

Owner's Guide and Installation Instructions



MVB Modulating Vertical Burner Water Heater



***Models 910500 • 910750 • 911000 • 911250
• 911500 • 911750 • 912000***

*This water heater must be installed and serviced by an authorised person.
This water heater must be certified in accordance with AS 3814 before being brought into service
Please leave this guide with a responsible officer.*

RHEEM AUSTRALIA PTY LTD A.B.N. 21 098 823 511
www.rheem.com.au
For Service Telephone **131 031 AUSTRALIA**
0800 657 335 NEW ZEALAND

Date of installation: _____
Model N°: _____
Serial N°: _____
Installed by: _____
Purchased from: _____

Victorian Customers

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.

An electronic copy of these Owner's Guide and Installation Instructions
can be downloaded from rheem.com.au.

PATENTS

This water heater may be protected by one or more patents or registered designs
in the name of Raypak Inc.

TRADEMARKS

® Registered trademark of Rheem Australia Pty Ltd.
™ Trademark of Rheem Australia Pty Ltd.

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

CONTENTS

HOUSEHOLDER OR RESPONSIBLE OFFICER –

This booklet contains important information about your new water heater, including terms of the Rheem warranty. We recommend you read pages 4 to 10. The other pages are intended for the installer but may be of interest

WARRANTY	4
SAFETY, WARNINGS, INSTALLATION NOTES	6
ABOUT YOUR WATER HEATER	10
HOW YOUR WATER HEATER WORKS	12
SAVE A SERVICE CALL	13
MAINTENANCE REQUIREMENTS	17
WATER SUPPLIES	18
INSTALLATION	20
CONNECTIONS – PLUMBING	26
CONNECTIONS – GAS	38
CONNECTIONS – FLUE	40
APPLICATIONS & MODES	52
CONNECTIONS – ELECTRICAL	66
LOCATION OF CONTROLS	79
USER INTERFACE AND ADJUSTMENTS	81
OPERATING THE WATER HEATER	104
COMMISSIONING	101
SERVICE PROCEDURES	105

RAYPAK WATER HEATER WARRANTY – AUSTRALIA ONLY

RAYPAK MVB WATER HEATER MODELS 910500, 910750, 911000, 911250, 911500, 911750, 912000

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 131031, with Contact Centre personnel available 24 hours, 7 days a week to take your call and if necessary to arrange a service call for during normal working hours Monday to Friday (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 from the 1st September 2020.
- 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 Rheem may reject a claim under this warranty in its sole discretion if:
 - a) You do not arrange for a major service to be conducted on your water heater, in accordance with Rheem's recommendation in the Owner's Guide and Installation Instructions; and
 - b) The fault giving rise to the warranty claim would have been detected and rectified during that major service.
- 2.2 The decision of whether to repair or replace a faulty component is at Rheem's sole discretion.
- 2.3 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.
- 2.4 Where a failed component or water heater is replaced under this warranty, the balance of the original warranty period will remain effective. The replacement does not carry a new Rheem warranty.
- 2.5 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.
- 2.6 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.
- 2.7 This warranty only applies to the original and genuine Rheem water heater in its original installed location and any genuine Rheem replacement parts.
- 2.8 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.
- 2.9 Rheem may reject a claim under this warranty in its sole discretion if a third party solar diverter is connected to the water heater.
- 2.10 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.
- 2.11 If the water heater is not sized to supply the hot water demand in accordance with the guidelines in Rheem's 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 from the date of installation 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.

SAFETY, WARNINGS, INSTALLATION NOTES

It is important you read the following safety and warnings information.

SAFETY AND WARNINGS

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

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

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

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

- 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 with reduced physical, sensory or mental capabilities i.e. the infirm, or by children. Children should be supervised to ensure they do not interfere with the water heater.
- If the power supply cord, plug or electrical conduit to the water heater is damaged, it must be replaced by a qualified person in order to avoid a hazard. The power supply cord and plug must be replaced with a genuine replacement part available from Rheem. Phone Rheem Service or their nearest Accredited Service Agent to arrange for an inspection.
- This water heater uses between 24V a.c. and 220 V – 240 V a.c. power for the electrically operated components. The removal of the front cover will expose 24V, 120V and 220 V – 240 V a.c. wiring. It must only be removed by a qualified person.
- Risk of electrical shock. More than one disconnect switch may be required to de-energize the equipment before servicing.
- Do not connect any Safety Extra Low Voltage (SELV) circuit(s) to this water heater.
- 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.
- 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 and air intake is not obstructed in any way at any time.
- MAKE SURE the gas on which the heater will operate is the same type as that specified on the heater rating plate.

- 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).

The Rheem warranty may not cover faults if relief valves or other safety devices are tampered with or if the installation is not in accordance with these instructions.

- **DANGER:** The operation of the high limit thermostat indicates a possibly dangerous situation. If the hi limit thermostat operates, it must not be reset and the water heater must be serviced by a qualified person.
- The water heater will operate until a water temperature of up to 82°C is reached, depending upon the temperature setting.

Refer to “How Hot Should The Water Be?” on page 7.

- The lever on the pressure relief valve and expansion control valve (if fitted) requires to be operated every six (6) months to clear any deposits and to ensure the valve and its drain line are not blocked.

Refer to “Relief Valves” on page 8 and “Maintenance Requirements” on page 17.

- For continued safety of this water heater it must be installed, operated and maintained in accordance with the Owner's Guide and Installation Instructions.
- Servicing of a water heater must only be carried out by qualified personnel. Phone Rheem Service or their nearest Accredited Service Agent.
- Only a person qualified to install or service a water heater can drain the water heater, if this is required.
- Do not modify this water heater.

CAUTION: This heater requires forced water circulation when the burner is operating. Severe damage will occur if the heater is operated without proper water flow circulation.

CAUTION: Operation of this heater in low temperature systems requires special piping arrangements. Harmful internal condensation will occur if the inlet water temperature does not exceed 50°C. Warranty claims will be denied when condensation occurs.

CAUTION: If this heater is to be installed in a negative or positive pressure equipment room, there are special installation requirements. Consult Rheem for details.

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.

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.
- Switch off the electrical supply at the isolator for the water heater.

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 isolator for the water heater.

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.

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 99).
- Open the gas isolation valve fully at the inlet to the water heater.
- Switch on the electrical supply at the supply isolator for the water heater.

NOTE: If the water heater is correctly installed, and there is a call for heat, this will also activate the circulating pump. The water heater will operate automatically when a call for heat occurs.

RELIEF VALVES

Pressure Relief Valve

This water heater incorporates a pressure relief valve located near the top, at the rear of the water heater. This valve is essential for the water heater’s safe operation.

It is possible for the valve to discharge a quantity of water through the drain line during each heating period.

Expansion Control Valve

In many areas, including South Australia, Western Australia and scaling water areas, it is mandatory an expansion control valve or expansion tank is fitted to the cold water line to the water heater.

