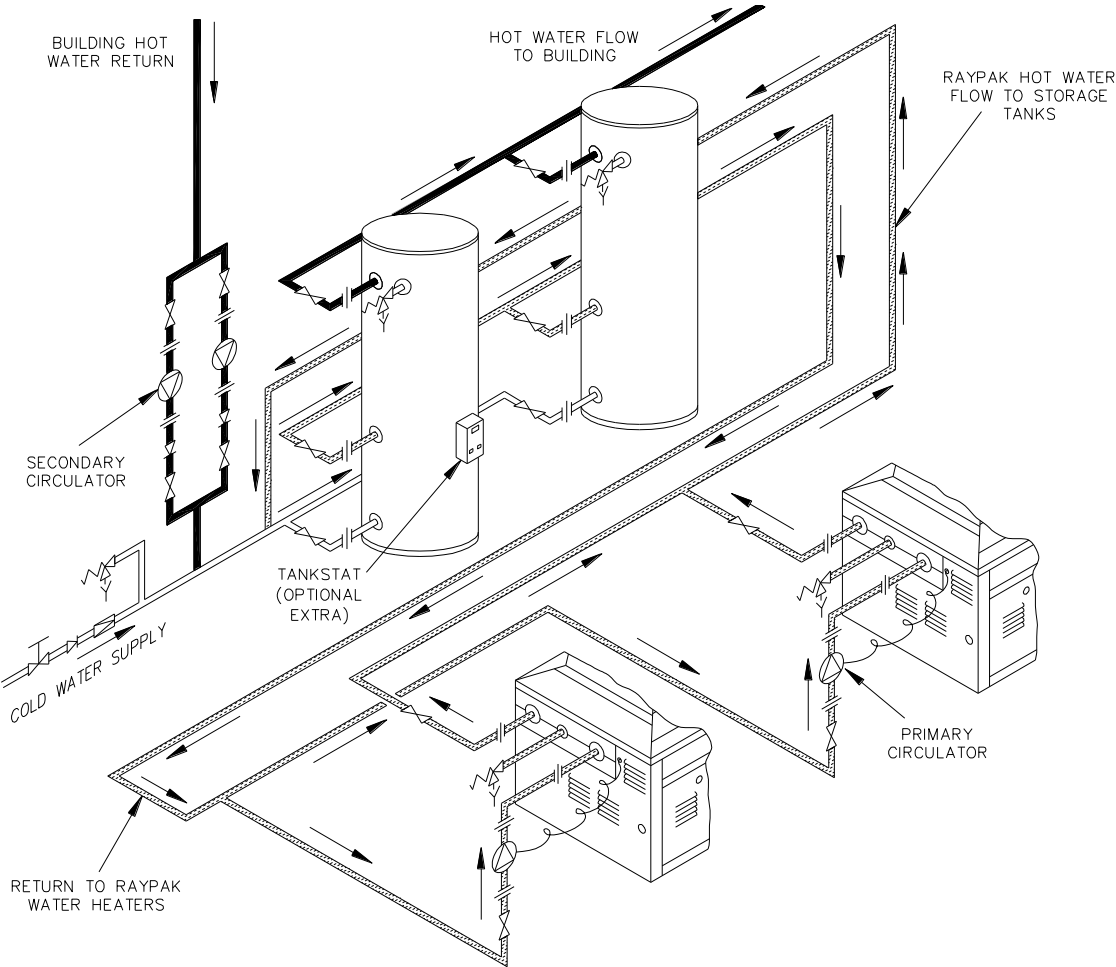
Plumbing Diagrams



LEGEND

- ⊥ STOP VALVE
- ▽ NON RETURN VALVE
- ⊠ PRESSURE LIMITING VALVE
- ⊞ EXPANSION CONTROL VALVE
- ⊘ GATE OR BALL VALVE
- ⊙ CIRCULATOR
- ≡ UNION
- Y TUNDISH
- DIRECTION OF FLOW
- COLD WATER SUPPLY
- ▨ PRIMARY FLOW & RETURN
- HOT WATER FLOW & RETURN

Typical Installation – One Water Heater One Storage Tank



LEGEND

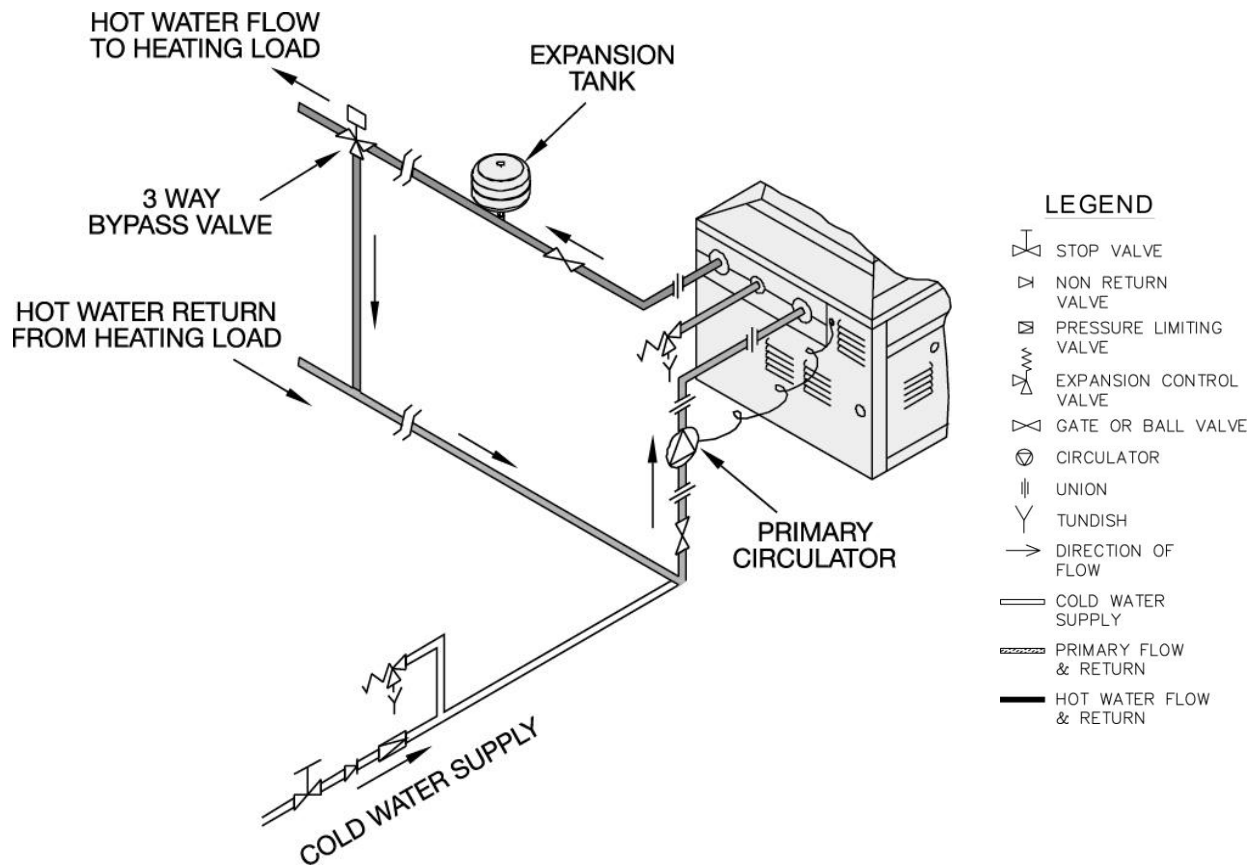
- ⊥ STOP VALVE
- ▽ NON RETURN VALVE
- ⊠ PRESSURE LIMITING VALVE
- ⊞ EXPANSION CONTROL VALVE
- ⊘ GATE OR BALL VALVE
- ⊙ CIRCULATOR
- ≡ UNION
- Y TUNDISH
- DIRECTION OF FLOW
- COLD WATER SUPPLY
- ▨ PRIMARY FLOW & RETURN
- HOT WATER FLOW & RETURN

Typical Installation – Two Water Heaters, Two Storage Tanks

Mechanical, Hydronic and Process Heating Applications

For these applications, storage tanks are normally not required. Connect the water heaters and pumps in accordance with the principles shown in the diagram below with the following in mind:

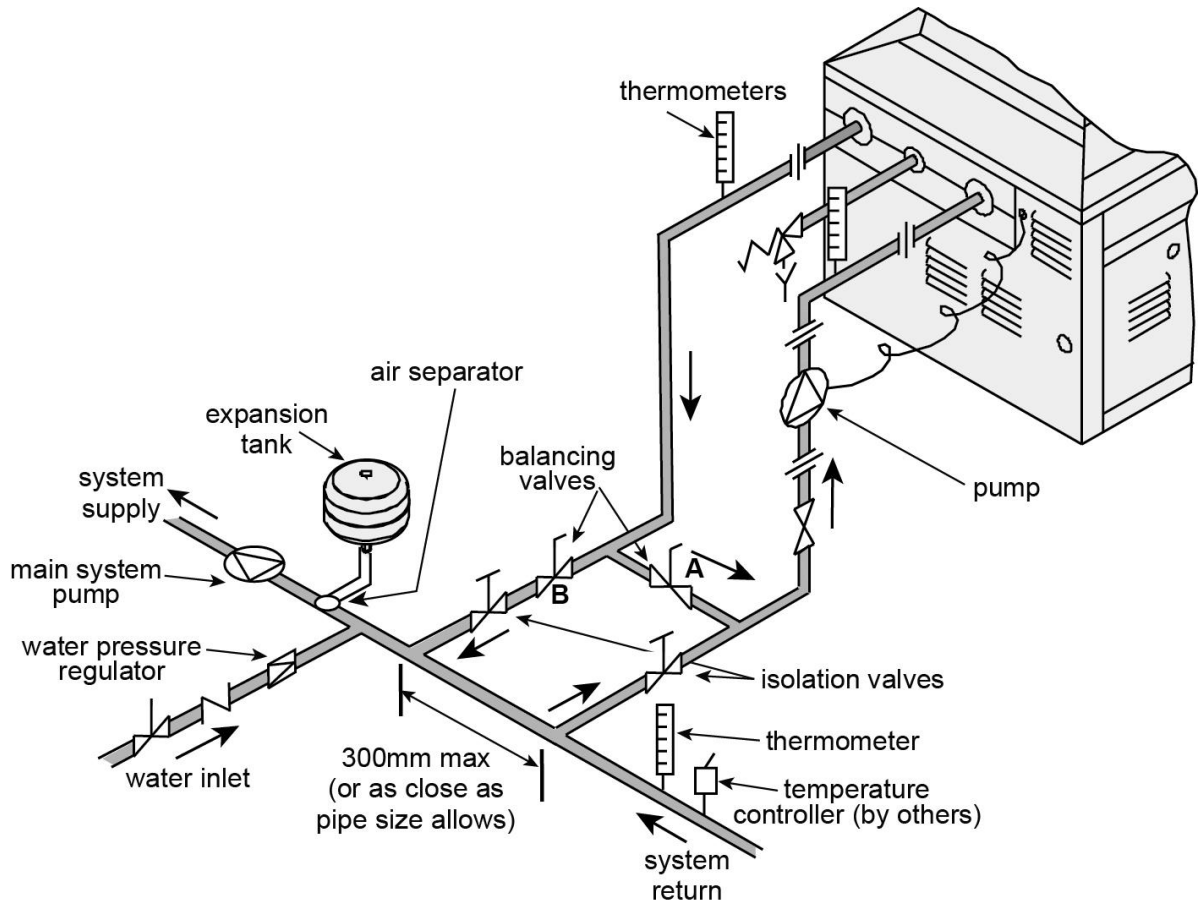
- Install the water heaters according to “Equa-flow® principles” detailed on page 22.
- A disconnection union must always be provided at the cold water inlet and hot water outlet on the water heater to allow for disconnection of the water heater.
- Each high point of the system should be fitted with an air bleed valve or automatic air eliminator.
- On radiator or heating systems where thermostatic or zone valves will vary the water flow through the load, a by-pass with a suitable control valve must be installed to control the system water flow rate. **BYPASS VALVES must be installed at the end of the system furthest from the water heater.**



Typical Installation – Raypak Mechanical Heating System

Closed Loop Water Source Heat Pump Applications

1. Only use a water heater with on/off controls. Note: on/off models not available in propane gas
2. The bypass pipe diameter **MUST** be the same as the inlet and outlet pipes.
3. Select the pipe size between the heater and the system loop main, equal to the inlet/outlet header connections of the water heater (as a minimum).
4. Install the correct pump. The temperature rise must be between 10°C and 15°C. Refer to the [“Pump Selection and Pipe Size”](#) table on page 18.



Typical Installation – Closed Loop Water Source Heat Pump

CONNECTIONS – ELECTRICAL

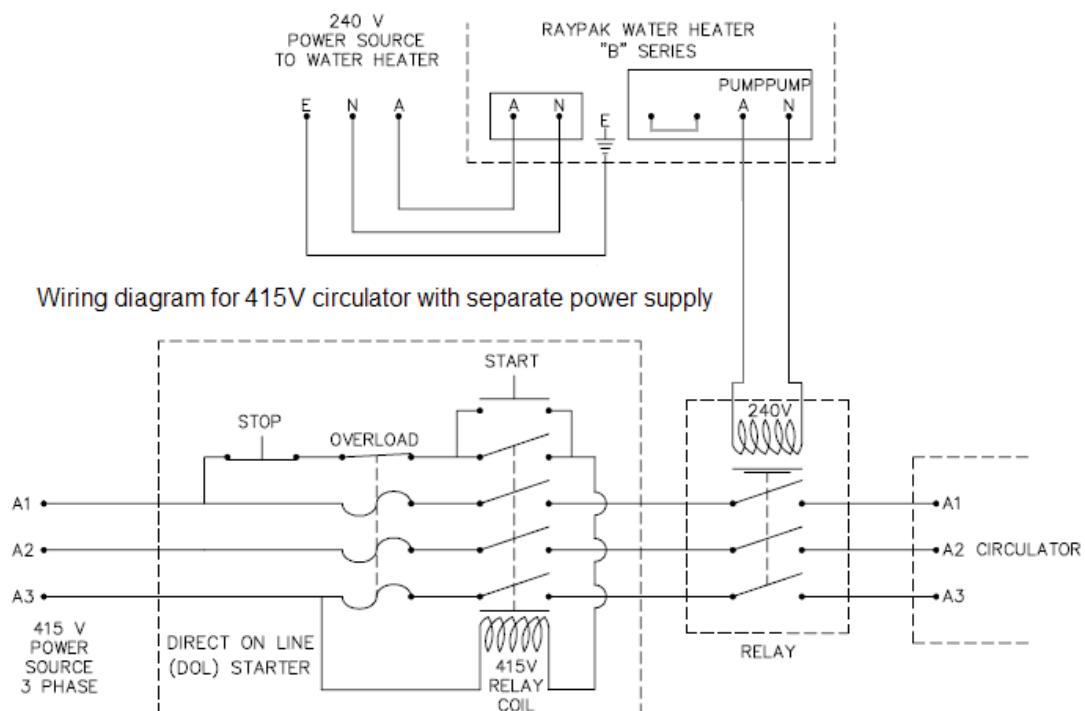
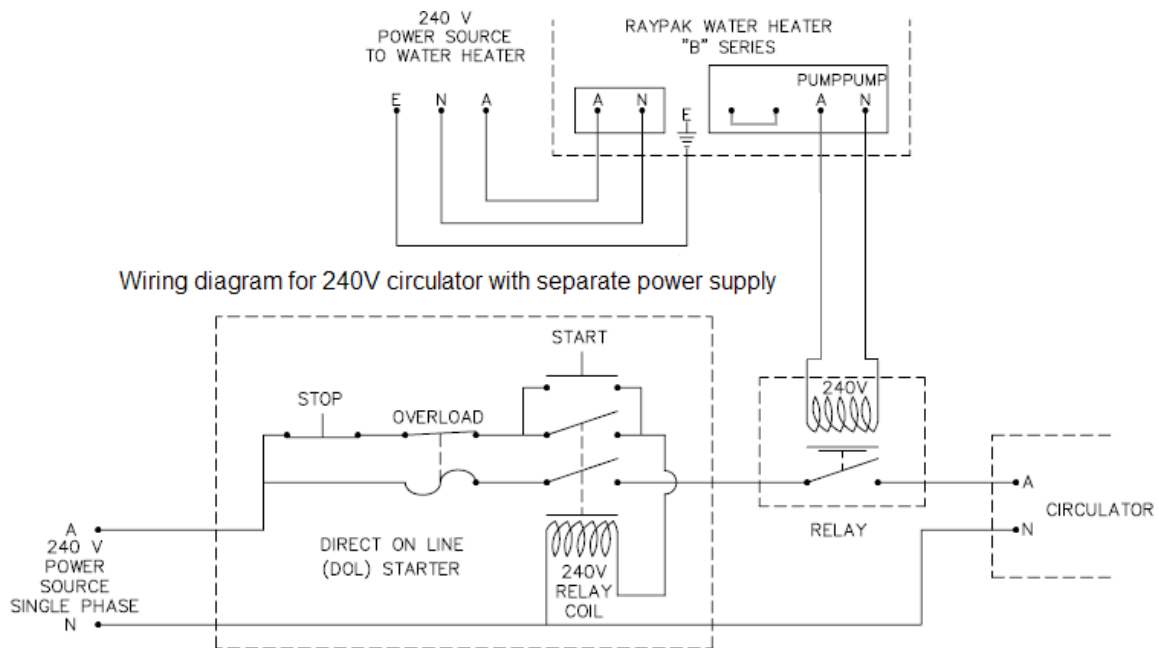
The electrical installation must comply with AS/NZS 3000, AS 5601 or AS/NZS 5601.1 and any local requirements.