The expansion control valve will discharge the quantity of water from its drain line during the heating period instead of the pressure relief valve as it has a lower pressure rating.

Valve Operation

Continuous leakage of water from either valve and its drain line may indicate a problem with the water heater. Refer to “Pressure Relief Valve Running” on page 13.

⚠ Warning: Never block the outlet of either valve or their drain lines for any reason. A relief valve drain must be left open to atmosphere, and be installed in a continuously downward direction.

In locations where water pipes are prone to freezing, the relief valve drain line must be insulated and not exceed 300 mm in length before discharging into a tundish through an air gap.

Operate the easing lever on the pressure relief valve and expansion control valve once every six (6) months to clear any deposits and ensure the valve and its drain line are not blocked. **It is very important the lever is raised and lowered gently.**

⚠ Warning: Water discharged from the pressure relief valve drain line will be hot. Exercise care to avoid any splashing of water by standing clear of the drain line’s point of discharge when operating either valve’s easing lever.

⚠ DANGER: Failure to operate the easing lever on the relief valve once every six (6) months may result in the water heater cylinder failing, or under certain circumstances, exploding.

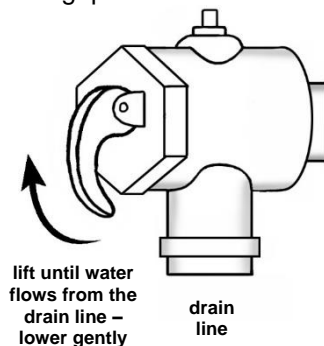
If water does not flow freely from the drain line when the lever is lifted, then the water heater must be checked. Phone Rheem Service or their nearest Accredited Service Agent to arrange for an inspection.

The pressure relief valve should be replaced at intervals not exceeding five (5) years and the expansion control valve should be checked for performance or replaced at intervals not exceeding five (5) years. The checking of the valves performance or replacement should occur more frequently in areas where there is a high incidence of water deposits. Refer to “Water Supplies” on page 18.

INSTALLATION NOTES

This water heater must be installed:

- by a qualified person,
- in accordance with the installation instructions,



- in compliance with the Plumbing Standard AS/NZS 3500.4,
 - The water heater is suitable for either indoor or outdoor installation.
- in compliance with the Australian / New Zealand Wiring Rules AS/NZS 3000,
 - Isolation switches must be installed in the electrical circuit to the water heater in accordance with the Wiring Rules, so the water heater can be switched off.
 - The power supply wires are to be directly connected to the terminal block and earth tab connection, with no excess wire loops inside the front cover. The temperature rating of the power supply wires insulation and any sensor or interlock wiring must suit this application or the wiring protected by insulating sleeving with an appropriate temperature rating if it can make contact with the internal header. The temperature of the internal header can reach up to 82°C under normal operation.
- in compliance with AS/NZS 5601.1 and AS 3814 as applicable under local regulations,
- in compliance with all local codes and regulatory authority requirements.
- in New Zealand, the installation must also conform to Clauses G11, G12 and H1 of the New Zealand Building Code.
- The water heater must be commissioned and certified in accordance with AS 3814.

Installation and commissioning requirements and details for the installing plumber, gas fitter and licensed electrical worker commence on page 20.

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® MVB water heater.

The operation of the water heater depends on the application. For hot water applications up to 71°C, a W model will be installed. For mechanical heating (hydronic) or for hot water applications above 71°C, a H model will be installed.

THE WATER HEATER IS FACTORY SUPPLIED FOR USE ON NATURAL GAS. USE ON PROPANE GAS WILL REQUIRE CONVERSION BY RHEEM SERVICE. CONTACT RHEEM SERVICE ON 131 031 MODEL IDENTIFICATION

The model identification number and heater serial number are found on the heater rating plate located on the upper rear jacket panel of the heater. The model number will have the form 910500BNH or similar depending on the heater size and configuration. Refer to the table below to determine the model of heater.

9	1	0	5	0	0	B	N	H
Commercial MVB		Approx Thermal Input (MJ/h)				Header Material B = Bronze C = Cast Iron	Gas Type N = Nat gas P = Propane	Heater Configuration H = Hydronic W = Domestic Hot Water

Table 1: Model Number Identification

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.

The maximum user adjustable set point temperature for DHW models ('W' suffix) is 71°C. For temperatures above 71°C, a hydronic model ('H' suffix) will be required. Hydronic models ('H' suffix) are able to be user set to 82°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 and still allow hotter water to the kitchen and laundry.

TEMPERATURE ADJUSTMENT

The system temperature will have been set by the installer to suit the application, adjustment should not be required. Only an authorised person can make adjustments to the MVB.

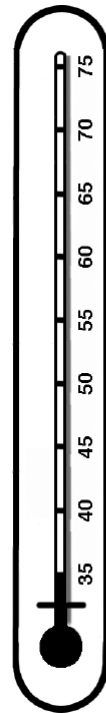
DOES THE WATER CHEMISTRY AFFECT THE WATER HEATER?

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 18.

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 18.

HOW LONG WILL THE WATER HEATER LAST?

The water heater is supported by a manufacturer's warranty (refer to "[Warranty](#)" on page 4). 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 12.



Maximum user adjustable temperature for W models

HOT WATER INSTALLATIONS Minimum recommended stored water temperature

HOT WATER INSTALLATIONS Maximum recommended supply temperature to bathrooms and ensuites

PRECAUTIONS

Where damage to property can occur in the event of the water heater leaking, the water heater should be installed in a safe tray or suitably banded. Construction, installation and draining of a safe tray or banding should 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 "Maintenance Requirements" on page 17.

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.

HOW YOUR WATER HEATER WORKS

BURNER IGNITION

The MVB incorporates an automatic ignition system. On a call for heat the fan performs a high speed pre-purge operation to ensure any unburnt gas is cleared from the combustion chamber before rotating at the speed required for start gas rate.

The water heater primary pump will be initiated and a self-proving flow switch will close when flow is detected. Other devices in the safety chain must also be closed before an ignition attempt will commence.

A Hot Surface Igniter (HSI) rod begins to glow and when the temperature reaches the desired set point, the gas valve is opened. If successful ignition is achieved the burner will operate. For H models only, the controls will modulate the burner rate depending on the incoming temperature versus the set point. Once the set point is achieved, the burner will turn off and a post purge function will occur. For W models, some modulation will occur toward the end of the heating cycle to limit temperature overshoot. Should successful ignition not be achieved within 4 seconds the automatic flame control system will shut down the gas valve and the heater will go into lockout and require manual intervention to reset the water heater.

The MVB incorporates many safety features including:

- Self-proving air pressure switch
- Self-proving water flow switch
- Blocked flue pressure switch
- Electronic thermostatic control sensing temperature at the water heater inlet, outlet and storage tank or system flow
- Auto reset hi-limit thermostat
- EN298 certified controls, including manual reset hi-limit
- Dungs double block gas valve
- Pressure relief valve

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.

- **Are 3 phase pumps wired correctly?**

Have an electrician inspect the wiring of 3 phase pumps for correct rotation.

- **Is the BMS system timed out?**

Check the settings on the BMS to ensure they are suitable to enable heating when required.

- **Is the ignition system 'locked out'?**

Reset the water heater. Refer to "To Reset the Water Heater" on page 82.

- **Is a code displayed on the control panel?**

Check the display on the control panel (refer to the "MVB Error Codes" on page 13).

- **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 "Water Pressure Specifications" on page 27).

- **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.

MVB ERROR CODES

If any of the sensors detect an abnormal condition or an internal component fails during the operation of the MVB, the display may show the error. This code may either be the result of a temporary condition in which case the display will revert to its normal readout when the condition is corrected, or it may be the result of a condition that the controller has evaluated as not safe to restart the unit. In this case, the unit control will be locked out, requiring the maintenance person to manually reset the control by pressing and releasing the **RESET** button.

Heater Errors

When an error condition occurs, the controller will display an error code on the user interface. These error codes and several suggested corrective actions are included in the MVB Fault Text section on page 14.

Heater Faults

1. When a fault condition occurs, the controller will flash a red light on the PIM™ and display the error code in the Toolbox menu on the user interface. The alarm output will also be activated. Most fault conditions will also cause the water heater pump to run in an attempt to cool the unit.
2. Note the error code, either through the flash code on the PIM™ and/or from the Toolbox menu on the user interface, and reference the explanation of the fault along with troubleshooting steps in the MVB fault text section.
3. Press and release the **RESET** button to clear the fault on the user interface and resume operation. Be sure to observe the operation of the unit for a period of time to ensure correct operation and no reoccurrence of fault code(s).

DANGER: When servicing or replacing components that are in direct contact with the water, be certain that:

- There is no pressure in the water heater. (Isolate the water heater. Raise the release on the relief valve. Do not depend on the pressure gauge reading).
- The water heater water is not hot.
- The electrical power is off.

WARNING: When servicing or replacing any components of this unit be certain that:

- The gas is off.
- All electrical power is disconnected.

WARNING: Do not use this appliance if any part has been under water. Improper or dangerous operation may result. Contact a qualified service technician to inspect the water heater and to repair or replace any part of the water heater that has been under water prior to placing the water heater back in operation.

CAUTION: Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing. See wiring diagram.

CAUTION: If overheating occurs or the gas supply fails to shut off, do not turn off electrical power to the circulating pump. This may aggravate the problem and increase the likelihood of water heater damage.

Instead, shut off the gas supply to the water heater at the gas isolating valve.

MVB FAULT TEXT

Error Display

If there is an active error, then it is displayed as the first item in the Toolbox Menu and it is the default display for the control until the error is resolved.

Error Item	Description and Troubleshooting
OUTLET SEN	Check the outlet water sensor and its wiring.
LIMIT SEN	Check the high limit sensor and its wiring.
INLET SEN	Check the inlet sensor and its wiring.
GAS PRESS	Check PIM™ wiring.
IGNITION	Reset control, push and release RESET button
LIMIT TRIP	Water heater temperature tripped the high limit.
FLAME	False flame detected. Shut off gas supply, recycle power.
ID CARD	Identity card, check ID card and wiring.
IGN CTRL	Internal control fault. Reset power, replace control.
DELTA T	Temperature difference between the inlet and outlet exceeded the set point. Check water flow.
LOW 24VAC	Low 24 VAC power. Check power supply wiring and transformer.
BLOW SPEED	Blower speed out of range. Check blower wiring and blower.

Table 2: Error Display

LED Error Code Listing

Active errors detected are indicated by LED lights on the PIM™.

LED Code	Error Mode	Recommended Troubleshooting
Off	Normal Operation	
Red LED steady ON, Green Power LED OFF	ID Card Fault	Check that the proper ID card is securely connected. Perform a power and system restart.
Steady ON	Internal Control Failure	Perform a power and system reset. If fault remains, replace PIM™.
1 flash	N/A	N/A
2 flashes	False Flame Error	Check for proper gas valve closure. Clean burner and electrodes.
3 flashes	Ignition Lockout Fault	Check the gas supply. See table for more information.
4 flashes	N/A	N/A
5 flashes	Low Voltage Fault	Check the 24 VAC input voltage. The voltage must be above 18.0 VAC.
6 flashes	N/A	N/A
7 flashes	Hi-Limit Fault	Check for proper water flow. Check hi-limit and outlet sensor.
8 flashes	Sensor Fault	See VERSA for fault identification. Check sensor wiring. Refer to Table 4 for sensor resistance values
9 flashes	N/A	N/A
10 flashes	N/A	N/A
11 flashes	N/A	N/A
12 flashes	N/A	N/A
13 flashes	Hi-Temperature Delta Fault	Check pump operation. Confirm proper water flow across heat exchanger.
14 flashes	Ft-Bus Communications Fault	Verify VERSA is connected and operating. Check the cable between the VERSA and PIM™.
15 flashes	Safety circuit open	Confirm all safeties are functioning normally. Check continuity at J8, pins 5 and 6 at the PIM™.

Table 3: PIM™ LED Error Codes

Sensor Resistance Values

Water Sensor/ Outdoor Sensor	
Water Temperature (°C)	Resistance (ohms)
0	32550
5	25340
10	19870
15	15700
20	12490
25	10000
30	8059
35	6535
40	5330
45	4372
50	3605
55	2989
60	2490
65	2084
70	1753
75	1481
80	1256
85	1070
90	915
95	786
100	667

Table 4: 10K/25 NTC (Curve J) Sensor Resistance Values

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

MAINTENANCE REQUIREMENTS

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 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, refer to "Annual Service" on page 106. If servicing is performed at six monthly intervals, rotate between "Annual Service Procedure" and "Six Monthly Service Procedure" on page 106. Refer to page 106 for "5 Year Service Procedure".

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

PRESSURE RELIEF VALVE

The pressure relief valve is located at the rear 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 13).

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 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 18).

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 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.

STORAGE TANKS (IF FITTED)

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

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.