This water heater must be hard wired to a 240V AC 50 Hz M.E.N. (multiple earthed neutral) mains power supply with an all pole isolating switch installed adjacent to and accessible from the water heater (refer to AS 5601, 5.2.11 or AS/NZS 5601.1:2010 clause 6.2.8). A suitable warning label must be affixed to the water heater if there are additional control circuits not isolated by this switch. This label should direct the service person to the isolation switch for that circuit.

Do not locate conduits across the doors, control panel or the top of the water heater.

Where a conduit is to be mounted on the water heater cabinet there must be a 10 mm air gap between the conduit and the water heater cabinet to prevent overheating of the wiring.

The power supply for the pump and the water heater must be supplied from the same circuit and isolating switch; alternatively the circulator power supply may be switched by a relay as depicted in the following wiring diagrams.



⚠ Warning: THE WATER HEATER MUST NOT OPERATE WITHOUT THE CIRCULATING PUMP RUNNING.

ELECTRONIC THERMOSTAT TEMPERATURE SETTING (SET POINT)

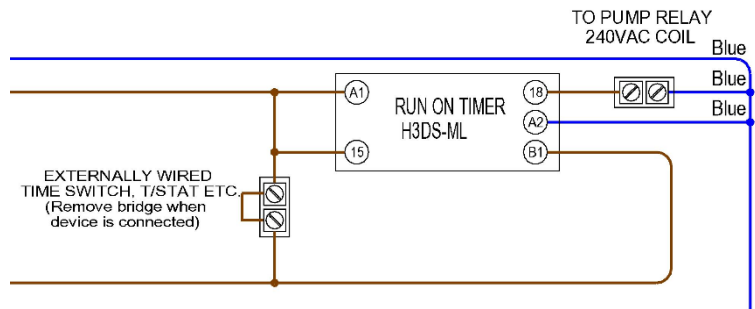
For reasons of safety and economy, we recommend that the electronic thermostat set point is set at the lowest temperature that will provide sufficient hot water. Discuss the temperature setting requirements with the householder or responsible officer. Refer to “Temperature Control” on page 49.

INTERMITTENT PUMP OPERATION

For applications utilising intermittent pump operation, a run on timer is provided (modulating models only). For on/off models, an optional pump run on timer kit part number 56076874 must be fitted to the water heater to prevent nuisance tripping of the high limit thermostat due to residual heat build up in the heat exchanger. The timer should be set to allow the pump to operate (run on) for at least ten (10) minutes.

EXTERNAL CONTROLS

Modulating models can be wired for use with an external control such as a remote thermostat or a remote time switch. To connect an external control to the water heater it is necessary to remove the bridging wire between terminals marked “TO TANKSTAT” and “FROM TANKSTAT” and connect the external control across these two terminals (refer to the diagram opposite and to the wiring diagrams on pages 30 to 38).



On/Off models may be wired as depicted above with the installation of kit 56076874 (supplied separately).

Where a remote thermostat such as a tankstat is utilised, the water heaters electronic thermostat set point should be adjusted to 5° higher than the setting on the remote thermostat (Refer to "Temperature Control" on page 49).

POWER FLUEING

If the flue cannot be designed as outlined in the ‘Indoor Installation’ section on page 14, then a power flue may be required. Power flues must be designed by persons competent to do so and must be electrically interlocked with the water heater(s). Contact Raypak for power flue wiring diagrams.

FLOW SWITCH

A flow switch is provided with the water heater and is wired to prevent operation of the main burner in the event of no water flow. Refer to “Flow Switch Adjustment” on page 48.

⚠ Warning: THE WATER HEATER MUST NOT OPERATE WITHOUT THE CIRCULATING PUMP RUNNING.

BUILDING MANAGEMENT SYSTEM (BMS)

For applications requiring connection to a building management system, relays are installed as standard on all models to provide ‘run’ and ‘fail’ status indication. The diagram on page 28 details a typical BMS system interface.

AMBIENT AIR COMPENSATOR

An Ambient Air Compensator (not supplied) may be installed and connected to the RWF55 electronic thermostat on modulating models (refer to “Ambient Air Compensator” on page 56).

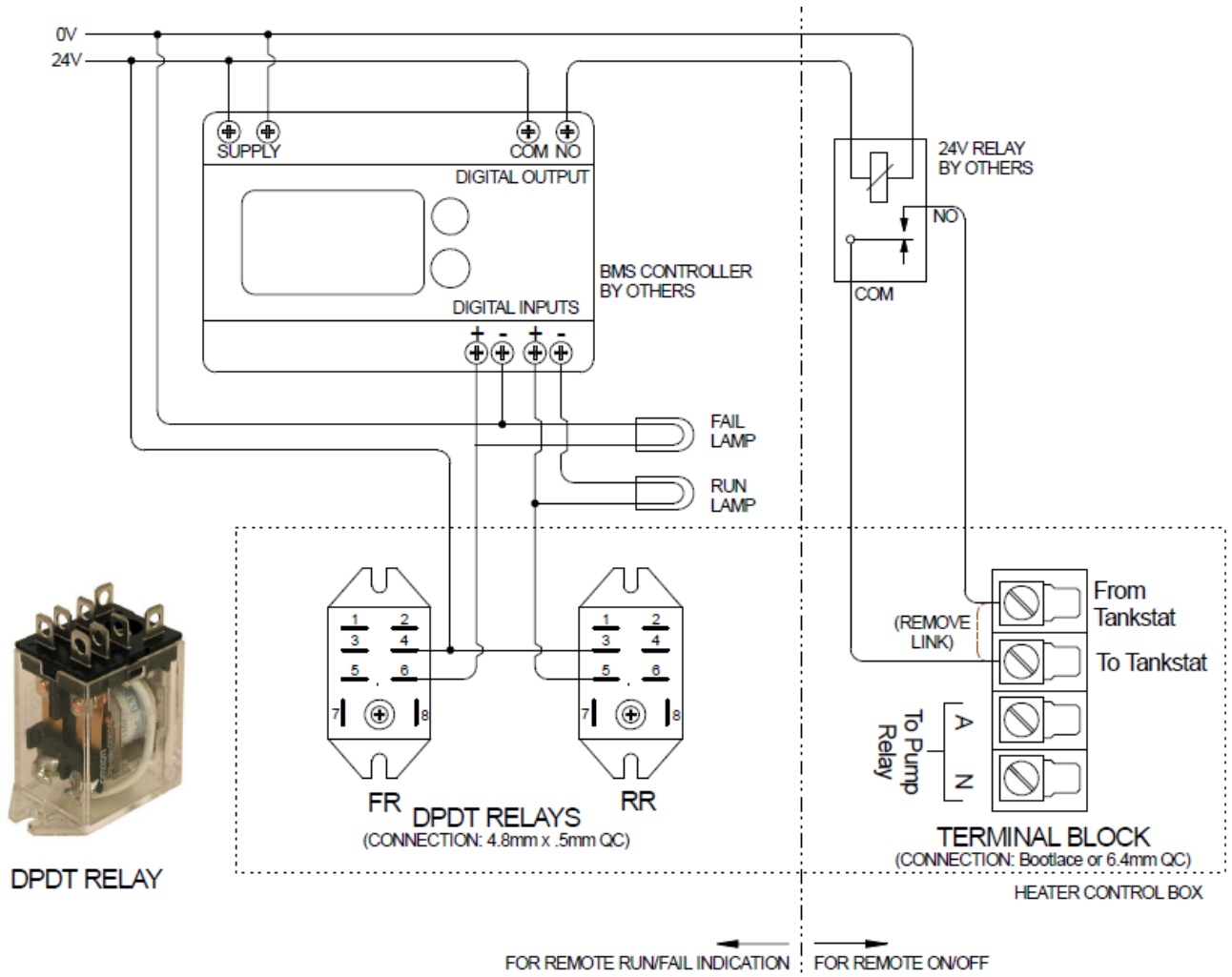
CONTROL PANEL ACCESS

To access the electrical enclosure:

- Remove the 3 Hex head screws from the clear Perspex front panel.
- Remove the front panel.

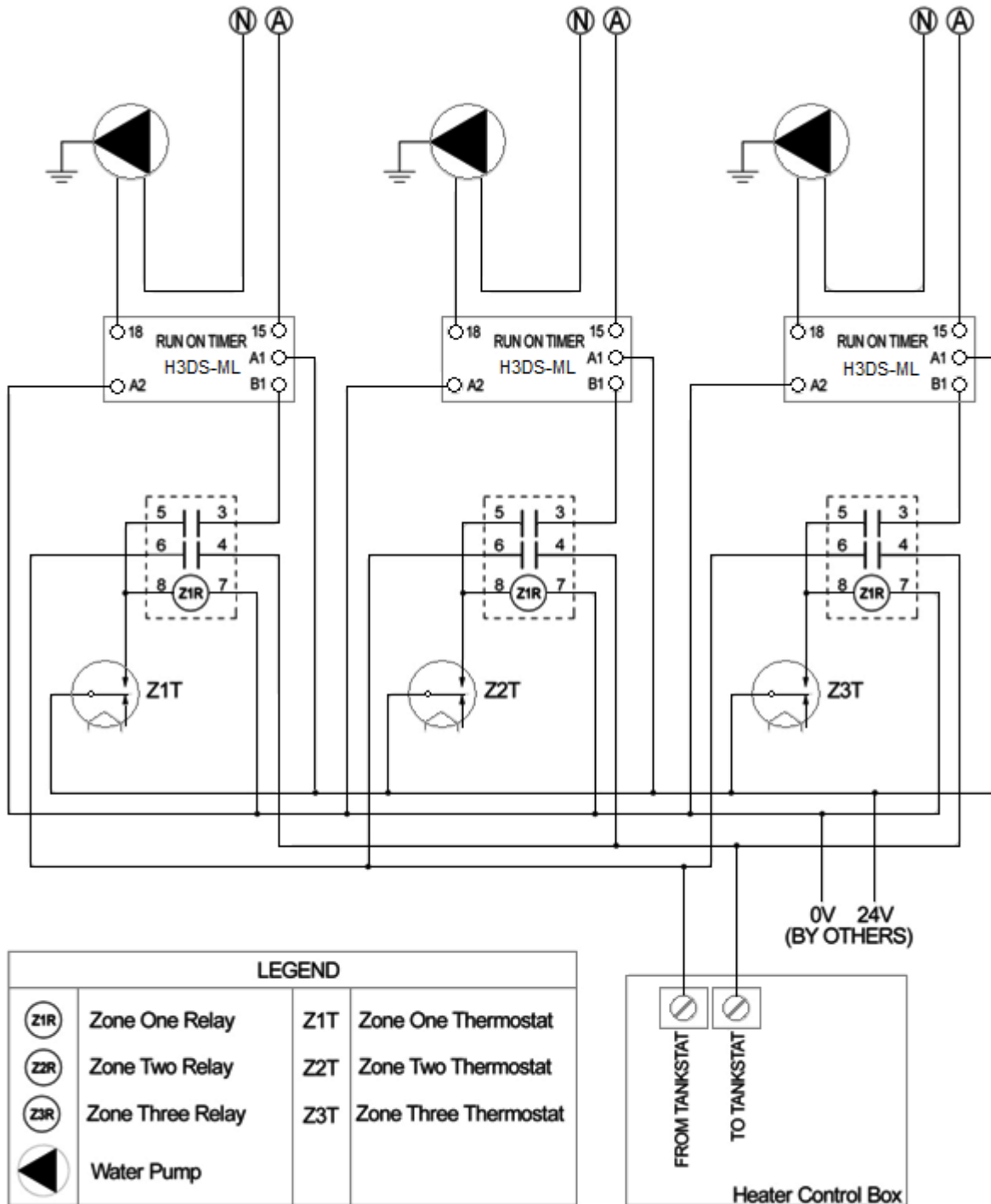


Wiring Diagram for Typical BMS System Interface



MULTI PUMP OPTION - MECHANICAL HEATING SYSTEMS

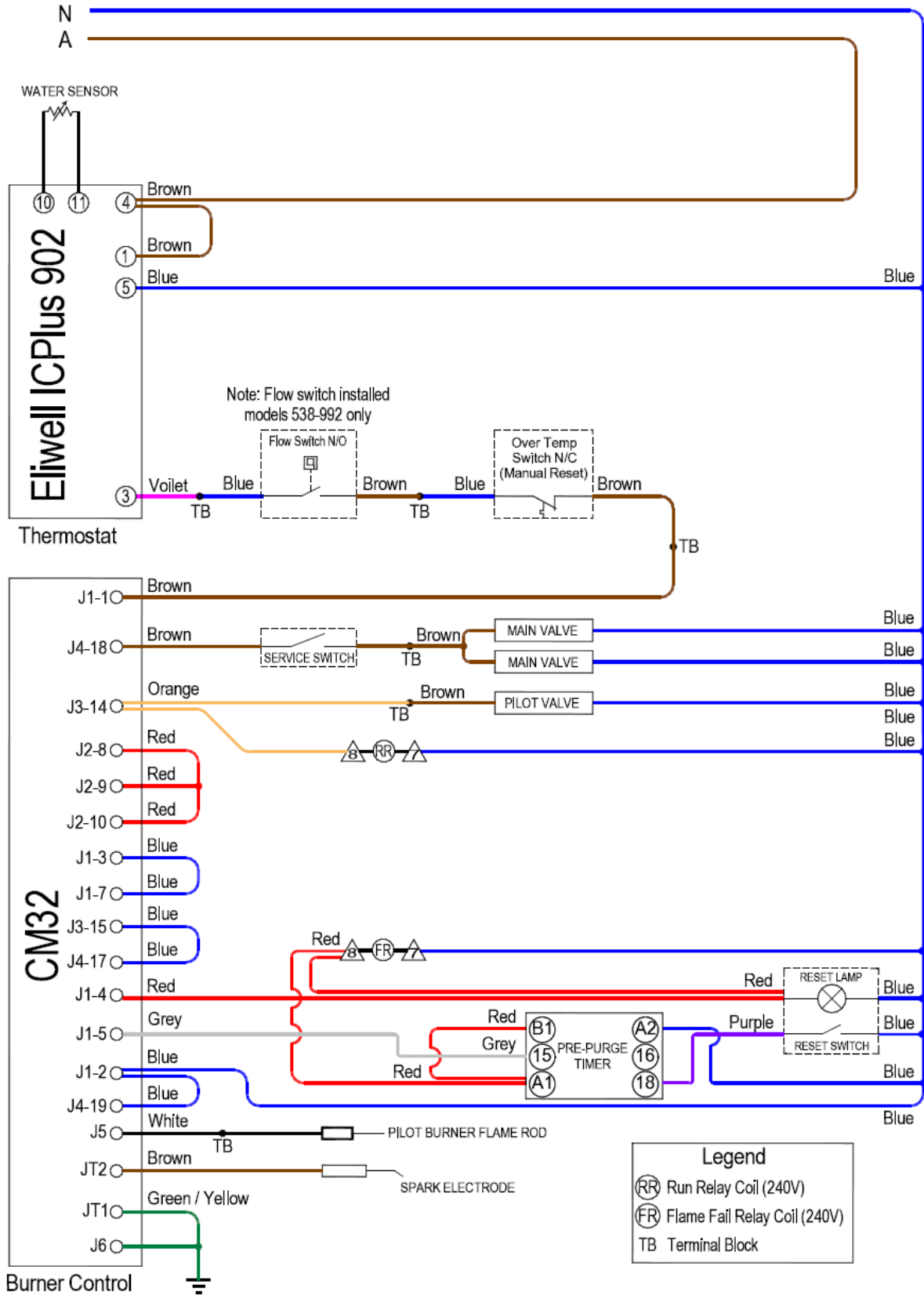
NOTE: When connecting additional controls, any relays, timers or other electrical components must be located in an additional enclosure and must NOT be fitted within the water heater. For outdoor installations the enclosure MUST be weatherproof.



Raypak Heater Models 538 to 4224
Modulating Units Only
(For On/Off install kit 56076874)

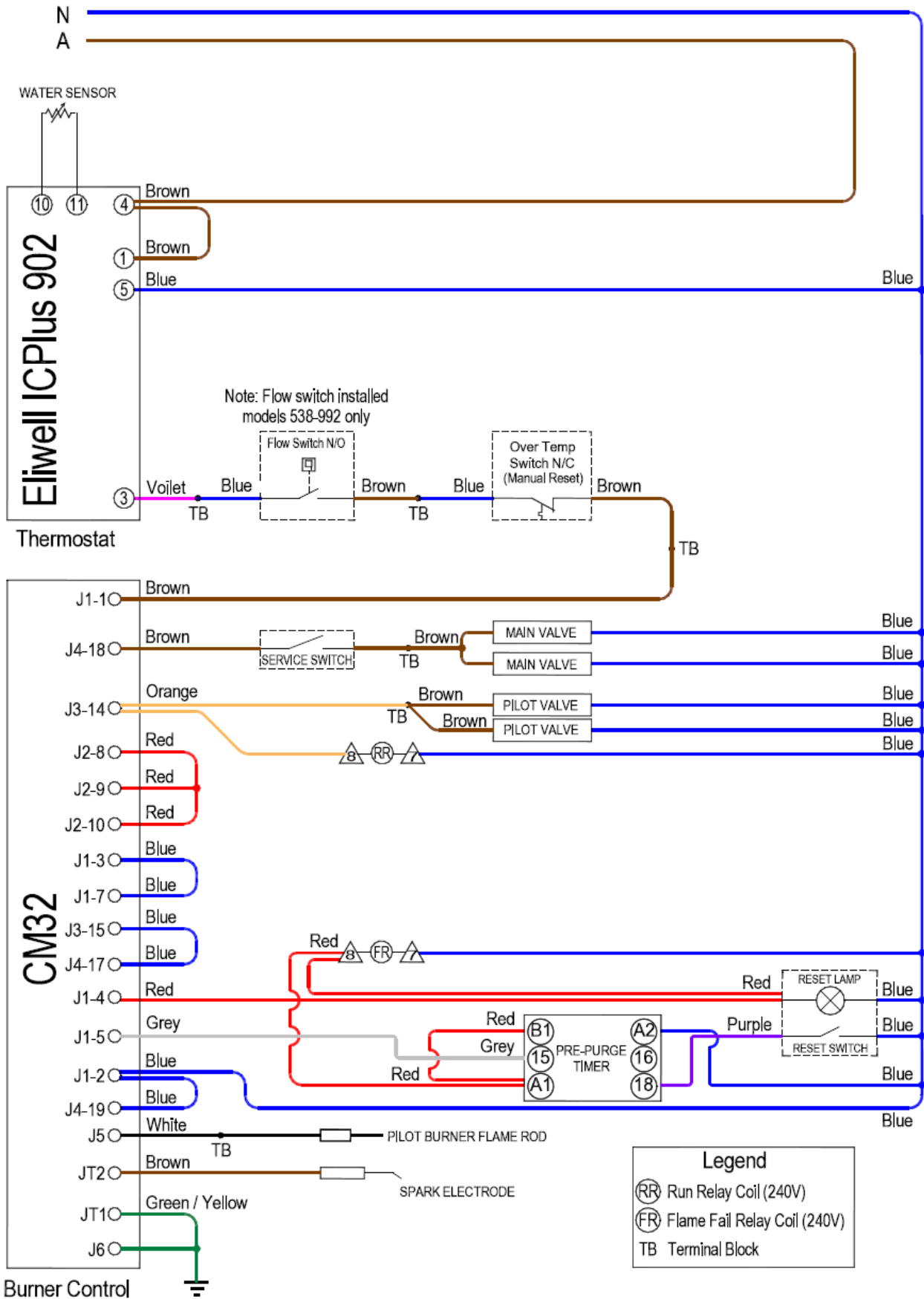
WIRING DIAGRAMS

ON/OFF MODELS 538 TO 992 INDOOR AND 972 OUTDOOR/HWT – NG



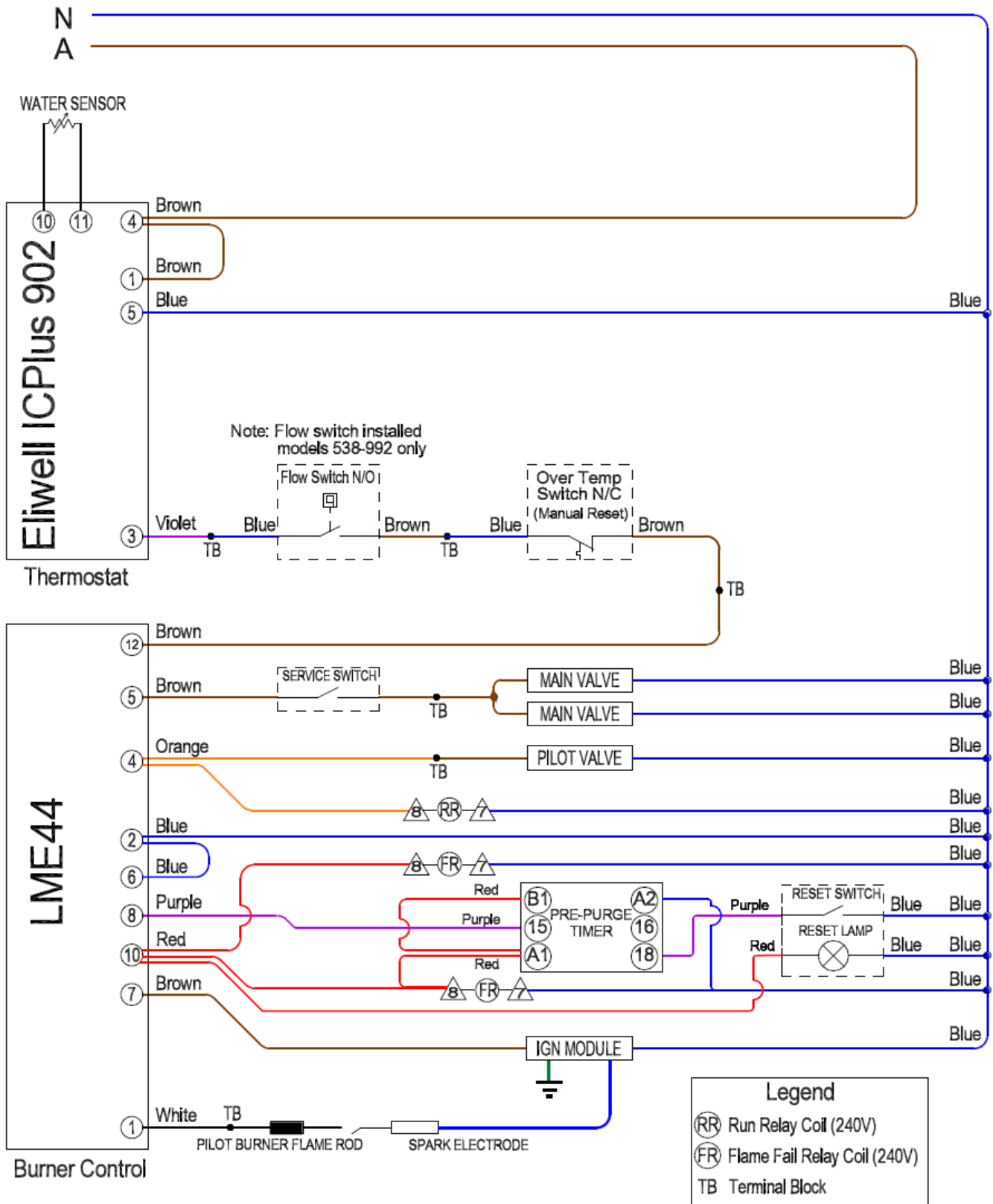
DRG No: 96159615 Rev F

ON/OFF MODELS 538 TO 868 OUTDOOR/HWT- NG



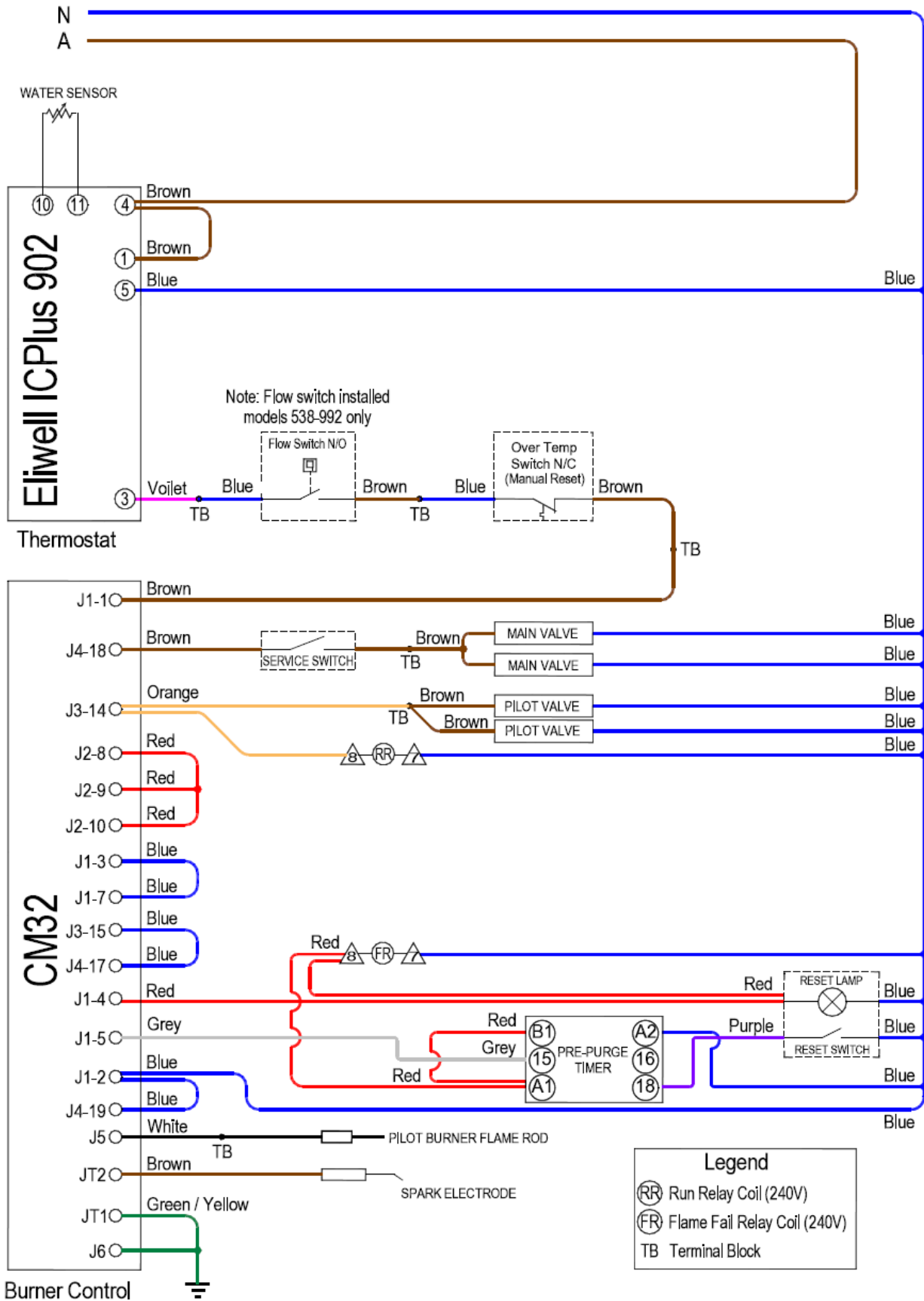
DRG No: AQ0200315 Rev A

ON/OFF MODELS 538 TO 992 INDOOR AND 972 OUTDOOR/HWT – LPG



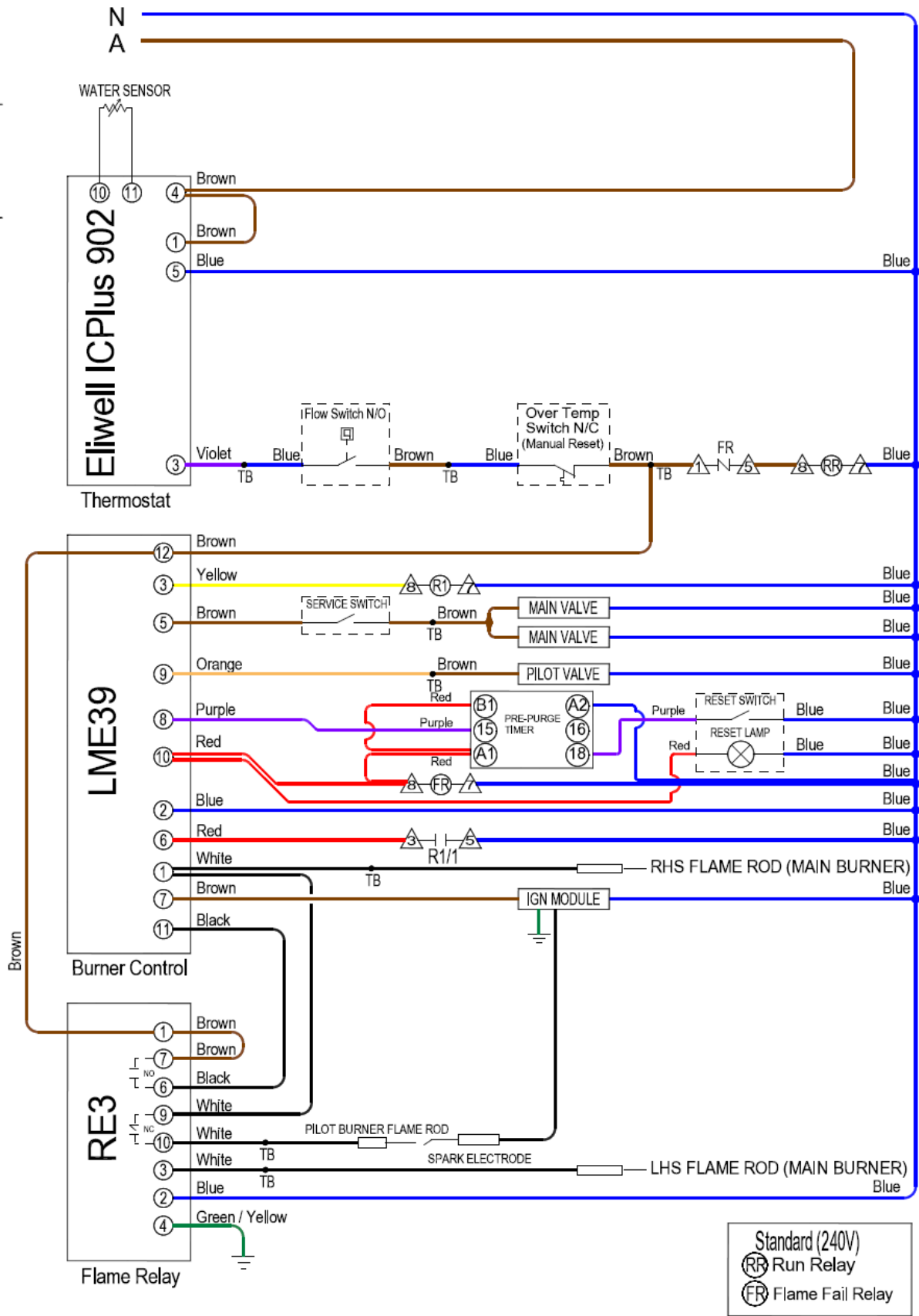
DRG No: 96159614 Rev H

ON/OFF MODELS 538 TO 868 OUTDOOR/HWT – LPG



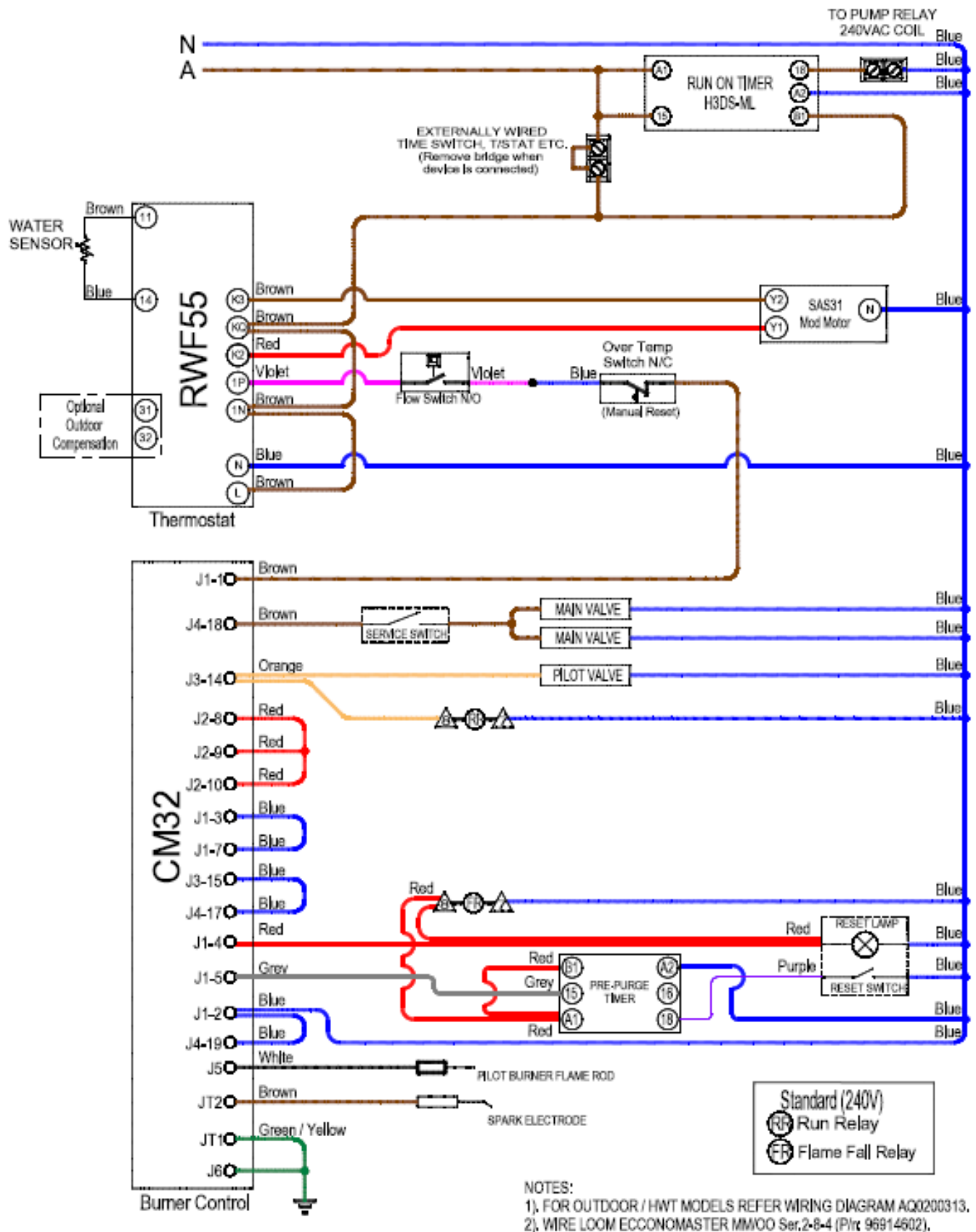
DRG No: AQ0200314 Rev A

ON/OFF MODELS > 1000MJ – NG AND LPG



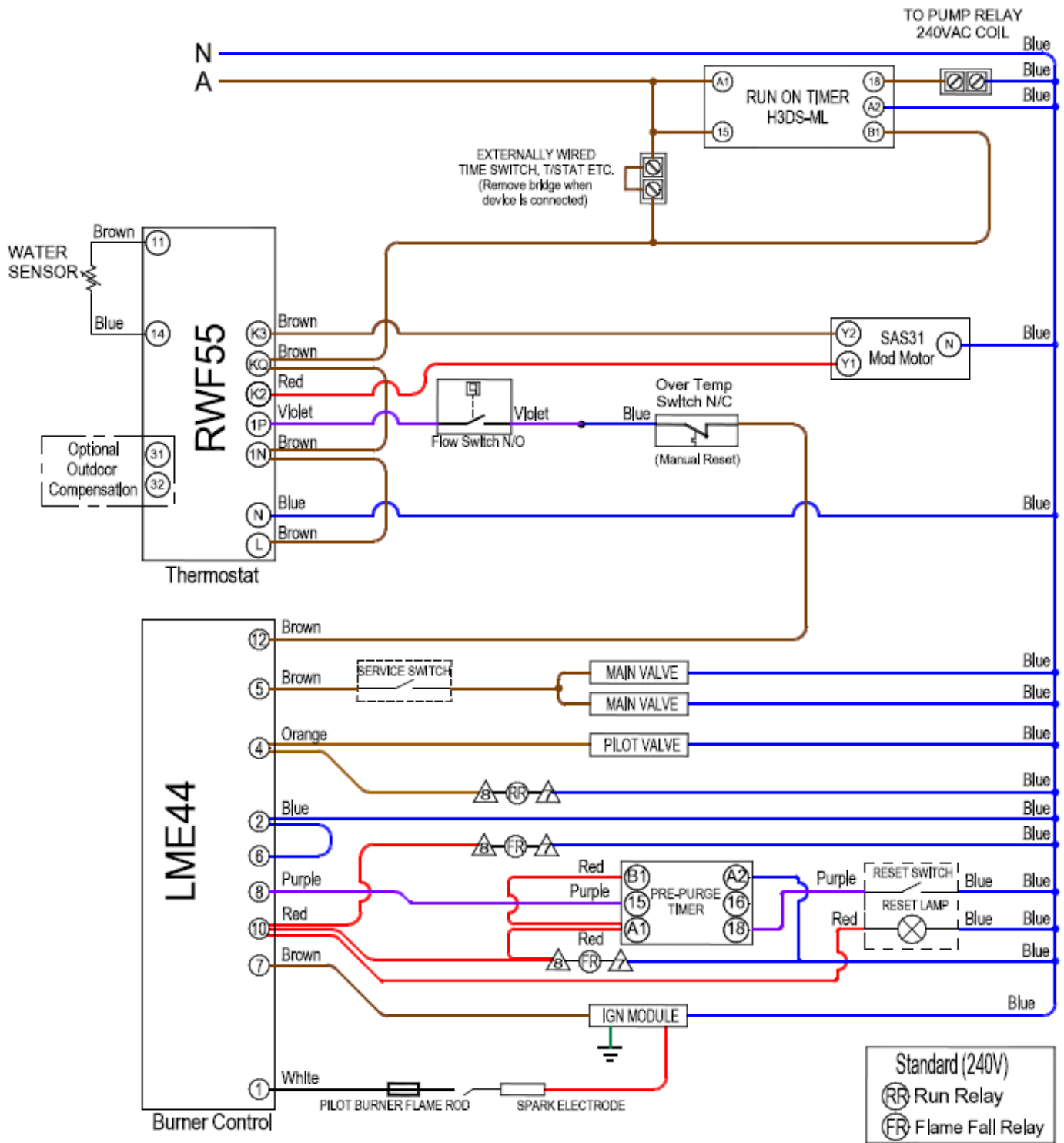
DRG No: 96159617 Rev F

MODULATING MODELS 538 TO 992 INDOOR AND 972 OUTDOOR/HWT – NG



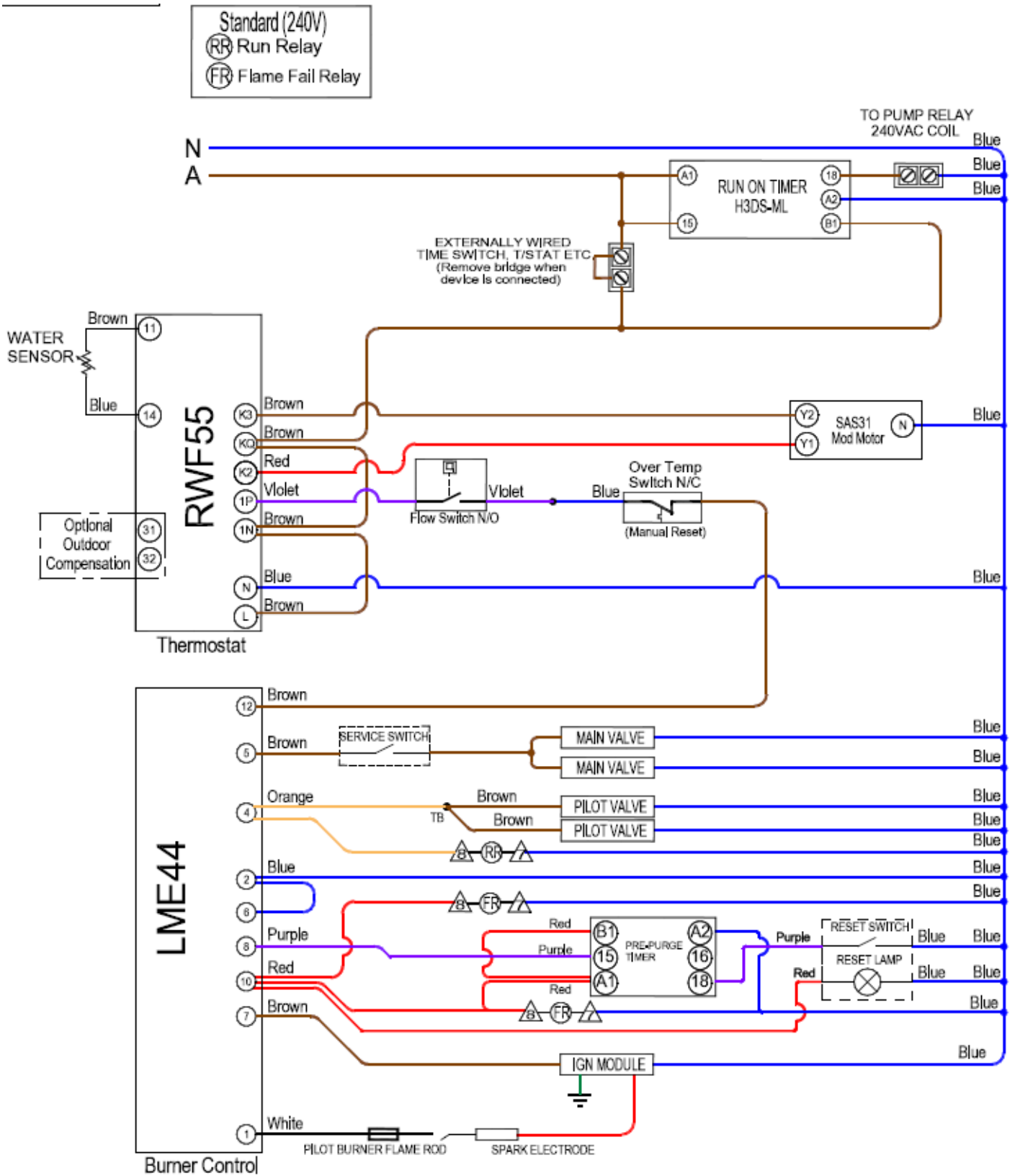
DRG No: 96159611 Rev F

MODULATING MODELS 538 TO 992 INDOOR AND 972 OUTDOOR/HWT – LPG



DRG No: 96159610 Rev G

MODULATING MODELS 538 TO 868 OUTDOOR/HWT – LPG

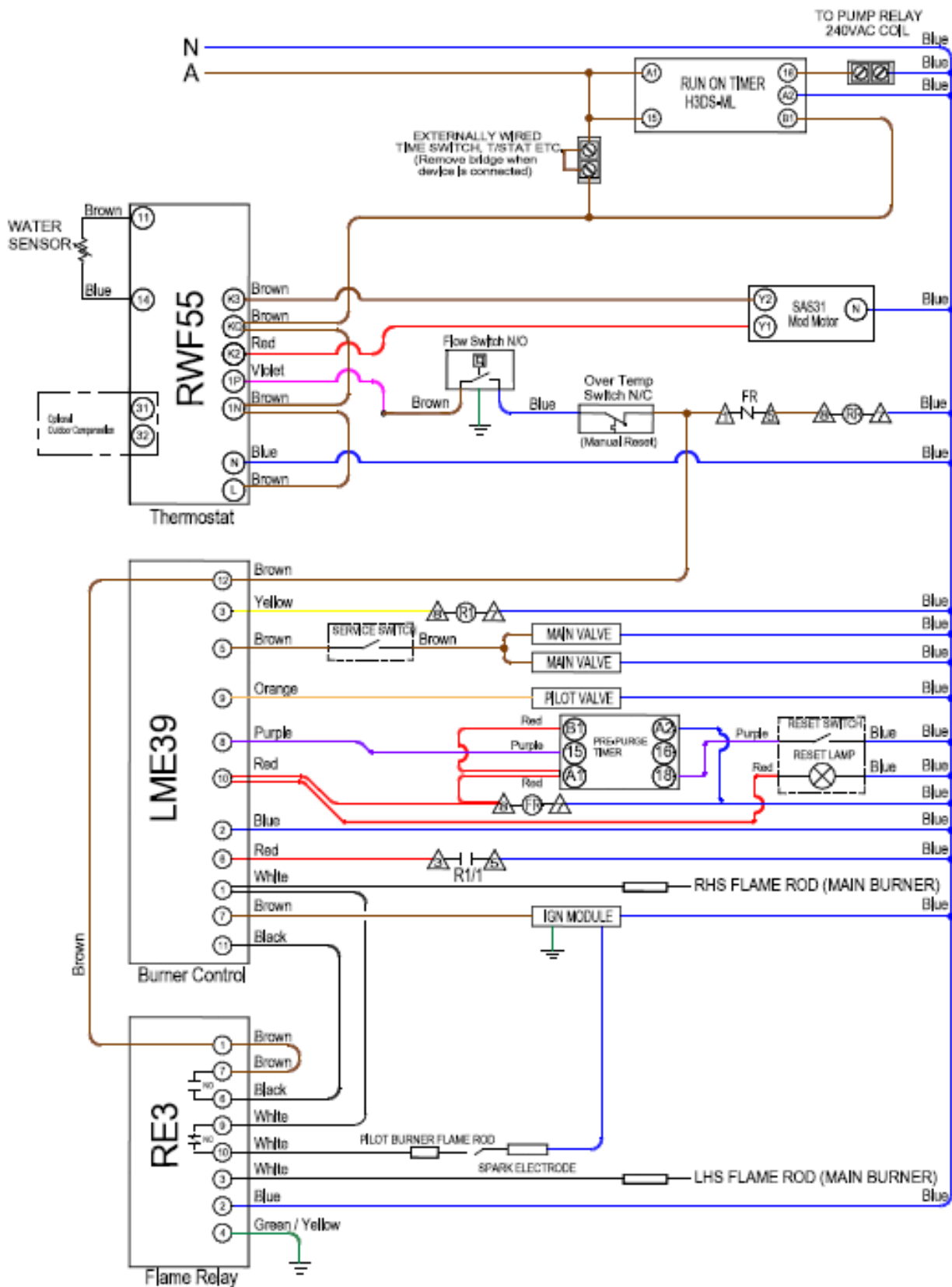


DRG No: AQ0200316 Rev B

MODULATING MODELS > 1000MJ – NG AND LPG

- Standard (240V)
- Run Relay
- Flame Fall Relay

NOTE: This Drawing May Change Without Notice
This drawing remains the property of Raypak Australia
and must not be reproduced without permission.



DRG No: 96159613 Rev E

LOCATION OF CONTROLS

ELECTRONIC THERMOSTAT

On/Off Models

On/Off type water heaters are fitted with an Eliwell ICPlus 902 electronic thermostat that has a temperature sensor located in the inlet side of the water heater header. This type of thermostat is used where the system load is constant (e.g. hot water supplied from a storage tank or in floor slab heating).

NOTE: If the water heater is connected to a storage tank with a tank thermostat fitted, the water heaters electronic thermostat set point should be set 5° higher than the tank thermostat setting.

Modulating Models

Water heaters with modulating operation are fitted with an RWF55 adjustable electronic thermostat that has a temperature sensor located in the outlet side of the water heater header. This type of thermostat is used where the system load is variable e.g. Mechanical Heating. The electronic thermostat will cycle the burner from full fire to 30% and then off.

GAS CONTROL

On/Off Models Natural Gas 538-992

On/Off type water heater models 538-992 (natural gas) are fitted with a Brahma GVC30 double block gas valve.

On/Off Models Natural Gas 1142-4224

On/Off type water heater models 1142-4224 (natural gas) are fitted with a Siemens VGD series double block gas valve and Siemens SKP15 and SKP25 (SKP25.003E2) actuators.

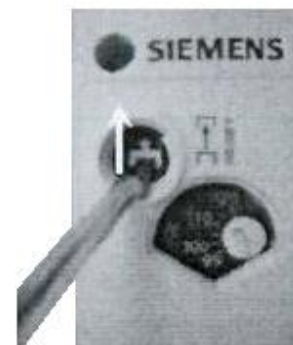
Modulating Models – Natural Gas and Propane

Modulating type water heaters are fitted with a Siemens VGD series double block gas valve that has Siemens SKP15 and SKP25 (SKP25.003E2) actuators. Modulation is done via a Siemens SAS31 modulating motor. The RWF55 electronic thermostat controls the modulating motor so that the gas rate modulates to match the required heating load. Modulating water heaters are usually installed on a heating system with radiators or a fan coil. A limited range of models suitable for use on propane gas are available. These are supplied with modulating gas valves and may also be used for mains pressure hot water applications.