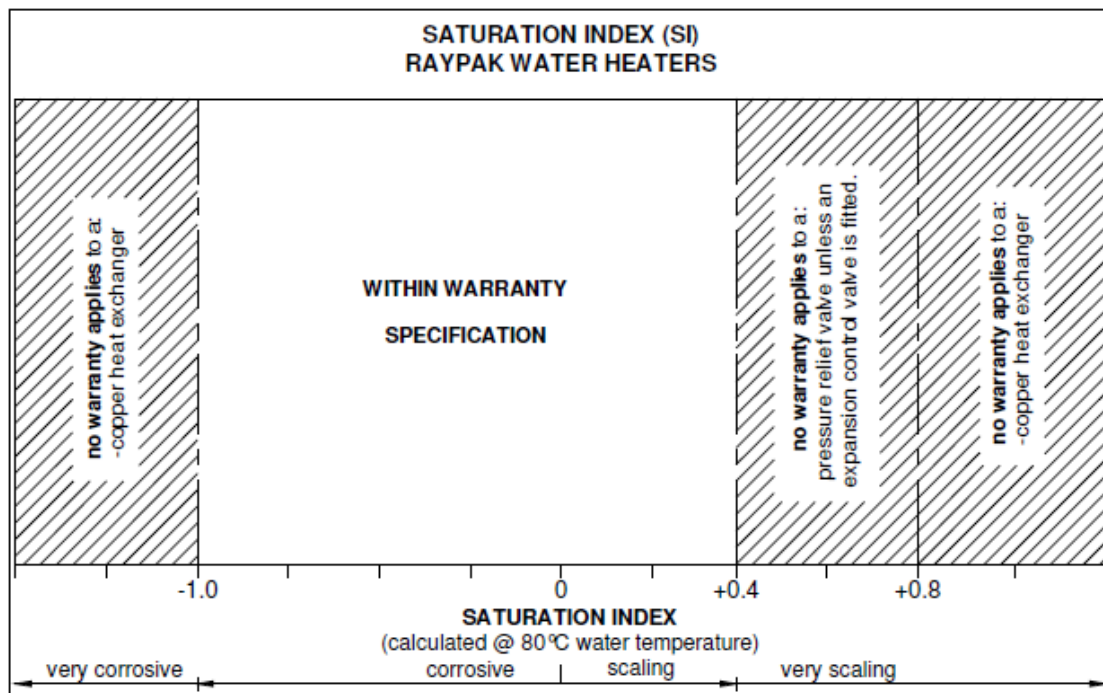
In a corrosive water supply, the water can attack copper parts and cause them to fail. Where the saturation index is less than -1.0 , the water is very corrosive and the Rheem warranty does not apply to a copper heat exchanger in a Raypak water heater.

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 [Fig 4](#) on page 26 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.

AUTOMATIC CHEMICAL FEEDERS

All chemicals must be introduced and completely diluted into the water before being circulated through the heater. High chemical concentrations will result when the pump is not running (e.g. overnight).

NOTE: High chemical concentrates from feeders that are out of adjustment will cause rapid corrosion to the heat exchanger. Such damage is not covered under the warranty.

NOTE: Failure of a heat exchanger due to lime scale build-up on the heating surface, low pH or other chemical imbalance is non-warrantable.

INSTALLATION

INSTALLATION STANDARDS

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/NZS 5601.1 AS/NZS 3000 and AS 3814 as applicable under local regulations, and all local codes and regulatory authority requirements.
- in New Zealand, the installation must also conform to Clauses G11, G12 and H1 of the New Zealand Building Code.
- The water heater must be commissioned and certified in accordance with AS 3814.

Warning: the water and gas fittings on this water heater are NPT threaded and will not seal against BSP (ISO 7) threaded fittings. Adaptors are provided with the water heater and **MUST** be fitted before installing the water heater.

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.

The following parts are supplied with the water heater:

- Temperature/Pressure gauge
- Fitting Kit comprising:
 - 2 off NPT to BSP water inlet and outlet adaptors
 - 1 off NPT to BSP gas inlet adaptor
 - 1 off 10m sensor lead and adaptor

If additional sensors are required these can be ordered from Rheem, P/No AQ0203117.

The following items may also have been supplied:

1. One or two pumps depending on the application requirements.
2. Various flue components including adaptor, condensate drain, straight lengths, 45 and/or 90 degree bends, Tees, terminals, brackets and sealing clamps.
3. Outdoor Sensor P/No AQ0203116
4. Bacnet/Metasys Interface Module P/No AQ0200125 (for Bacnet or Metasys configured BMS systems).
5. Lonworks Interface Module P/No AQ0200126 (for Lonworks configured BMS systems).

Note: MVB is internally configured for Modbus BMS systems and requires no additional interface.

Check that all required items have been supplied with the water heater before continuing with the installation.

WATER HEATER APPLICATION

THIS WATER HEATER IS NOT SUITABLE FOR POOL HEATING.

This water heater is designed for the purpose of heating potable water or for 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 shown on the water heater 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.**

INSTALLATIONS AT ELEVATION

Rated inputs are suitable for up to 600 m elevation without de-rating. Contact Rheem for installations at altitudes 600 m and above sea level. The product is suitable for installations at altitudes up to 3050m above sea level (adjustments may be required).

WATER HEATER LOCATIONS

This water heater is suitable for outdoor or indoor installation. The flueing will depend on where the water heater is installed and the location of the flue terminal. The following configurations are supported by Rheem:

Outdoor - (refer to [Fig: 5, 6, 7](#) on page 33)

Indoor:

- a) Room sourced air for combustion with vertical flue discharge (refer to [Fig: 9](#) on page 35) or horizontal flue discharge (refer to [Fig: 6 and 7](#) on page 33)
- b) Room sealed air for combustion with vertical or horizontal flue discharge and the air intake on the same plane as the flue discharge (refer to [Fig: 10, 11](#) on page 36)
- c) Room sealed air for combustion with vertical or horizontal flue discharge and the air intake not on the same plane as the flue discharge (refer to [Fig: 10, 11](#) on page 36)

Common flueing of MVB is not currently supported.

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. Vertically terminating flues must terminate above roofs, walls or parapets in accordance with AS/NZS 5601.1.

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 front and side panels 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 located at the back of the water heater.

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, structurally sound surface. The water heater is suitable for installation on open mesh structures and also on a combustible surface but must NEVER be installed on carpeting.

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

FIRE RESISTANT MATERIALS

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

SAFE TRAY

Where damage to property can occur in the event of the water heater leaking, the water heater should be installed in a safe tray or be suitably banded. Construction, installation and draining of a safe tray or bunding should 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.

ANCHORING

If the heater needs to be secured to the ground, use the hole pattern shown in Fig. 1, following local codes. Additional clearance may be required when using the factory anchor bracket.