HIGH LIMIT THERMOSTAT

The high limit thermostat is a manual reset over temperature thermostat that will automatically switch off and shut down the water heater in the event of a temperature control or water flow fault. When the system water temperature has cooled sufficiently, the high limit thermostat can be manually reset as follows:

1. Using a flat bladed screwdriver, unscrew and remove high limit reset lever cap located on front of high limit.
2. Use the screwdriver to lift the high limit reset lever to the up position as depicted in the illustration shown opposite.
3. Replace high limit reset lever screw cap.

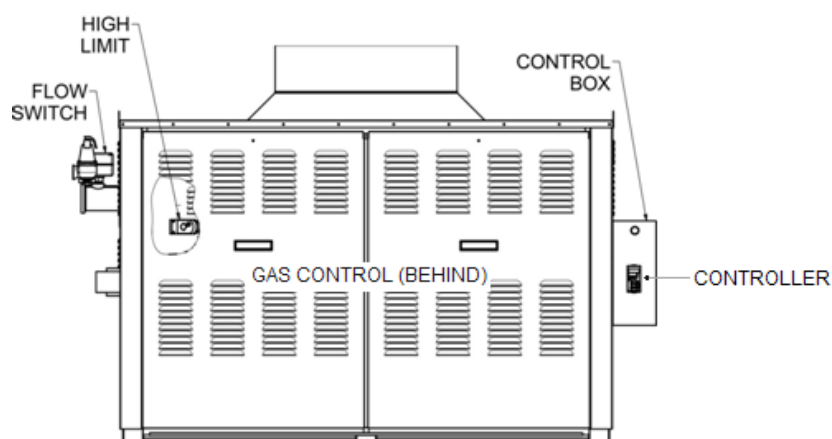


FLOW SWITCH

A flow switch is provided with the water heater and is wired to prevent operation of the main burner in the event of no water flow.

RATING LABEL

The rating label details the model number, serial number, gas type, burner pressure, water pressure and electrical specifications of the water heater. The rating label is located behind the access panel on the inside left hand side of the water heater.



SAFETY PRECAUTIONS

⚠ Warning: Ceramic fire tile refractories are used in Raypak water heaters. Refractories must be treated with care because they can be harmful by inhalation and irritating to the skin, eyes and respiratory system.

DURING FIRST FIRING OF THE WATER HEATER

- Fumes and smoke may be produced.
- Avoid breathing fumes and ventilate the area to clear any smoke and vapours.
- Production of smoke should cease within 30 minutes.

WHEN HANDLING

- Minimise airborne dust.
- Wear an approved mask or respirator.
- Avoid any contact with the skin and eyes.
- Wear suitable loose fitting, long sleeved clothing or disposable overalls.
- Wear gloves and eye protection.
- Consult Occupational Health and Safety Authorities for any further information.

AFTER HANDLING

- Rinse any exposed skin areas with clean water.
- Wash work clothing separately.

REMOVAL OF USED PRODUCT

- Follow the precautions as detailed in the section 'WHEN HANDLING' above, over exposure to dust formed after service may cause respiratory disease as cristobalite, a form of crystalline silica, may be formed above 900 degrees Celsius.
- Seal used product in a disposable bag and dispose of via normal garbage collection methods.

Consult Occupational Health and Safety Authorities for further Information regarding removal of used ceramic fibre lining.

COMMISSIONING

COMMISSIONING MUST ONLY BE UNDERTAKEN BY A PROPERLY QUALIFIED AND IN MOST CASES APPROPRIATELY LICENSED PERSON WHO IS FAMILIAR WITH THE COMMISSIONING REQUIREMENTS OF AS 3814. ALL REGULATORY AUTHORITIES REQUIRE THE APPLIANCE AND ITS INSTALLATION TO BE INSPECTED AND CERTIFIED.

⚠ Warning: Ceramic fire tile refractories are used in Raypak water heaters. Refractories must be treated with care because they can be harmful by inhalation and irritating to the skin, eyes and respiratory system.

Refer to “[Safety Precautions](#)” on page 40 for the precautions to be taken when the water heater is first operated.

PRE-COMMISSIONING CHECK LIST

1. Conduct a visual inspection of the water heater and equipment for damage and report as necessary.
2. Ensure the water heater is suitable for the type of gas available.
3. For propane models, ensure the supplied 850 kPa (125 PSI) pressure relief valve has been installed if being used in a mains pressure water heating application. The fitted 415 kPa (60 PSI) pressure relief valve is suitable for low pressure mechanical heating or process heating applications.
4. Ensure the correct power supply is available and the water heater and circulation pump are correctly wired (refer to “[Connections - Electrical](#)” on page 26).
5. Ensure the pump is installed in the correct orientation, the flow direction is correct and, for three phase pumps, the phase rotation is correct.
6. Ensure the position of the water heater complies with the installation requirements of this manual, AS 5601 or AS/NZS 5601.1 and local authority requirements.
7. Ensure the ventilation to the plant room complies with the requirements of AS 5601 or AS/NZS 5601.1 and local authority regulations. Mechanical ventilation, if provided, must be interlocked with the water heater as required by AS 5601 or AS/NZS 5601.1.
8. Ensure the flue complies with the installation requirements of this manual, AS 5601 or AS/NZS 561.1 and local authority requirement. A power flue, if provided, must be interlocked with the water heater as required by AS 5601 or AS/NZS 5601.1.
9. Ensure adequate clearance has been left for servicing the water heater (refer to “[Clearances](#)” on page 14).
10. Ensure flammable or combustible materials are not stored near the water heater. Flammable liquids such as petrol, newspapers and similar articles must be kept well away from the water heater and the flue system.
11. Ensure swimming pool chemicals, household cleaners, etc., are not stored near the water heater.
12. Ensure nothing is placed on top of the water heater or in contact with the flue system. Ensure the flue terminal is not obstructed in any way at any time.
13. Ensure the combustion air openings are not obstructed.
14. Ensure the system is filled with water and any air has been expelled.
15. Purge all air from gas supply piping.
16. Test ALL gas connections for leaks using soapy water. **DO NOT USE A NAKED FLAME.**

WHAT TO DO IF YOU SMELL GAS?

- **DO NOT TRY TO LIGHT ANY GAS APPLIANCE.**
- **DO NOT TOUCH OR OPERATE ANY ELECTRICAL SWITCH.**
- **TURN OFF THE GAS SUPPLY AT THE GAS METER OR ISOLATION VALVE.**
- **DO NOT USE A MOBILE PHONE IN THE VICINITY. VACATE THE AREA AND CALL YOUR GAS SUPPLIER OR QUALIFIED GAS FITTER.**

COMMISSIONING THE WATER HEATER

THE WATER HEATER MUST BE COMMISSIONED AND CERTIFIED IN ACCORDANCE WITH AS 3814, APPENDICES A-F.

Refer to “[Operating the Water Heater](#)” section on page 44 for instructions on filling and lighting the water heater.

Refer to “[Component Checks and Adjustment Procedures](#)” on page 45 for instructions on adjustment of the water heater.

OPERATIONAL CHECKS

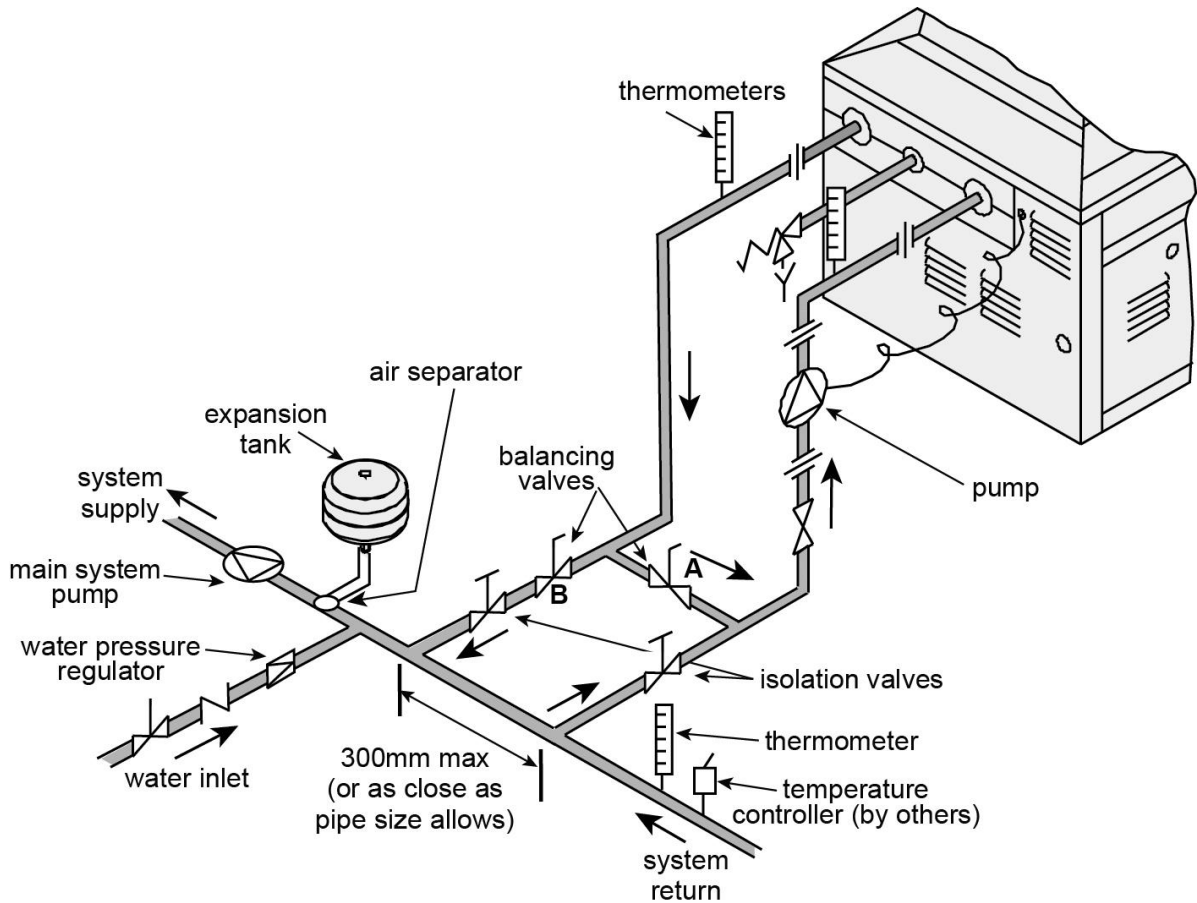
- Turn on water heater and circulation pump and verify flow switch operation (refer to “[To Turn on the Water Heater](#)” on page 44).
- Test the operation of the water heater with no gas flow to confirm its operation up to lockout stage and then turn off the power to the water heater.
- Open the gas isolation valve and switch on power to the water heater.
- With the main burner lit and at high fire, check the gas inlet pressure (refer to “[Gas Inlet Pressure Check](#)” on page 45).
- Check the water heater gas train and components for gas leaks using soapy water. **NOT A NAKED FLAME**
- Set the burner gas pressure to that shown on the rating label (refer to “[Burner Gas Pressure Adjustment](#)” on page 45).
- Make a visual check of the burners. The flame should be blue with a well-defined pattern. A yellow or floating flame indicates restricted air openings or an incorrect burner gas pressure setting.
- Verify that the high limit thermostat is operating and set correctly (refer to “[High Limit Thermostat Adjustment](#)” on page 48).
- For indoor installations check that the flue is drawing correctly.
- Check operation of the water pressure relief valve.
- It is normal for the water heater to produce some smoke and possibly condensation for the first thirty (30) minutes of operation from new (refer to “[Safety Precautions](#)” on page 40).
- If the installation is for a closed loop water source heat pump, perform the “[Closed Loop Water Source Heat Pump Commissioning Procedure](#)” on page 43.
- Explain to the responsible officer the functions and operation of the water heater.

⚠ Warning: Upon completion of the installation and commissioning of the water heater, leave this guide with the responsible officer. **DO NOT** leave this guide inside of the cover of the water heater, as it may interfere with the safe operation of the water heater or ignite when the water heater is turned on.

CLOSED LOOP WATER SOURCE HEAT PUMP COMMISSIONING PROCEDURE

Refer to the diagram below for the location of components described in this procedure.

- 1 Check that both isolation valves are open.
- 2 Adjust balancing valve **A** to half open and balancing valve **B** to fully open.
- 3 Start up the water heater and adjust balancing valve **A** to obtain a heater inlet temperature of approximately 10°C greater than the system loop return temperature, (turning valve **A** in the open direction will increase the heater inlet temperature and closing valve **A** will lower the heater inlet temperature). **NOTE:** The heater inlet should never be less than 44°C.
- 4 If the heater inlet temperature remains less than 10°C higher than the system loop return temperature and valve **A** is fully open, leave valve **A** fully open and throttle valve **B** until the heater inlet temperature rises to be 10°C higher than the system loop return temperature.
- 5 Main loop and heater temperatures should be checked regularly throughout the season to prevent condensation forming in the water heater. If the balancing valves are adjusted at the coldest loop temperature (typically 10°C) and the heater temperature to 44°C then the entire heating season should have a proper 44°C operation. The heater inlet temperature can be higher than 44°C without heater damage, but operating at less than 44°C inlet can cause damage from condensation.



Typical Installation – Closed Loop Water Source Heat Pump

OPERATING THE WATER HEATER

FOR YOUR SAFETY READ BEFORE LIGHTING

TO FILL THE WATER HEATER

Water Heating Applications

- Open all building hot water tap(s) (don't forget the showers) and supply cock(s) and valve(s) in the system.
- Open the isolation valves fully on the cold, flow / return and hot water branches to the storage tank(s).
- Open the cold water isolation valve on the cold water line to the storage tank(s). Air will be forced out of the taps.
- Close each tap as water flows freely from it.
- Check the pipe work for leaks.

Mechanical/Process Heating Applications

- If a header tank is fitted, ensure it is filled with water.
- Open the isolation valve on the inlet line to the water heater.
- Bleed air from the system at all high points to ensure that the entire system is filled with water.
- Check the pipe work for leaks.

TO TURN ON THE WATER HEATER

⚠ Warning: If you smell gas do not attempt to turn on the water heater.

The power supply to the water heater must not be switched on until the system is filled with water.

- Fill the system with water (refer to "[To Fill the Water Heater](#)" on page 44)
- Open the gas isolation valve fully at the inlet to the water heater.
- Switch on the electrical supply at the water heaters isolation switch. **NOTE:** If the water heater is correctly installed, this will also activate the circulating pump.

The water heater will operate automatically when a call for heat occurs.

TO TURN OFF THE WATER HEATER

If it is necessary to turn off the water heater on completion of the installation, such as on a building site or where the premises are vacant, then:

- Switch off the electrical supply at the water heaters isolation switch. **NOTE:** If the water heater is correctly installed, this will also shut down the circulating pump.
- Close the gas isolation valve at the inlet to the water heater.
- Close the cold water isolation valve at the inlet to the water heater.
- Close the isolation valves on the cold and hot water branches to shut down an individual water heater in a bank (water heating applications only).

TO RESET THE WATER HEATER

If the system water temperature is abnormally low, the ignition system may have 'locked out'. A lockout condition is indicated by the reset button being illuminated. If this occurs, the ignition system can be reset as follows:

- Note: there will be a delay of at least 5 minutes before the heater will restart to allow for the escape of any unburnt gas which may be present from a previous failed ignition attempt. Pressing the reset button before 5 minutes has elapsed will have no effect.
- Press and hold the reset button for approximately 1 second (the reset button light should extinguish).

If the water heater still fails to operate, call your nearest Rheem Service Department or Accredited Service Agent to arrange for an inspection.

COMPONENT CHECKS & ADJUSTMENT PROCEDURES

GAS INLET PRESSURE CHECK

IMPORTANT – Check the gas supply pressure at the inlet to the water heater with the water heater and all other gas burning appliances in the premises operating (burners alight). The minimum gas supply pressures are:

- Natural Gas - 1.13 kPa
- Propane - 2.75 kPa

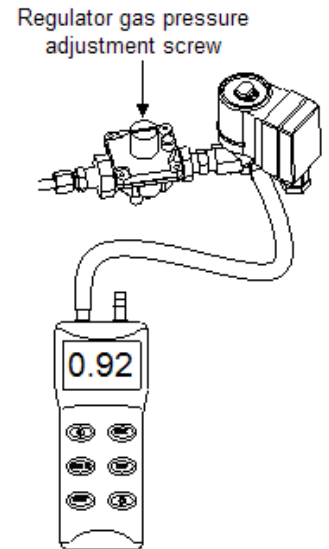
If this minimum cannot be achieved, it may indicate the meter or the gas line to the water heater is undersized. It is important to ensure that an adequate gas supply pressure is available to the water heater when all gas burning appliances on the same gas supply are operating.

The maximum static supply pressure at lock up **MUST NOT** exceed 4kPa.

PILOT GAS PRESSURE ADJUSTMENT

All models are fitted with an RV20LM pilot regulator. The pilot gas pressure is set by adjusting the RV20LM pilot regulator as follows:

1. Turn off water heater.
2. Remove pilot solenoid gas test point cover, unscrew gas test point screw and fit manometer to gas test point.
3. Remove RV20LM regulator gas pressure adjustment screw cap.
4. Turn on water heater and allow pilot to light.
5. Adjust pilot gas pressure to 0.92 kPa for natural gas or 2.75 kPa for propane. To increase pilot gas pressure, rotate the adjusting screw clockwise or to decrease pilot gas pressure rotate the adjusting screw anticlockwise.
6. Turn off water heater, refit RV20LM adjustment screw cap, remove manometer, refit pilot solenoid gas test point screw and refit pilot solenoid gas test point cover.

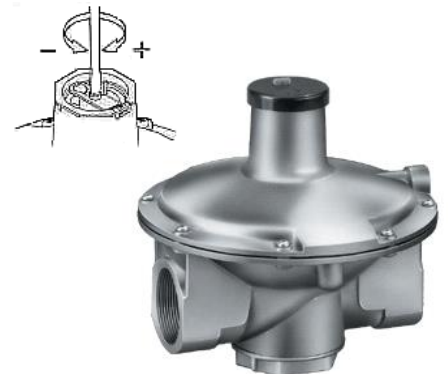


BURNER GAS PRESSURE ADJUSTMENT

On/Off Models Natural Gas 538-992

On/Off type water heaters models 538-992 (natural gas) are fitted with a Brahma GVC30 double block gas valve and a Jeavons J48 appliance regulator. The burner gas pressure for these models is set by adjusting the Jeavons J48 appliance regulator as follows:

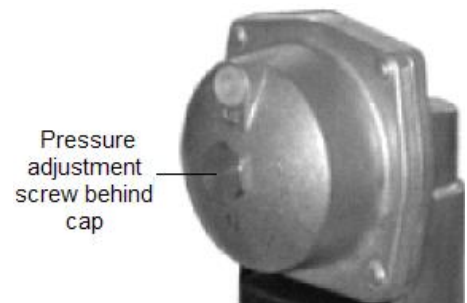
1. Turn off water heater.
2. Remove main burner gas test point screw and fit manometer to gas test point.
3. Remove J48 regulator pressure adjustment screw cap.
4. Turn on water heater and allow main burner to light.
5. Adjust burner pressure to that indicated on the rating label. To increase burner gas pressure rotate the adjusting screw clockwise or to decrease burner gas pressure rotate the adjusting screw anticlockwise.
6. Turn off water heater, refit adjustment screw cover, remove manometer and refit gas test point screw.



On/Off Models Natural Gas 1142-4224

On/Off type water heaters models 1142-4224 (natural gas) are fitted with a Siemens VGD series double block gas valve that has Siemens SKP15 and SKP25 actuators (SKP25.003E2). The burner gas pressure for these models is set by adjusting the SKP25 actuator as follows:

1. Turn off water heater.
2. Remove main burner gas test point screw and fit manometer to gas test point.
3. Remove SKP25 pressure adjustment screw cap.
4. Turn on water heater and allow main burner to light.



5. Adjust burner pressure to that indicated on the rating label. To increase burner gas pressure rotate the adjusting screw clockwise or to decrease burner gas pressure rotate the adjusting screw anticlockwise.
6. Turn off water heater, refit adjustment screw cover, remove manometer and refit gas test point screw.

Modulating Models

Modulating type water heaters are fitted with a Siemens VGD series double block gas valve that has Siemens SKP15 and SKP25 actuators (SKP25.003E2). The burner gas pressure for these models is set by adjusting the SKP25 actuator for both the low and high rate as follows:

Low Gas Rate Adjustment

1. Turn off water heater.
2. Remove main burner gas test point screw and fit manometer to gas test point.
3. Remove SAS31 modulating motor from AGA30.7 adaptor by unscrewing SAS31 locknut anticlockwise (refer to Diagram A)
4. Turn on water heater and allow main burner to light.
5. Adjust the low fire gas pressure to 0.3kPa (Natural Gas Models) or 1.3kPa (propane models) by first loosening the brass locknut then turning the body of the adaptor AGA30.7 clockwise to increase pressure or anticlockwise to decrease pressure (refer to Diagram B). Tighten the locknut with 30Nm.
6. Note: The low gas pressure may change upon fitment of the motor. If so, repeat step 5 to set the low pressure to the correct value.