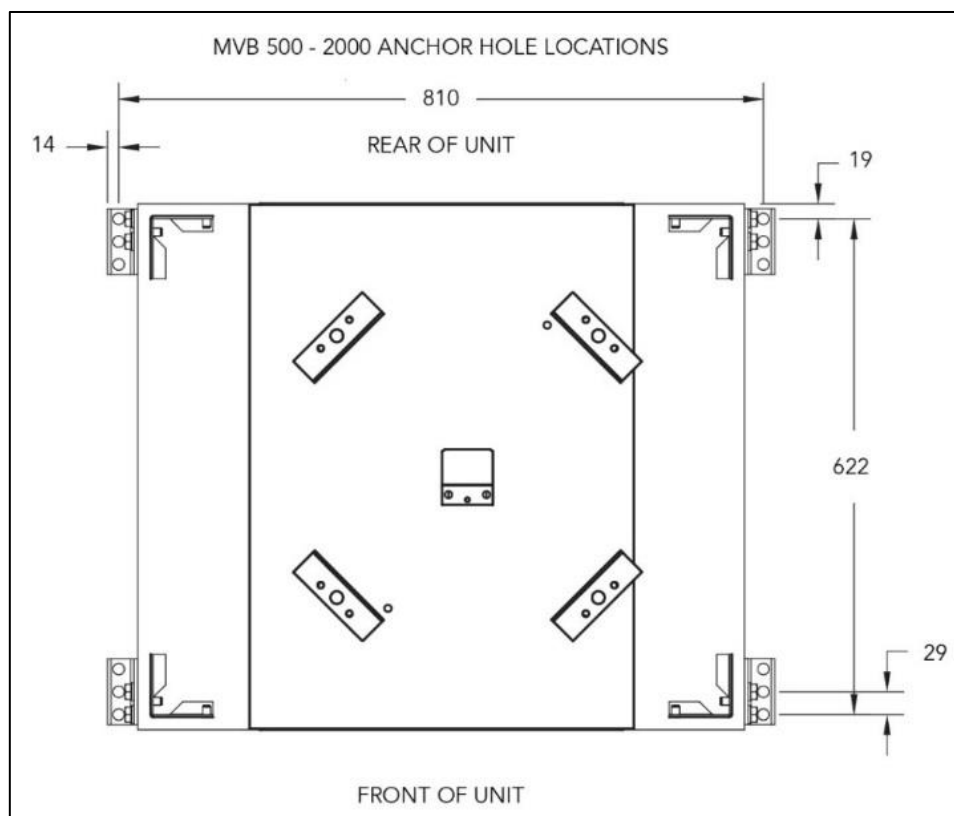


Fig. 1: Anchor Hole Locations

CLEARANCES

The clearances in [Table 5](#) and [Fig 2](#) on page 23 must be observed when installing the water heater.

The water heater must be installed with service access in mind. There are also special requirements in AS/NZS 5601.1 for water heaters installed in a garage, an enclosed space and other locations. Remember all local authorities have regulations about putting water heaters into roof spaces.

Heater Side	Minimum Clearance from Combustible Surfaces (mm)	Minimum Service Clearance (mm)
Right Side	25	500
Left Side	25	500
Rear	300	600
Front	Open	900
Top	0	350
Floor*	0	0

*DO NOT install on carpeting.

Table 5: Clearances – All Installations

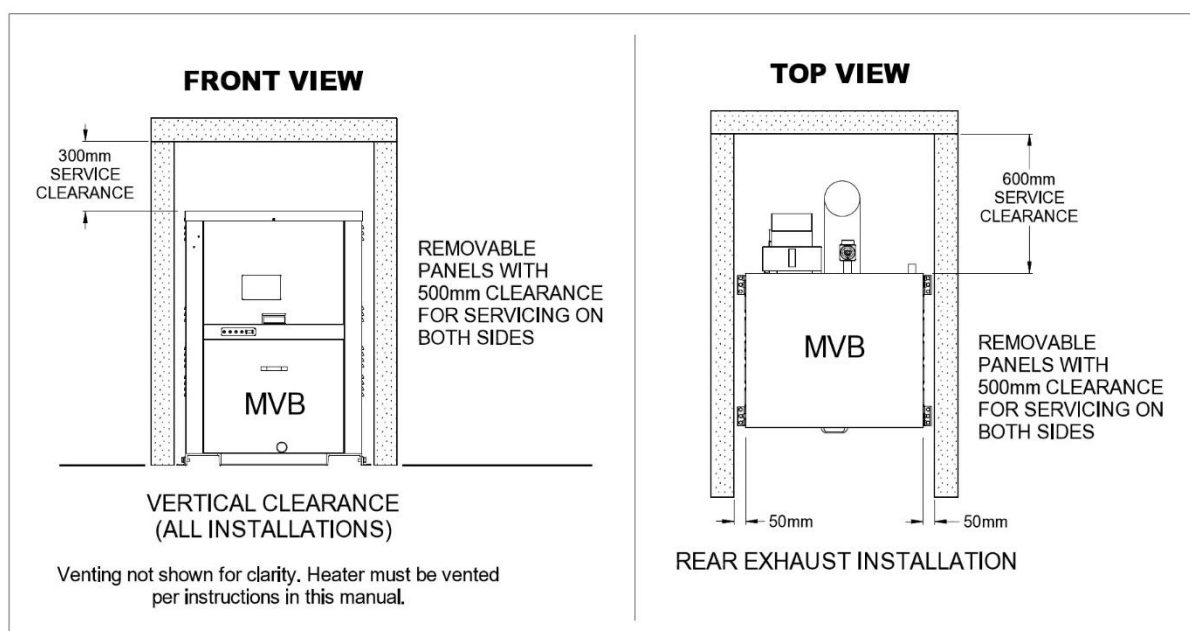


Fig. 2: Minimum Clearances– Indoor and Outdoor Installations

PLANNING THE INSTALLATION

The MVB requires adequate clearance on all four sides to facilitate maintenance. Gas, water, electrical, air intake and flue discharge connections are all located at the back of the water heater and careful planning should be undertaken to ensure a successful installation. The following order is recommended:

- Plan the layout
- Install water inlet including pump and manifolds
- Install water outlet including manifolds
- Install gas lines including any regulators and manifolds
- Install air intake (room sealed models)
- Install flue
- Make electrical connections

Table 6: MVB Dimensions and Technical Data

MVB Model			910500	910750	911000	911250	911500	911750	912000
Natural & Propane	Input	MJ/h	527	791	1054	1319	1582	1846	1990
	Output	kW	126	189	252	316	379	442	476
Dimensions									
B		mm	1092	1245	1397	1549	1702	1905	2057
D		mm	813	965	1118	1270	1422	1575	1727
E		mm	889	1041	1194	1346	1499	1651	1803
F		mm	603	756	908	1060	1213	1365	1518
G*			R1	R1	R1¼	R1¼	R1¼	R2	R2
H*			R2	R2	R2½	R2½	R2½	R2½	R2½
K		mm	150			200			
M		mm	368			451			
N		mm	150			200			
P		mm	889	1041	1232	1346	1499	1727	1880
R		mm	152	152	152	152	152	229	229
V		mm	51	51	51	51	51	127	127
Weight		kg	272	299	326	354	381	426	454
Relief Valve Connection			RC¾	RC¾	RC¾	RC¾	RC¾	RC¾	RC¾
Electrical Rating 240V 50Hz		Amps	6.25	6.25	6.25	6.25	6.25	8.5	8.5
Min Buffer Tank Capacity		L	217	326	434	544	653	761	820
Max Storage Tank Capacity		L	6511	9767	13022	16329	19585	22840	24597
Litres Recovery Per Hour @	30	°C rise	3617	5426	7234	9072	10880	12689	13665
	40	°C rise	2713	4069	5426	6804	8160	9517	10249
	50	°C rise	2170	3256	4341	5443	6528	7613	8199
	60	°C rise	1809	2713	3617	4536	5440	6344	6833
	65	°C rise	1669	2504	3339	4187	5022	5856	6307
	70	°C rise	1550	2325	3100	3888	4663	5438	5856
	75	°C rise	1447	2170	2894	3629	4352	5076	5466
	80	°C rise	1356	2035	2713	3402	4080	4758	5124
	85	°C rise	1277	1915	2553	3202	3840	4478	4823

*Water and gas connections are NPT. An NPT to BSP adapter kit is supplied with the water heater.