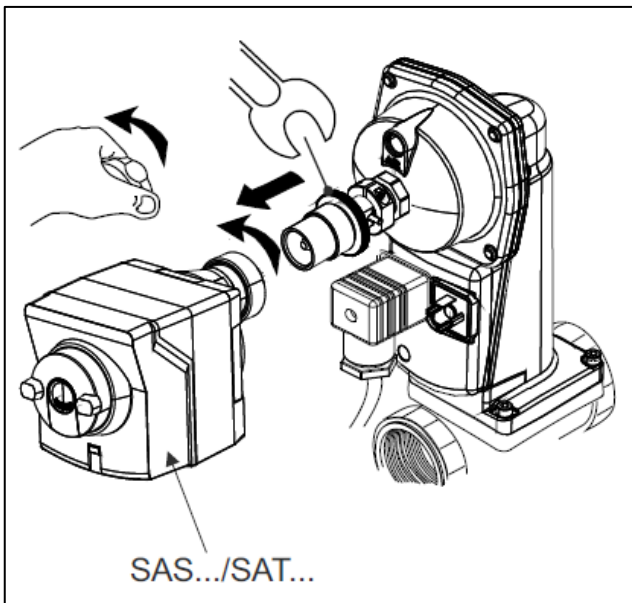


Diagram A

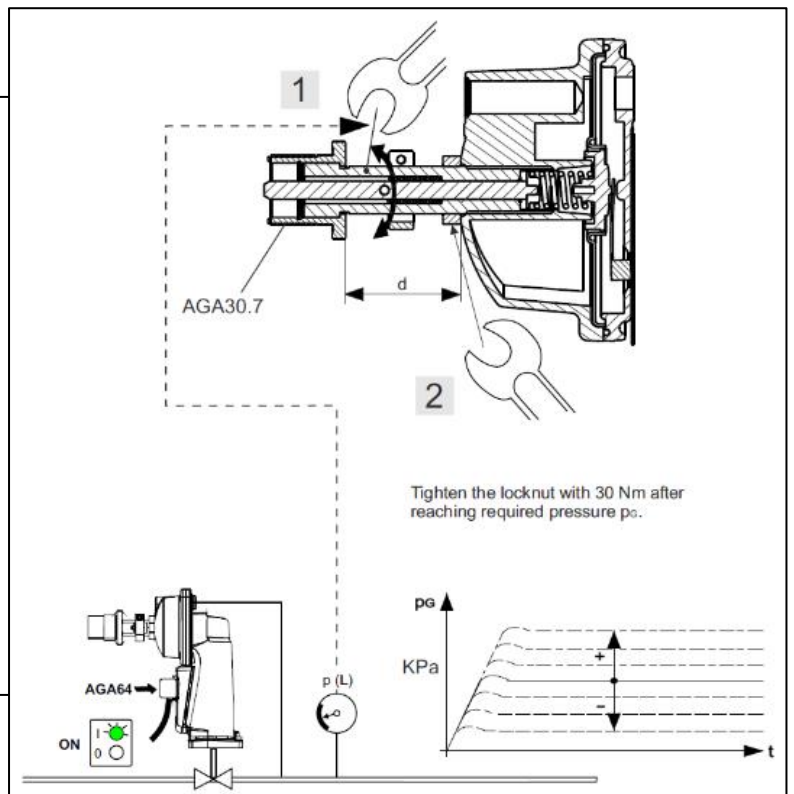


Diagram B

High Gas Rate Adjustment

7. Press and hold 'ESC' on the RWF55 electronic thermostat for 5 seconds to enter manual mode. 'HApnd' appears on the lower display, the current water temperature is shown on the upper display.
8. Refit the SAS31 modulating motor to the AGA30.7 adaptor (refer to Diagram C) NOTE: The lock nut should be hand tight only, do NOT use tools.
9. Loosen the cap screw off the brass nut using an Allen key then turn it anticlockwise until the slot on the adaptor is not covered by the nut. Refer Diagram D.
10. Drive the SAS31 modulating motor to the high gas pressure to 0.92kPa (natural gas models) or 2.75kPa (propane models) by pressing the up (▲) button on the RWF55 electronic thermostat.
11. Turn the brass nut clockwise until it is in contact with the shaft on the adaptor. Tighten the cap screw using an Allen key to lock the nut in place.
12. Press and hold 'ESC' on the RWF55 electronic thermostat for 5 seconds to re-enter auto mode.
13. Turn off water heater, remove manometer and refit gas test point screw.

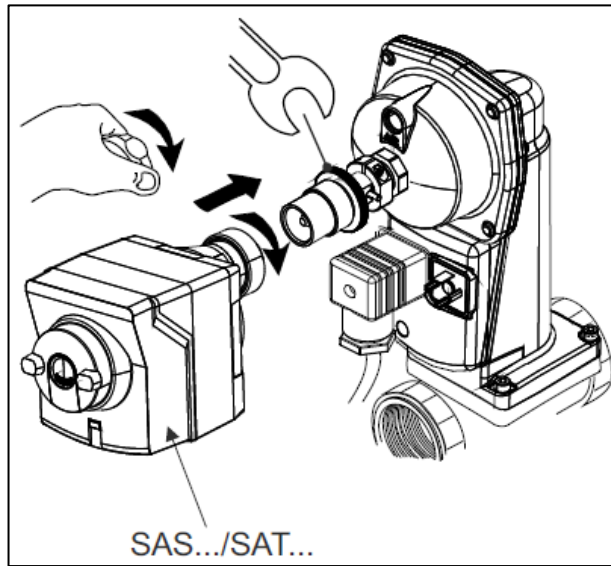


Diagram C

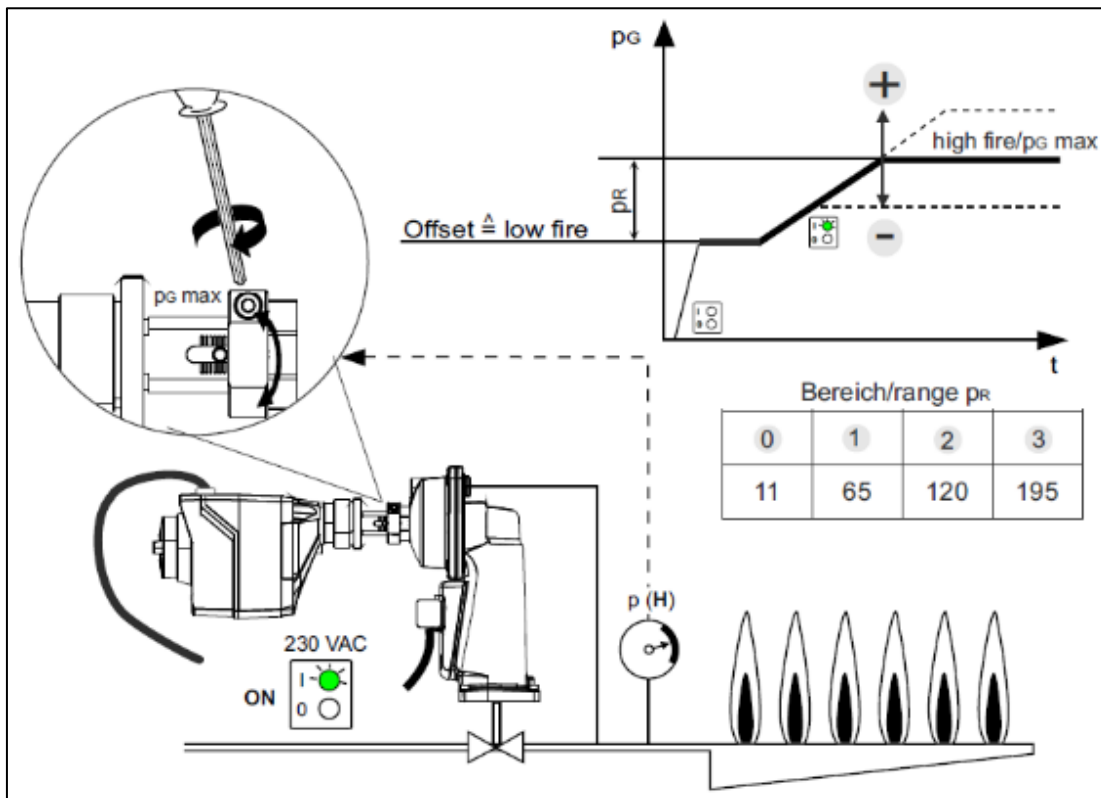
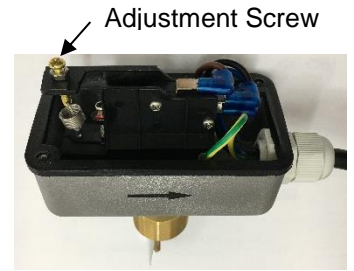


Diagram D

FLOW SWITCH ADJUSTMENT

The adjustment screw alters the amount of pressure or flow required to activate the micro switch. To adjust the setting:

1. Isolate power and remove flow switch cover.
2. Loosen adjustment screw locknut.
3. Restore power and ensure circulator is operating.
4. Turn adjustment screw clockwise to decrease the amount of flow required to activate the micro switch or turn adjustment screw anticlockwise to increase the amount of flow required to activate the micro switch.
5. Switch off circulator and ensure flow switch deactivates (contacts open). Repeat steps 1 – 5 until flow switch operates correctly.
6. Tighten adjustment screw locknut and refit flow switch cover.



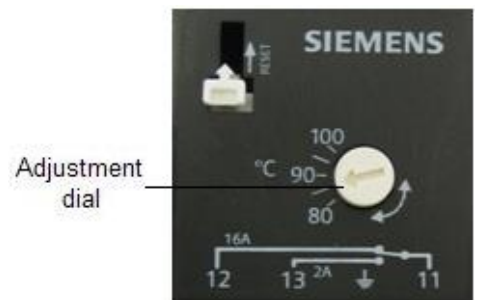
HIGH LIMIT THERMOSTAT ADJUSTMENT

The high limit thermostat (RAK-ST.1430) senses the water temperature leaving the heat exchanger and is typically set approximately 15°C above the electronic thermostats set point, however for high temperature applications the setting must not exceed:

- 85°C for installations utilising on/off models.
- 90°C for installations utilising modulating models.

To adjust the high limit temperature setting:

1. Isolate power and remove high limit front cover.
2. Using a small flat bladed screwdriver, rotate the adjustment dial so that the dial pointer aligns with the required temperature setting.
3. Refit high limit front cover and restore power.



To reset the high limit:

To reset the high limit refer to [“High Limit Thermostat”](#) on page 39.

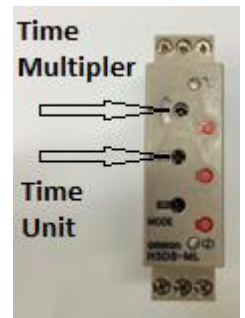
RUN ON TIMER ADJUSTMENT

Run on timers are factory set to 12 minutes. The following procedure details the method of changing the run on timer (if installed) to 12 minutes.

1. Using a small Phillips head screwdriver, rotate “Time Multiplier” to “12”.
2. Using a small Phillips head screwdriver, rotate “Unit of Time” to “1m”.

Example: For a “Time Multiplier” (12) x “Unit of Time” (1m).

12 X 1 = 12 minutes.



TANKSTAT ADJUSTMENT

The following procedure details the method of setting the optional tankstat temperature (if installed).

1. Rotate RAK tankstat adjustment dial to required set point temperature.

Note: The water heater electronic thermostat set point should be set 5° higher than the tankstat set point to prevent the electronic thermostat contacts from opening before the tankstat set point is reached.



TEMPERATURE CONTROL

⚠ Warning: Hotter water increases the risk of scald injury.

⚠ Warning: This water heater can deliver water at temperatures which can cause scalding.

⚠ Warning: For water heating applications it is necessary and we recommend that a temperature limiting device be fitted between the water heating system and the hot water outlets in any ablution and public areas such as bathrooms, ensuites or public amenities, to reduce the risk of scalding. The installing plumber may have a legal obligation to ensure the installation of this water heater meets the delivery water temperature requirements of AS/NZS 3500.4 so that scalding water temperatures are not delivered to a bathroom, ensuite, or other ablution or public area.

TEMPERATURE RISE

The correct temperature rise across the water heater heat exchanger is the result of correct pump selection and speed, pipe sizing and good plumbing (refer to “[Pump Selection](#)” on page 18)

The typical temperature rises for most applications will be between 10°C and 20°C.

A temperature rise of less than 10°C is indicative of excessive flow rate that can lead to erosion of the tube bundle and/or headers. A temperature rise greater than 25°C indicates insufficient water flow which can lead to warpage of the tube bundle and nuisance tripping of the high limit thermostat.

⚠ Warning: Damage to the water heater caused by insufficient or excessive temperature rise across the heat exchange is not covered by warranty.

TEMPERATURE ADJUSTMENT – ON/OFF MODELS (ICPLUS 902 ELECTRONIC THERMOSTAT)

All On/Off models are fitted with an Eliwell ICPlus 902 electronic thermostat which has the following features:

| KEYS | |
|--|--|
| <p>UP Press and release Scroll menu items Increases values Press for at least 5 sec Function can be configured by the user (H31)</p> | <p>STAND-BY (ESC) Press and release Returns to the previous menu level Confirms parameter value Press for at least 5 sec Function can be configured by the user (H33)</p> |
| <p>DOWN Press and release Scroll menu items Decrease values Press for at least 5 sec Function can be configured by the user (H32)</p> | <p>SET (ENTER) Press and release Displays alarms (if active) Opens Machine Status menu Confirm commands Press for at least 5 sec Opens Programming menu</p> |



- The thermostat display shows the current tank sensor temperature during normal operation.
- The thermostat has parameters that control system operation. Refer to “[ICPlus 902 Parameters](#)” on page 49.
- Thermostat set point, parameters, parameter options and parameter settings (or parameter information) can be viewed or adjusted. Refer to “[ICPlus 902 Adjustment Procedures](#)” on page 51.
- The ‘Relay OUT 1’ will illuminate whenever the thermostats internal relay is closed (call for heat).
- The thermostat can be locked to prevent tampering with system status and/or parameters. Refer to “[Locking the ICPlus 902 Thermostat](#)” on page 51.
- If the thermostat detects a faulty tank sensor (an open or closed circuit tank sensor), the thermostat will show fault code ‘E1’ on the display and the alarm LED will illuminate.

ICPlus 902 Parameters

The ICPlus 902 thermostat has parameters that control hot water system operation. Under normal conditions, including a power outage, parameter settings do not require adjustment; however, parameter settings may be altered to ‘fine tune’ a system to suit a particular installation.

The menu is comprised of a machine status menu and a programming menu. The machine status menu allows for quick viewing and/or adjusting of the thermostat set point (SP1) and actual tank sensor temperature value (Pb1) whilst the programming menu is comprised of folders which contain additional parameters which are relative to the folder heading. The accessibility of the parameters are divided at two levels, the User level and the Installer level.

The following tables detail all available folders, parameters, each parameter range or option and the default (factory) setting of each parameter. Parameters **MUST** be set to the 'Raypak Factory Setting' column for the hot water system to operate correctly.

| Parameter | Description | Unit of measure | Range | Raypak Factory Setting | Level |
|--------------------------------------|---|-----------------|---------------|------------------------|-----------|
| SP1 | Pb1 value control setpoint SP1 | °C/°F | LS1~HS1 | 50 | / |
| REGULATOR 1 (folder 'rE1') | | | | | |
| HC1 | Sets the controller 1 operating mode (H=hot, C=cold) | flag | H/C | H | Inst |
| OS1 | Value to be added to SP1 if reduced set enabled | °C/°F | -30.0~30.0 | 0.0 | Inst |
| dF1 | Regulator 1 activation differential | °C/°F | 0.0~30.0 | 2.0 | User/Inst |
| HS1 | Maximum value assignable to SP1 | °C/°F | LS1~HdL | 80 | User/Inst |
| LS1 | Minimum value assignable to SP1 | °C/°F | LdL~HS1 | 20 | User/Inst |
| HA1 | Pb1 maximum value alarm on Regulator 1 | °C/°F | LA1~150.0 | 140 | Inst |
| LA1 | Pb1 minimum value alarm on Regulator 1 | °C/°F | -150.0~HA1 | -50 | Inst |
| dn1 | Switch on delay | sec | 0~250 | 0 | Inst |
| dO1 | Delay time after switching off | min | 0~250 | 0 | Inst |
| di1 | Delay between switch ons | min | 0~250 | 0 | Inst |
| dE1 | Switch off delay | sec | 0~250 | 0 | Inst |
| On1 | Controller 1 switch on time in the event of a faulty probe | min | 0~250 | 0 | Inst |
| OF1 | Controller 1 switch off time in the event of a faulty probe | min | 0~250 | 1 | Inst |
| ALARMS (folder 'AL') | | | | | |
| AFd | Alarm differential | °C/°F | 1.0~50.0 | 2.0 | Inst |
| tP | Enable all keys to acknowledge and alarm | flag | n/y | y | Inst |
| COMMUNICATION ('folder 'Add') | | | | | |
| PtS | Selection of communication protocol | flag | t/d | t | Inst |
| dEA | Index of the device within the family | num | 0~14 | 0 | Inst |
| FAA | Device family | num | 0~14 | 0 | Inst |
| Adr | Modbus protocol controller address | num | 1~255 | 1 | Inst |
| bAU | Baudrate selection | num | 48/96/192/384 | 96 | Inst |
| Pty | Modbus parity bit | num | n/E/o | E | Inst |
| StP | Modbus stop bit | flag | 1b/2b | 1b | Inst |
| DISPLAY (folder 'diS') | | | | | |
| LOC | Setpoint edit lock | flag | n/y | n | User/Inst |
| PS1 | Password 1 | num | 0~250 | 0 | User/Inst |
| PS2 | Password 2 | num | 0~250 | 15 | Inst |
| ndt | Display values with decimal point | num | n/y/int | n | User/Inst |
| CA1 | Calibration 1 | °C/°F | -30.0~30.0 | 0.0 | User/Inst |
| CAI | Intervention of the offset on display | num | 0/1/2 | 2 | Inst |
| LdL | Minimum value that can be displayed by the device | °C/°F | -199.9~HdL | -50.0 | Inst |
| HdL | Maximum value that can be displayed by the device | °C/°F | LdL~199.9 | 140.0 | Inst |
| dro | Select the unit of measurement of probe 1 | flag | C/F | C | Inst |
| CONFIGURATION (folder 'CnF') | | | | | |
| HOO | Probe type selection | flag | Ptc/ntc | ntc | User/Inst |
| HO2 | Secondary function actuation time | sec | 0~15 | 5 | Inst |
| HO5 | Window filter | num | -2/-1/0/1/2 | 0 | Inst |
| HO8 | Stand-by operating mode | num | 0/1/2 | 2 | Inst |
| H10 | Delay for output activation | min | 0~250 | 0 | Inst |
| H31 | Configuration of UP key | num | 0~7 | 0 | Inst |
| H32 | Configuration of DOWN key | num | 0~7 | 0 | Inst |
| H33 | Configuration of ESC key | num | 0~7 | 6 | Inst |
| rEL | Firmware version | / | / | / | User/Inst |
| tAB | Parameters table | / | / | / | User |
| COPY CARD (folder 'FPr') | | | | | |
| UL | Upload | / | / | / | Inst |
| dL | Download | / | / | / | Inst |
| Fr | Format | / | / | / | Inst |

Note: If a parameter is modified from the programming menu, the thermostat must be reset to ensure correct operation. To reset, remove the power supply to thermostat, wait ten seconds and then restore the power supply.

ICPlus 902 Adjustment Procedures

Notes to all ICPlus 902 thermostat adjustment procedures:

- If a button is not pressed within 15 seconds during any thermostat adjustment procedure, the thermostat will automatically exit the relevant folder and any changes made will be saved.
- The thermostat will operate as normal whilst performing any thermostat adjustment procedure.
- Some parameter changes require the thermostat to be reset.

Checking or Adjusting ICPlus 902 Thermostat Set Point

1. Press and release the **SET** button. 'SP1' will be displayed.
2. Press and release the **SET** button. The current set point temperature setting will be displayed.
3. Press and release the up ▲ or down ▼ button to change the set point setting (skip this step if viewing only). Press and release the **SET** button to confirm modification.
4. Continually press and release the **ESC** button until the display shows the current tank temperature.

Checking or Adjusting ICPlus 902 Thermostat User Parameters

User parameter settings can be viewed or changed (except for read only informational parameters) by performing the following procedure:

1. Press and hold the **SET** button for 5 seconds. 'dF1' will be displayed at which time the **SET** button can be released.
2. Press and release the up ▲ or down ▼ button to scroll the required parameter.
3. Press and release the **SET** button to enter the selected parameter.
4. Press and release the up ▲ or down ▼ button to change the parameter setting (skip this step if viewing only). Press and release the **SET** button to confirm modification.
5. Continually press and release the **ESC** button until the display shows the current tank temperature.

Checking or Adjusting ICPlus 902 Thermostat Installer Parameters

Installer parameter settings can be viewed or changed (except for read only informational parameters) by performing the following procedure:

1. Press and hold the **SET** button for 5 seconds. 'dF1' will be displayed at which time the **SET** button can be released.
2. Press and release the up ▲ or down ▼ button to scroll to 'PA2'. Press and release the **SET** button.
3. Press and release the up ▲ or down ▼ button to scroll the parameter to '15' then press and release **SET** button. (If 'PA2' parameter was previously adjusted, scroll the parameter to the adjusted value).
4. Press and release the up ▲ or down ▼ button to scroll the required folder. Press and release the **SET** button to enter the folder.
5. Press and release the up ▲ or down ▼ button to scroll the required parameter. Press and release the **SET** button to enter the parameter.
6. Press and release the up ▲ or down ▼ button to change the required parameter. Press and release the **SET** button to confirm modification (skip this step if viewing only).
7. Continually press and release the **ESC** button until the display shows the current tank temperature.

Note: Some parameter changes require the thermostat to be reset. Refer to "[ICPlus 902 Parameters](#)" on page 49 for more information.

Locking the ICPlus 902 Thermostat

The thermostat can be locked to prevent tampering of the thermostats parameters. There are two types of locks.

- The thermostat can be locked to prevent any changes to the set point 'SP1'. The set point can still be viewed and the parameter programming menu can be accessed and settings changed.

- The thermostat can be locked to prevent access to User and Installer parameters. The system status parameter set point 'SP1' can still be viewed and changed. A password entry ('PA1' for User level and 'PA2' for Installer level) is required to be set when first locking the thermostat and the thermostat is unlocked by entering the same code each time parameter access is required.

Note: Both locks may be activated to prevent tampering with all parameters. In this case only system status parameters can be viewed.

ICPlus 902 Locking & Unlocking Procedure – Set Point

To lock: Change 'LOC' parameter to 'y'.

To unlock: Change 'LOC' parameter to 'n'.

Note: To change 'LOC' parameter, refer to [“Checking or Adjusting ICPlus 902 Thermostat User Parameters”](#) on page 51.

ICPlus 902 Locking & Unlocking Procedure – User and Installer Parameters

To lock: Change the 'PS1' or 'PS2' parameter to any value from '1' to '250'. This value will become the unlocking code. Note: 0 = no lock. To change 'PS1' and 'PS2' parameter, refer to [“Checking or Adjusting ICPlus 902 Installer Parameters”](#) on page 51.

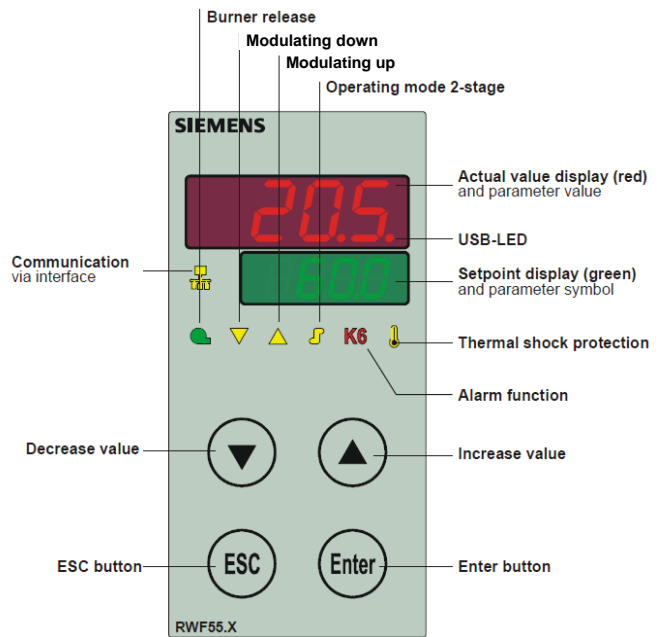
To unlock: When trying to access parameters 'PA1' or 'PA2' will be shown on the thermostats display;

1. Press and release the **SET** button, '0' will be displayed.
2. Press and release the up ▲ or down ▼ button to display the access code previously set when first locking the thermostat.
3. Press and release the **SET** button to access the folders and parameters.

TEMPERATURE ADJUSTMENT – MODULATING MODELS (RWF55 ELECTRONIC THERMOSTAT)

All modulating models are fitted with an RWF55 electronic thermostat which has the following features:

- The thermostat display shows the current tank sensor (probe) temperature and the current set point temperature during normal operation.
- The thermostat has parameters that control system operation. Refer to "RWF55 Parameters" on page 53.
- Thermostat set point, parameters, parameter options and parameter settings (or parameter information) can be viewed or adjusted. Refer to "RWF55 Adjustment" on page 54.
- The burner symbol will illuminate green whenever the thermostats internal relay is closed (call for heat).
- If the thermostat detects a faulty temperature sensor the thermostat will show a fault code on the display. Refer to "Diagnostic Features Of RWF55 Controller" on page 10.
- An Ambient Air Compensator (not supplied) can be connected. Refer to "Ambient Air Compensator" on page 56.



RWF55 Parameters

The RWF55 thermostat has parameters that control hot water system operation. Under normal conditions, including a power outage, parameter settings do not require adjustment; however, parameter settings may be altered to ‘fine tune’ a system to suit a particular installation.

The parameter menu is comprised of a process data level parameter menu, a parameter level parameter menu and a configuration level parameter menu.

The following tables detail all available parameters, each parameter range and the default (factory) setting of each parameter. Parameters **MUST** be set to the grey shaded ‘Raypak Setting’ column for the hot water system to operate correctly.

| RWF55 User (OPr) Level Parameters | | | |
|-----------------------------------|---------|-------------|-------------------|
| Parameter | Display | Value Range | Raypak Setting |
| Set point 1 | SP1 | SPL – SPH | 78 ⁽¹⁾ |

⁽¹⁾ Set point is user definable and may differ to setting shown in ‘Raypak Setting’ column. The temperature should be adjusted lower for modulating models used in mains pressure water heating applications.

| RWF55 Parameter (PArA) Level Parameters | | | |
|---|---------|----------------------|----------------|
| Parameter | Display | Value Range | Raypak Setting |
| Proportional band | Pb.1 | 0.1...999.9 digit | 20 |
| Derivative time | dt | 0...9999 seconds | 15 |
| Integral action time | rt | 0...999.9 digit | 60 |
| Dead band (neutral zone) | db | 0...999.9 digit | 3 |
| Actuator running time | tt | 0.0 to -1999.9 digit | 30 |
| Switch on threshold burner | HYS1 | 0.0 to -199.9 digit | -3 |
| Switch off threshold stage II | HYS2 | 0.0...HYS# digit | 0 |
| Upper switch off threshold | HYS3 | 0.0...999.9 digit | 4 |
| Response threshold | q | 0.0...999.9 | 0.0 |

| RWF55 Configuration (ConF) Level Parameters | | | | | |
|---|----------|--------------------------------------|---------|----------------------|----------------|
| Menu | Sub Menu | Parameter | Display | Value Range | Raypak Setting |
| InP | InP1 | Sensor Type | SEn1 | 1....19 digit | 6 |
| | | Correction of measured value | OFF1 | -1999....+9999 digit | 0 |
| | | Start of display | SCL1 | -1999....+9999 digit | 0 |
| | | End of display | SCH1 | -1999....+9999 digit | 100 |
| | | Filter time constant, analog input 1 | dF1 | 0.0....100.0 digit | 1 |
| | | Temperature unit | Unit | 1....2 digit | 1 |
| ConF | Cntr | Controller type | CtYP | 1....2 digit | 1 |
| | | Operating Action | CACt | 0....1 digit | 1 |
| | | Lower set point limit | SPL | -1999....+9999 digit | 0 |
| | | Upper set point limit | SPH | -1999....+9999 digit | 95 |
| | AF | Alarm function | FnCt | 0....12 digit | 0 |
| | | Limit value | AL | -1999....+9999 digit | 0 |
| | | Switching differential | HYSst | 0....999.9 | 1 |
| | | Response to Out Of Range | ACrA | 0....1 digit | 0 |
| | | | | | |

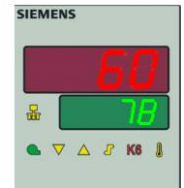
RWF55 Adjustment Procedures

Notes to all RWF55 adjustment procedures:

- If a button is not pressed within 180 seconds during any thermostat adjustment procedure, and **'ENTER'** has not been pressed to save the new value, the thermostat display will revert to show the current probe temperature without modifying the selected parameter. If this occurs it will be necessary to reprogram the selected parameter.
- The thermostat will operate as normal whilst performing any thermostat adjustment procedure.

Checking or Adjusting RWF55 Set Point

1. Press and release the (▼) button, the current set point temp (green display) will start flashing.
2. Press and release (▲) or (▼) to adjust the set point to the required value.
3. Press and release **'ENTER'** to confirm the new setting. The green display will stop flashing and the new set point will be displayed.



Checking or Adjusting RWF55 'User (OPr) Level' Parameters

Note: For Raypak standard programming only user level parameter SP 1 is able to be adjusted, other parameters may be available but are display only at this level.

1. Press and release **'ENTER'**, 'OPr' appears in the lower display.
2. Press and release **'ENTER'**; 'SP 1' and the current set point are displayed.
3. Press and release **'ENTER'**; 'SP 1' will start flashing
4. Press and release (▲) or (▼) button to enter the value for SP 1 as shown in the 'Raypak Setting' column of the ["RWF 55 User Level Parameters"](#) table on page 53.
5. Press and release **'ENTER'** to accept the new setting. 'SP 1' will cease flashing and the new set point will be displayed.
6. Press and release (▲) or (▼) button, 'InP1' and the current water temperature will be displayed. This is information only to confirm the sensor is reading the correct water temperature.
7. Press **'ESC'** for more than 2 seconds, the display will revert to show the probe and set point temperatures.

Checking or Adjusting RWF55 'Parameter (PArA) Level' Parameters

NOTE: Incorrect setting of the parameters in this menu may cause the water heater to malfunction. Advice should be sought from a Raypak representative prior to using a setting other than that given in the tables.

1. Press and release **'ENTER'**, 'OPr' appears in the lower display.
2. Press and release the down button (▼), 'PArA' appears in the lower display.
3. Press and release **'ENTER'**; 'Pb 1' and its value are displayed.
4. Press and release **'ENTER'**; 'Pb 1' will start flashing
5. Press and release (▲) or (▼) to enter the value for the relevant parameter as shown in the 'Raypak Setting' column of the "[RWF55 Parameter \(PArA\) Level Parameters](#)" table on page 53.
6. Press and release **'ENTER'** to accept the new setting.
7. Press and release (▼) to advance to the next parameter.
8. Perform steps 4 – 6 for each parameter. When the last 'Parameter Level' parameter has been set, proceed to step 9.
9. Press and hold **'ESC'** for more than 2 seconds. The display will revert to show the probe and set point temperatures.

Adjusting 'Configuration (ConF) Level' Parameters

There are 8 menus within the ConF level, each menu contains a number of sub-menus and each sub menu contains a number of parameters. Only the menus and parameters which use a Raypak setting which differs from the Siemens default setting are listed in the "[RWF55 Configuration \(ConF\) Level Parameters](#)" table on page 54.

NOTE: Incorrect setting of the parameters in this menu may cause the water heater to malfunction. Advice should be sought from a Raypak representative prior to using a setting other than that given in the tables.

To select a menu

1. Press **'ENTER'**, 'OPr' appears in the lower display.
2. Press and release the down button (▼) twice, 'ConF' appears in the lower display.
3. Press and release **'ENTER'**. 'InP' is shown on the display.
4. Press and release the down button (▼) to scroll through the various menus, 'InP' → 'Cntr' → 'rAFC' → 'AF' → 'OutP' → 'binF' → 'diSP' → 'IntF'.

To select a sub menu and adjust parameters.

5. Once the required menu has been selected in step 4, press and release **'ENTER'**. The first submenu will be displayed i.e. from Menu 'InP' the first sub menu is 'InP1'.
6. Press and release the down button (▼) to select the required sub menu.

The sub menus are as follows

| Menu | Sub Menus | | | | | |
|------|-----------|---------|--------|--------|--------|--------|
| InP | InP1 → | InP2 → | InP3 | | | |
| Cntr | CtyP → | CACt → | SPL → | SPH → | oLLo → | oLHi → |
| rAFC | FnCt → | rASL → | toLP → | rAL → | | |
| AF | FnCt → | AL → | HYSr → | ACrA → | | |
| OutP | FnCt → | Si Gn → | rOut → | OPnt → | End → | |
| BinF | bin1 → | bin2 → | | | | |
| diSP | diSU → | diSL → | tout → | deCP → | CodE → | |
| IntF | r485 → | | | | | |

7. Once the required sub menu has been selected press and release **'ENTER'**. The first parameter for that sub menu and its current setting will be displayed i.e. for 'InP1', the first parameter is 'SEn1'. Refer to "[RWF55 Configuration \(ConF\) Level Parameters](#)" table on page 54.
8. Press and release the down button (▼) to scroll through the various parameters within the sub menu.
9. Once the required parameter has been selected, press and release **'ENTER'** the parameter i.e. 'SEn1' will start flashing.
10. Press and release (▲) or (▼) to enter the value for the relevant parameter as shown in the 'Factory Setting' column of the "[RWF55 Configuration \(ConF\) Level Parameters](#)" table on page 54.
11. Press and release **'ENTER'** to accept the new setting.
12. Perform steps 9 – 11 for each parameter. When the last 'Configuration Level' parameter has been set, proceed to step 13.
13. Press and hold **'ESC'** for more than 2 seconds. The display will revert to show the probe and set point temperatures.

AMBIENT AIR COMPENSATOR

The RWF55 electronic thermostat can be configured to use weather-compensated set point shifting.

When weather-compensated set point shifting is selected the set point is automatically adjusted according to the outdoor temperature; this function assists in reducing temperature fluctuations in the building due to additional heat being gained or lost due to the weather. Each Raypak must have its own outside sensor (no parallel connection).



An LG-Ni1000 or PT1000 outdoor sensor (not supplied) must be connected across terminals 31 & 32 of the RWF55 and the following parameters must be correctly set.

Parameters for Optional Ambient Air Compensator – RWF55 Electronic Thermostat

The following parameters enable the weather-compensated set point shifting function of the RWF55 electronic thermostat.

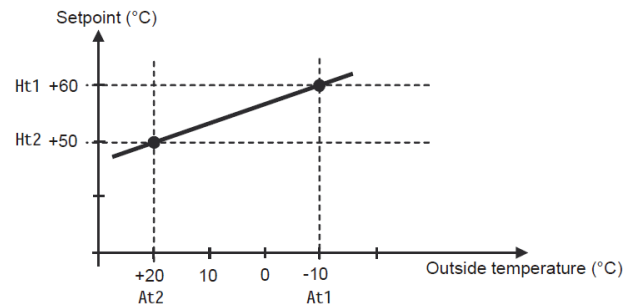
To access and adjust the Configuration (ConF) Level Parameters refer to ["Adjusting Configuration Level Parameters"](#) on page 55.

| RWF55 Configuration (ConF) Level Parameters | | | | | |
|---|------|-----------------------------------|---------|---------------|-----------------------------------|
| Level | | Parameter | Display | Value Range | Raypak Setting |
| InP | InP3 | Sensor Type | Sen3 | 0...3 | 1 - Pt1000 / 2 - LG-Ni1000 |
| | | Function | FnC3 | 0...1 | 1 - weather compensated set point |
| | | Correction of measured value | OFF3 | -1999...+9999 | 0 – No offset |
| | | Filter Time Constant ¹ | dF3 | 0.0...1500.0 | 1278 seconds |

¹ The filter time constant is used to adapt the digital 2nd order input filter (time in s; 0 s = filter off). If the input signal changes abruptly, approx 26% of the change is captured after a time corresponding to the filter time constant dF3 (2 x dF3: approx 59% is captured; 5 x dF3 approx 96% is captured).