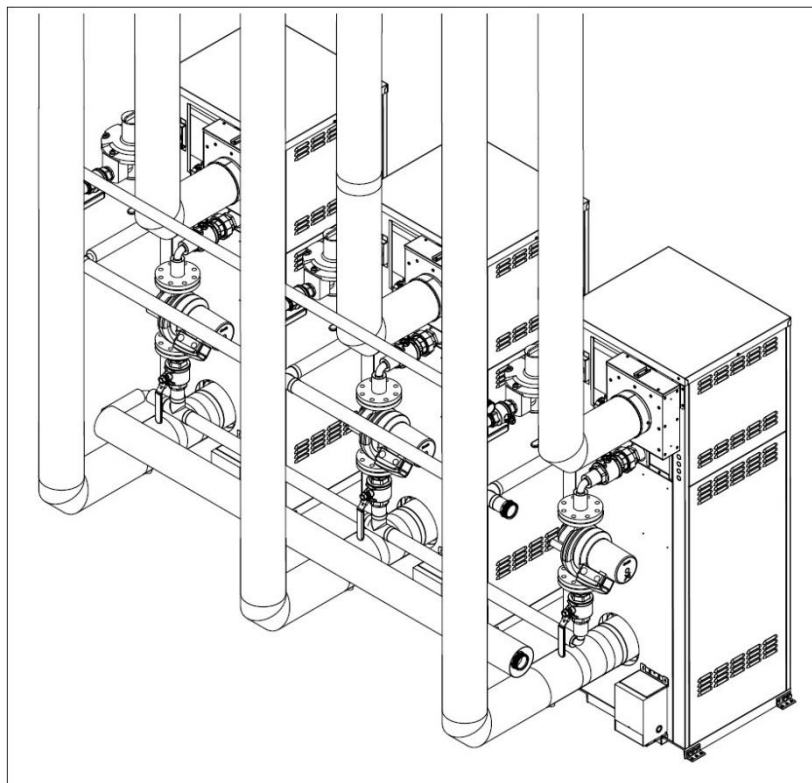
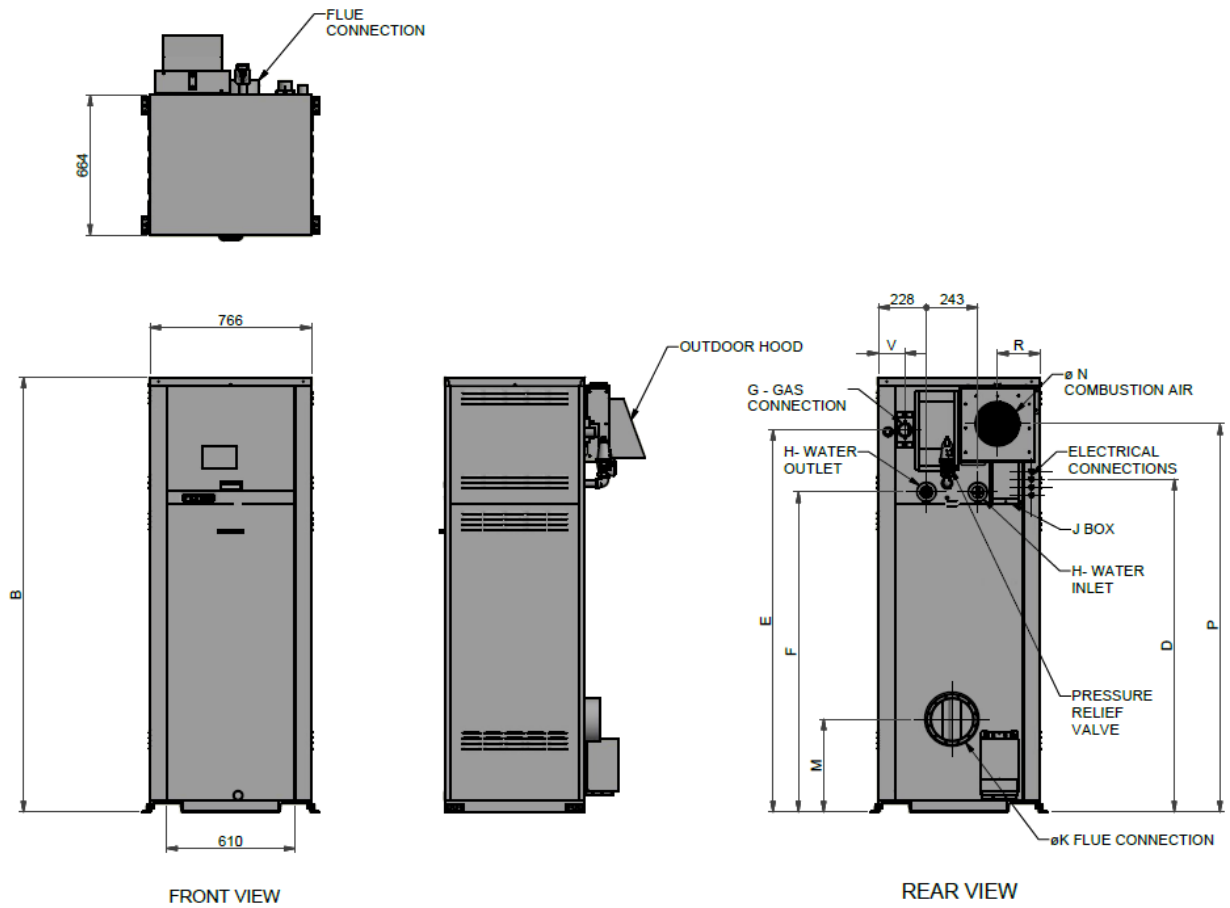


Fig 3 – Multiple MVB with Vertical Room Sealed Flueing Showing Typical Gas, Water, Air Intake and Flue Configurations

CONNECTIONS – PLUMBING

COLD WATER SUPPLY / MAKEUP

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.

Water Heating Applications (W Models)

An isolation valve and non-return valve must be installed on the cold water line to the system. An acceptable arrangement is shown in [Fig 4](#) on page 42.

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. Refer to [Table 7](#) on page 27.

Where a H model is being used to produce hot water at temperatures above 65°C for DHW use in potable water circuits, the 60PSI (415kPa) relief valve must be exchanged for a 150PSI (1000kPa) relieve valve unless an open vented storage vessel is being used.