The following parameters determine the target temperature for a particular outdoor temperature and also set the heating curve slope.

Prior to altering the settings advice should be sought from the heating system designer to determine the optimum values suitable for the application.



Heating Curve Slope

NOTE: Incorrect setting may cause unacceptable temperature fluctuations in the heating system.

To access and adjust the Parameter (PARA) Level Parameters refer to ["Checking or Adjusting Parameter \(PARA\) Level Parameters"](#) on page 55.

NOTE: The parameters below cannot be accessed until the Parameter FnC3 has been set, refer to page 56.

| RWF55 Parameter (PARA) Level Parameters | | | | |
|---|---------|-----------|---|-----------------|
| Parameter | Display | Range | Function | Default Setting |
| Outside temperature Curve point 1 | At1 | -40...120 | Sets the target heater temperature for an outdoor temperature and determines point 1 of the heating curve Refer to heating curve slope diagram above | -10 |
| Heater temperature Curve point 1 | Ht1 | SPL...SPH | | 60 |
| Outside temperature Curve point 2 | At2 | -40...120 | Sets the target heater temperature for an outdoor temperature and determines point 2 of the heating curve Refer to heating curve slope diagram above | 20 |
| Heater temperature Curve point 2 | Ht2 | SPL...SPH | | 50 |

SERVICE PROCEDURES

ONLY AN AUTHORISED PERSON MAY REPAIR OR SERVICE A GAS APPLIANCE

⚠ Warning: Ceramic fire tile refractories are used in Raypak water heaters. Refractories must be treated with care because they can be harmful by inhalation and irritating to the skin, eyes and respiratory system.

Refer to “[Safety Precautions](#)” on page 40 for the precautions to be taken when servicing the water heater.

SIX MONTHLY SERVICE PROCEDURE

1. Isolate power to the water heater.
2. Operate the pressure relief valve (PRV) manually to check that the drain is clear and the valve reseals.
3. Remove burner access door(s) and header access panels.
4. Visually inspect combustion chamber area for build-up of debris and clean if necessary.
5. Check the water heater thoroughly for any damage.
6. Check the heat exchanger and water seal areas for leaks and signs of sooting.
7. Check air vents and louvers, clean as required.
8. Restore power and check operation of the ignition system and all safety devices.
9. Check operation and calibration of all temperature control devices.
10. Perform a leak test on all gas unions using a soapy water solution.
11. Check and monitor the operation of the water heater for at least ten (10) minutes.
 - With the burner lit, make a visual check of the main burner and pilot flame. Yellow flames indicate some restriction of the combustion air openings or incorrect burner gas pressure setting.
 - A bright orange, luminous flame is not normal and can cause sooting under prolonged operation.
12. Clean and remove any dust and debris from the water heater and its immediate area.
13. Refit burner access door(s) and header access panels.

ANNUAL SERVICE PROCEDURE

1. Conduct the Six Monthly Service Procedure detailed above PLUS;
2. Isolate gas, electricity and water supplies.
3. Disconnect and remove the burner tray.
4. Check igniter electrode and flame rod(s) - clean and re-align if required. Inspect and clean the earth terminal.
5. Check burner sheet metal and refractory tiles (replace if corroded or damaged).
6. Check main burner injectors – clean if required.
7. Clean burner bars.
8. Inspect external area of heat exchanger, clean fins and baffles.
9. Refit the burner tray and reconnect the gas train.
10. Restore gas, electricity and water supplies.
11. Perform a leak test on the gas train using soapy water solution.
12. Check burner pressure - adjust if required. Refer to “[Gas Pressure Adjustment](#)” on page 45.
13. Refit all panels and the burner access door(s).
14. Inspect flue for corrosion, obstruction and flue gas leakage.

5 YEARLY SERVICE PROCEDURE

1. Conduct the Annual Service procedure above PLUS;
2. Replace all relief valves.

A Service Report, including any damaged or faulty components, should be given to the responsible officer and arrangements made to affect immediate repairs. Use only genuine replacement parts on this water heater.

⚠ Warning: DO NOT return the water heater to service where an unsafe condition exists. Operation of the water heater when faulty or incorrectly adjusted will result in rapid and severe damage which is not covered by warranty.

WATER SUPPLIES

This water heater must be installed in accordance with this advice to be covered by the Rheem warranty.

This water heater is manufactured to suit the water conditions of most public reticulated water supplies. However, there are some known water supplies which can have detrimental effects on the water heater and its operation and/or life expectancy. If you are unsure of your water quality, you may be able to obtain information from your local water supply authority. This water heater should only be connected to a water supply which complies with these guidelines for the water heater Rheem warranty to apply.

SATURATION INDEX

The saturation index (SI) is used as a measure of the water's corrosive or scaling properties.

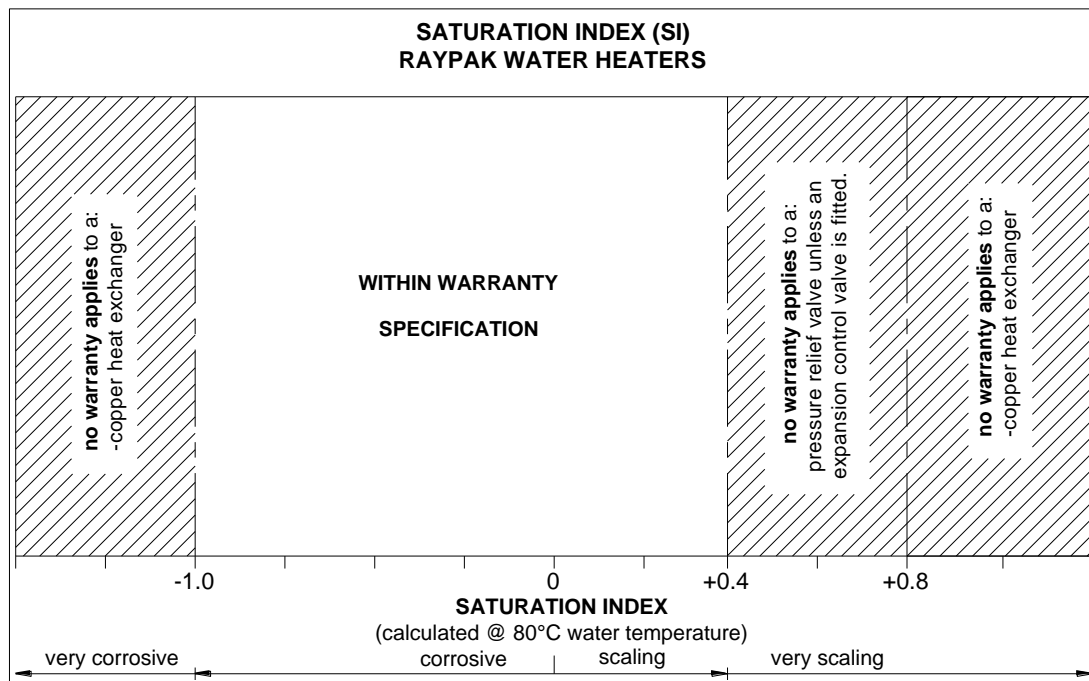
In a corrosive water supply, the water can attack copper parts and cause them to fail. Where the saturation index is less than -1.0 , the water is very corrosive and the Rheem warranty does not apply to a copper heat exchanger in a Raypak water heater.

In a scaling water supply calcium carbonate is deposited out of the water onto any hot metallic surface. Where the saturation index exceeds $+0.40$, the water is very scaling. An expansion control valve must be fitted on the cold water line after the non-return valve to protect and for the Rheem warranty to apply to the pressure relief valve on the Raypak water heater and the temperature pressure relief valve and cylinder of the storage tank connected to the system. Refer to the "[Cold Water Connection Plumbing Diagram](#)" on page 17 for the position of the expansion control valve.

Where the saturation index exceeds $+0.80$, the Rheem warranty does not apply to a copper heat exchanger in a Raypak water heater.

Water which is scaling may be treated with a water softening device to reduce the saturation index of the water.

The following chart details how the Rheem warranty applies according to the saturation index.

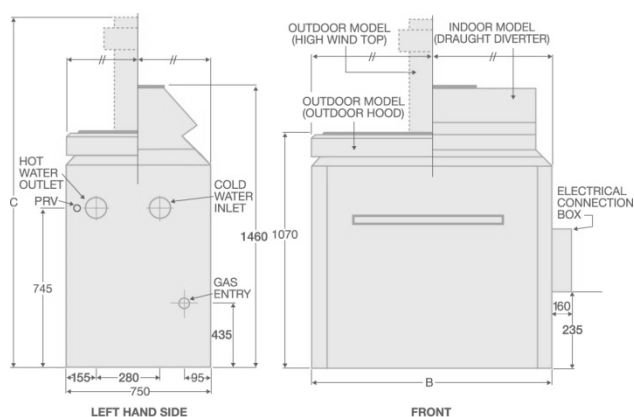


CHANGE OF WATER SUPPLY

The changing or alternating from one water supply to another can have a detrimental effect on the operation and / or life expectation of the water heater, the storage cylinder and the relief valves.

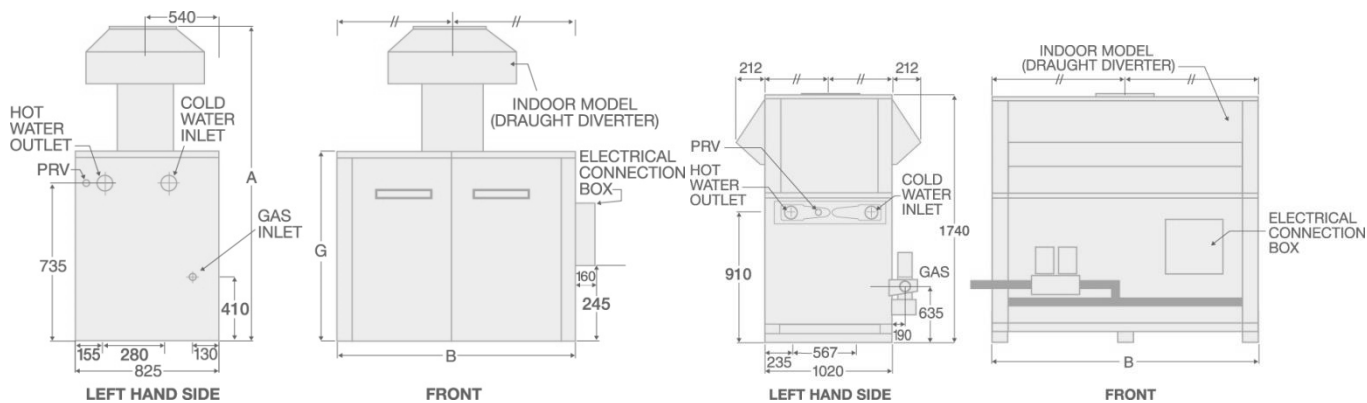
Where there is a changeover from one water supply to another, e.g. a rainwater tank supply, bore water supply, desalinated water supply, public reticulated water supply or water brought in from another supply, then water chemistry information should be sought from the supplier or it should be tested to ensure the water supply meets the requirements given in these guidelines for the Rheem warranty to apply.

DIMENSIONS AND TECHNICAL DATA



Models 538 - 868

| | | Model | 538 | 658 | 768 | 868 |
|---|--------------|-------|------|------|------|------|
| Natural Gas | Input (MJ/h) | | 539 | 661 | 765 | 870 |
| | Output (kW) | | 120 | 150 | 170 | 195 |
| Propane Gas | Input (MJ/h) | | | 620 | | |
| | Output (kW) | | | 140 | | |
| Electrical Rating 240 V 50 Hz | Power (W) | | 50 | 50 | 50 | 50 |
| | Current (A) | | 0.21 | 0.21 | 0.21 | 0.21 |
| Weight empty | Kg | | 195 | 200 | 250 | 260 |
| Flue Connection | mm | | 255 | 305 | 305 | 355 |
| Dimensions | A | mm | - | - | - | - |
| | B | mm | 830 | 955 | 1055 | 1160 |
| | C | mm | 2130 | 2255 | 2255 | 2355 |

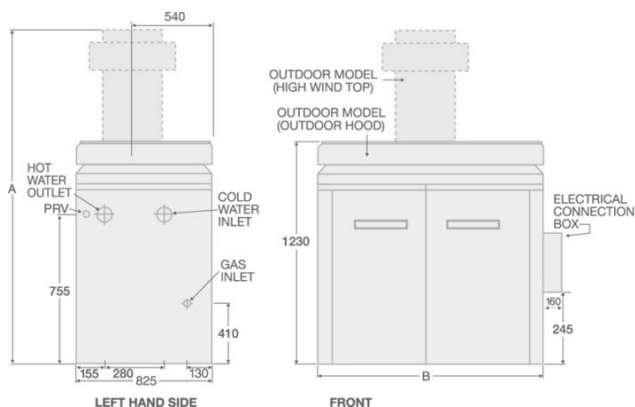


Indoor Models 992 - 1922

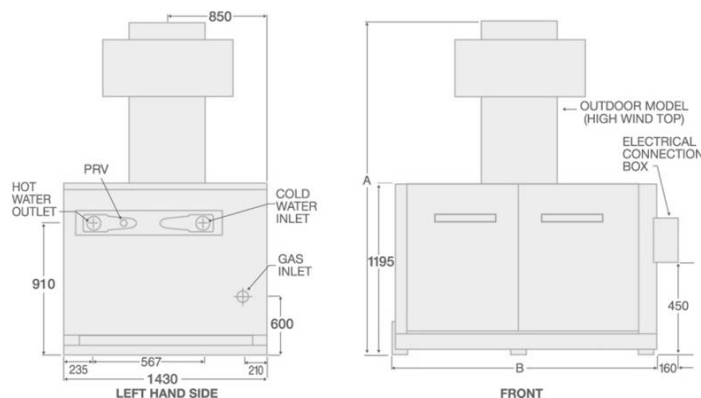
Indoor Models 2214 - 4224

| Model | | 992 | 1182 | 1292 | 1412 | 1722 | 1922 | |
|---|--------------|------------|-------------|-------------|-------------|-------------|-------------|------|
| Natural Gas | Input (MJ/h) | 999 | 1186 | 1289 | 1412 | 1722 | 1922 | |
| | Output (kW) | 225 | 265 | 285 | 315 | 380 | 430 | |
| Propane Gas | Input (MJ/h) | 933 | - | - | 1296 | - | 1772 | |
| | Output (kW) | 205 | - | - | 290 | - | 395 | |
| Electrical Rating 240 V 50 Hz | Power (W) | 100 | 100 | 100 | 100 | 100 | 100 | |
| | Current (A) | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | |
| Weight empty | Kg | 310 | 330 | 360 | 390 | 440 | 460 | |
| Flue Connection | mm | 355 | 405 | 405 | 455 | 455 | 505 | |
| Dimensions | A | mm | 1810 | 1915 | 1915 | 1990 | 2060 | 2130 |
| | B | mm | 1330 | 1510 | 1615 | 1740 | 2070 | 2270 |
| | G | mm | 860 | 860 | 860 | 860 | 930 | 930 |

| Model | | 2214 | 2634 | 3164 | 3694 | 4224 | |
|---|--------------|-------------|-------------|-------------|-------------|-------------|------|
| Natural Gas | Input (MJ/h) | 2215 | 2636 | 3165 | 3692 | 4224 | |
| | Output (kW) | 505 | 600 | 720 | 840 | 960 | |
| Propane Gas | Input (MJ/h) | - | - | - | - | - | |
| | Output (kW) | - | - | - | - | - | |
| Electrical Rating 240 V 50 Hz | Power (W) | 100 | 100 | 100 | 100 | 100 | |
| | Current (A) | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | |
| Weight empty | Kg | 625 | 700 | 780 | 860 | 940 | |
| Flue Connection | mm | 610 | 660 | 710 | 760 | 815 | |
| Dimensions | A | mm | - | - | - | - | |
| | B | mm | 1550 | 1780 | 2060 | 2350 | 2640 |
| | G | mm | - | - | - | - | - |



Outdoor Models 972 - 1852



Outdoor Models 2004 - 3804

| Model | | 972 | 1142 | 1242 | 1362 | 1662 | 1852 |
|----------------------------------|--------------|------|------|------|------|------|------|
| Natural Gas | Input (MJ/h) | 976 | 1142 | 1242 | 1357 | 1657 | 1854 |
| | Output (kW) | 220 | 255 | 275 | 300 | 370 | 410 |
| Propane Gas | Input (MJ/h) | - | - | - | - | - | - |
| | Output (kW) | - | - | - | - | - | - |
| Electrical Rating 240 V 50 Hz | Power (W) | 100 | 100 | 100 | 100 | 100 | 100 |
| | Current (A) | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 |
| Weight empty | Kg | 360 | 385 | 410 | 440 | 510 | 520 |
| Dimensions | A mm | 2500 | 2395 | 2395 | 2570 | 2640 | 2920 |
| | B mm | 1330 | 1510 | 1615 | 1740 | 2070 | 2270 |

| Model | | 2004 | 2404 | 2804 | 3304 | 3804 |
|----------------------------------|--------------|------|------|------|------|------|
| Natural Gas | Input (MJ/h) | 2004 | 2404 | 2804 | 3304 | 3804 |
| | Output (kW) | 445 | 530 | 625 | 740 | 845 |
| Propane Gas | Input (MJ/h) | - | - | - | - | - |
| | Output (kW) | - | - | - | - | - |
| Electrical Rating 240 V 50 Hz | Power (W) | 100 | 100 | 100 | 100 | 100 |
| | Current (A) | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 |
| Weight empty | Kg | 650 | 730 | 810 | 890 | 970 |
| Dimensions | A mm | 3165 | 3210 | 3185 | 2965 | 3165 |
| | B mm | 1550 | 1780 | 2060 | 2350 | 2635 |

This page is intentionally blank.

This page is intentionally blank.

This page is intentionally blank.