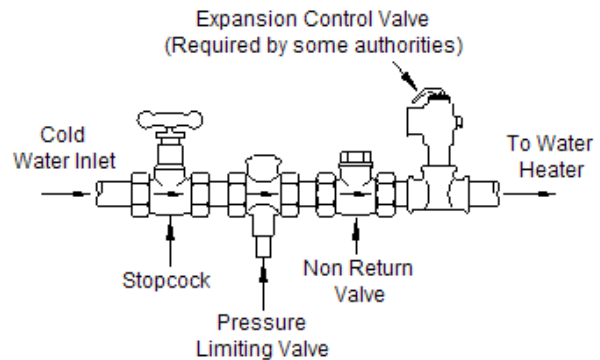


Fig 4: Cold Water Connection Plumbing

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

Mechanical, Hydronic and Process Heating Applications (H Models)

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 (415 kPa) 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.

If the water heater is being used in an open vented system or is supplied with water from a tank supply and a pressure pump system is not installed then the minimum supply pressure as specified in [Table 12](#) on page 31 must be observed.

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.

Operation Type	W Models	H Models ³
Relief Valve Setting (kPa)	1000 (850) ¹	415
Expansion Control Valve (ECV) ² Setting (kPa)	850 (700) ¹	NA
Minimum Supply Pressure		
System water temperatures up to 65°C (kPa)	70 (7m)	70 (7m)
System water temperatures above 65°C (kPa)	120 (12m)	120 (12m)
Maximum Supply Pressure		
without ECV ² fitted	800 (680) ¹	330
with ECV ² fitted	680 (550) ¹	NA


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

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

³ H models used for high temperature DHW applications follow pressure limitations of W models.

Table 7: Water Pressure Specifications

HOT WATER DELIVERY (WATER HEATING APPLICATIONS)

 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.

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 controlling electronic thermostat above 65°C unless it is necessary. A BMS can be used to switch off the water heater during hours or days when it is not in use.

EXPANSION CONTROL VALVE

Local regulations may make it mandatory to install an expansion control valve (ECV), or expansion vessel, in the cold water line to the water heating system. In other areas, an ECV or expansion vessel is not required unless the saturation index is greater than + 0.4 (refer to “Water Supplies” on page 18). However, an ECV may be needed in a corrosive water area where there are sufficient quantities of silica dissolved in the water.

The ECV or expansion vessel must always be installed after the non-return valve and be the last valve installed prior to the water heater (refer to Fig 4 on page 42). 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. The drain line must be the same size, or larger, than the relief valve outlet to which it is connected.

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 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.

TEMPERATURE AND PRESSURE GAUGE

The temperature and pressure gauge is shipped loose (within the top cabinet) for field installation and should be installed within 300 mm of the water heater outlet in an easily readable location.

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.

Water Connection Sizes

MVB Model	910500	910750	911000	911250	911500	911750	912000
Water Inlet/Outlet*	RC2	RC2	RC2½	RC2½	RC2½	RC2½	RC2½
Relief Valve	RC¾	RC¾	RC¾	RC¾	RC¾	RC¾	RC¾

*Water and gas connections on the MVB are NPT threaded and will not seal against ISO 7 (BSP) threads. The adaptors supplied must be fitted in order to make further connections to the system.

Table 8: Water Connection Sizes

WATER INLET AND OUTLET

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

A disconnection union and isolation valve 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.

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.

PUMP SELECTION APPLICATIONS UP TO 65°C

[Table 9](#) on page 29 provides minimum pipe and pump sizes for typical water heating installations up to 65°C at the optimum temperature rise for these applications (20°K).

PUMP SELECTION APPLICATIONS ABOVE 65°C

In mechanical heating applications, the MVB is designed to operate on a primary flow and return circuit serving the main system flow and return circuit. [Table 10](#) on page 39 provides minimum pipe and pump sizes for primary circuit in mechanical heating and domestic hot water applications over 65°C at the optimum temperature rise for these applications (15°K).

MVB Pipe Size and Pump and Pipe Selection Chart – DHW and Hydronic Applications up to 65°C (20 degree rise)										
MVB Model	Pump Model	Branch Size mm	Minimum Manifold Header Size (mm) / Pump Speed Setting							
			1 Unit		2 Units		3 Units		4 Units	
			pipe dia	speed	pipe dia	speed	pipe dia	speed	pipe dia	speed
			mm		mm		mm		mm	
910500	UPS32-80N	50	50	3	65	3	80	3	100	3
910750	UPS32-80N	65	65	3	80	3	100	3	100	3
911000	Magna 1 40-120	65	65	PP1	100	PP1	100	CP1	125	PP1
911250	Magna 1 40-120	80	80	CC2	100	CC2	125	CC2	125	CC3
911500	Magna 1 40-120	80	80	CC3	100	CC3	125	CC3	150	CC3
911750	Magna 1 65-150	100	100	CC2	125	CC2	150	CC2	200	CC2
912000	Magna 1 65-150	100	100	PP2	125	PP2	150	PP2	200	PP2

Note: Manifold header sizes are minimum requirements for water heater performance.

Pipe and pump sizing is for primary circuits in DHW and hydronic applications up to 71°C for a 20 degree rise.

Header sizing is based on a total length of 20m of primary flow and return piping and 20 bends, excluding equa-flow manifolds on storage tanks and MVBs, at 1.2m/sec velocity in copper pipe.

Magna 1 pumps have 3 speed control modes. PP = Proportional Pressure, CP = Constant Pressure, CC = Constant Curve. UPS pumps have 3 fixed speed control settings. The appropriate speed setting must be used to ensure correct operation

Table 9: Pump and Pipe Sizing for Water Heating Applications up to 65°C

MVB Pipe Size and Pump and Pipe Selection Chart – DHW and Hydronic Applications Between 65°C and 82°C (15 degree rise)										
MVB Model	Pump Model	Branch Size mm	Minimum Manifold Header Size (mm) / Pump Speed Setting							
			1 Unit		2 Units		3 Units		4 Units	
			pipe dia	speed	pipe dia	speed	pipe dia	speed	pipe dia	speed
			mm		mm		mm		mm	
910500	UPS32-80	50	50	3	80	3	100	3	100	3
910750	Magna 1 40-120	65	65	PP1	100	PP1	100	PP1	125	PP1
911000	Magna 1 40-120	80	80	PP1	100	CC2	125	PP1	150	PP1
911250	Magna 1 40-120	80	80	CC3	125	CC3	125	CC3	150	CC3
911500	Magna 1 65-150	100	100	CC2	125	PP2	150	PP2	200	CC2
911750	Magna 1 65-150	100	100	CC3	125	CC3	150	CC3	200	CP3
912000	Magna 1 65-150	100	100	CC3	125	CC3	150	CC3	200	CC3

Note: Manifold header sizes are minimum requirements for water heater performance.

Pipe and pump sizing is for primary circuits in DHW and hydronic applications between 65°C and 82°C for a 15 degree rise.

Header sizing is based on a total length of 20m of primary flow and return piping and 20 bends, excluding equa-flow manifolds on storage tanks and MVBs, at 1.2m/sec velocity in copper pipe.

Magna 1 pumps have 3 speed control modes. PP = Proportional Pressure, , CP = Constant Pressure, CC = Constant Curve. UPS pumps have 3 fixed speed control settings. The appropriate speed setting must be used to ensure correct operation

Table 10: Pump and Pipe Sizing for Mechanical Heating Applications

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

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

Refer to [Table 11](#) on page 41 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 [Table 11](#).

MVB Flow Rate and Pressure Drop Table												
MVB Model	Temperature Rise (°C)						Min Flow			Max Flow		
	10		15		20		L/sec	dP (kPa)	dT Deg C	L/sec	dP (kPa)	dT Deg C
	L/sec	dP (kPa)	L/sec	dP (kPa)	L/sec	dP (kPa)						
910500	3.13	11.05	2.00	5.00	-	-	1.60	3.35	19.4	6.40	34.44	5.0
910750	4.62	25.15	3.00	10.80	2.26	7.10	2.11	5.79	21.7	6.40	42.06	7.2
911000	6.18	44.00	4.00	21.10	3.00	12.70	2.88	11.58	21.7	7.23	56.69	8.3
911250	7.23	56.70	5.00	35.60	3.77	25.80	3.58	19.81	21.7	7.23	67.67	10.6
911500	-	-	6.00	56.30	4.50	33.80	4.29	30.48	21.7	7.23	77.72	12.8
911750	-	-	7.00	82.90	5.28	44.70	4.99	42.67	21.7	7.23	82.91	15.0
912000	-	-	-	-	5.70	60.40	5.70	60.35	21.7	7.42	97.54	16.7

Table 11: Water Heater Flow Rate and Pressure Drop

Intermittent Pump Operation

The MVB can control up to three pumps simultaneously depending on water heater type and system configuration. The pumps will be energised and de-energised based on system parameters including pump run-on at the end of a heating cycle. Refer to “[Applications and Modes](#)” on page 52. These include:

W Models

1. Primary flow and return pump between water heater and storage tank. Where single phase pumps with max current not exceeding 8 Amps are used, power for pump is supplied via the MVB and pump is controlled directly via the MVB. Where three phase pumps, or single phase pumps with current exceeding 8 Amps, are used, the pump contactor is controlled via the MVB.

H Models

1. Water Heater primary flow and return pump between heater and main system flow and return circuit. Where single phase pumps with max current not exceeding 8 Amps are used, power for pump is supplied via the MVB and pump is controlled directly via the MVB. Where three phase pumps, or single phase pumps with max current exceeding 8 Amps, are used, the pump contactor is controlled via the MVB.
2. Main system flow and return circuit pump. The MVB can be optionally used to control the main system pump. Where single phase pumps with max current not exceeding 8 Amps are used, power for pump may be supplied via the MVB and pump is controlled directly via the MVB. Where three phase pumps, or single phase pumps with max current exceeding 8 Amps, are used, the pump contactor is controlled via the MVB.
3. DHW primary flow and return pump between water heater and storage tank (calorifier), in systems providing combined heating and DHW. Where single phase pumps with max current not exceeding 8 Amps are used, power for pump is supplied via the MVB and pump is controlled directly via the MVB. Where three phase pumps, or single phase pumps with current exceeding 8 Amps, are used, the pump contactor is controlled via the MVB.

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 and Magna 1 series pumps, refer to [Table 12](#) on page 31.

Pump	Minimum Inlet Head Required at Operating Temperature (m)				
	Up to 75°C	80°C	85°C	90°C	95°C
UPS32-80N	0.5	0.5	0.5	3.0	5.0
Magna 1 40-120	1.0	5.0	5.0	5.0	5.0
Magna 1 65-150	7.0	12.0	12.0	12.0	12.0

Note: the minimum relative inlet pressures apply to pumps installed up to 300m above sea level. Increase the relative inlet pressure by 100mm for every 100m above 300m altitude up to 2000m.

Table 12: Minimum Pressure Requirements for Grundfos UPS and Magna 1 Series Pumps

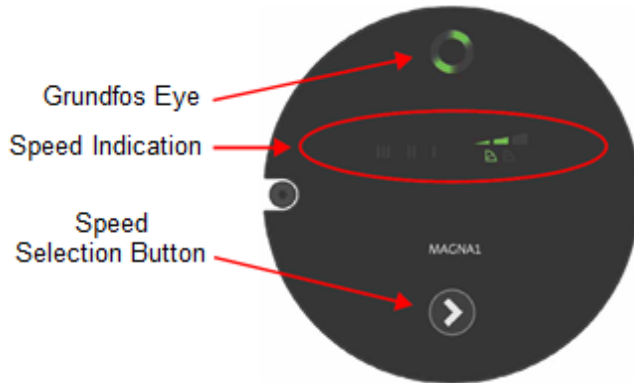
Checking or Adjusting Pump Speed Setting – Magna1 Pump

Magna1 pumps have 3 speed settings and 3 control modes which must be set according to the application. Refer to [Tables 9 and 10](#) on page 29 for the correct speed setting.

1. Ensure a call for heat is present and that power is being supplied to the pump.
2. Press and release the speed selection (arrow) button on the pump fascia. Each press and release of the button will advance the pump setting one position.

Magna1 pumps have nine settings which are as follows (shown in order of button progression from factory PP2 setting):

PP2	PP3	CP1	CP2	CP3	CCIII	CCII	CCI	PP1



Grundfos Eye Indication	
	Power OFF pump not running
	Power ON pump running in direction of rotating LEDs
	Alarm. The pump has stopped

SYSTEM INSTALLATION

Where the water heater is supplied as part of a package, including the storage cylinder and pump, the installation must comply with the requirements supplied in this manual and/or the drawing provided.

Where the water heater is to be installed as part of a hydronic heating application, the installation must comply with the plumbing interface design requirements supplied in this manual.

Failure to observe these requirements may result in ineffective hot water capacity or damage.

Mechanical, Hydronic and Process Heating Applications

Refer to page 36.

Domestic Hot Water Applications

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

- The storage tanks MUST be installed according to “Equa-flow® principles” as described in the installation instructions supplied with the storage tanks and detailed on page 33 and Fig 5 to 9 on page 45.
- The water heaters should be installed according to “Equa-flow® principles” as detailed in Fig 5 to 9 on page 45.

Note: Inlet water to the water heaters must return from the 2nd fitting on the storage tanks, never from the bottom. This is to ensure preheated water enters the water heater to limit condensation effects in the water heater. Refer to [Fig 8 and 9](#) on page 48.

- Install the pump according to the installation instructions supplied with the pump and as detailed in [Fig 8 and 9](#) on page 48.

Note: Pumps installed outdoors require a protective cover to prevent condensation build up within the pump on cold nights (available as an accessory to suit Magna 1 pumps from Rheem P/No AQ94200225).

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

- Each high point of the system MUST be fitted with an air bleed valve or automatic air eliminator.

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 storage tank 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).

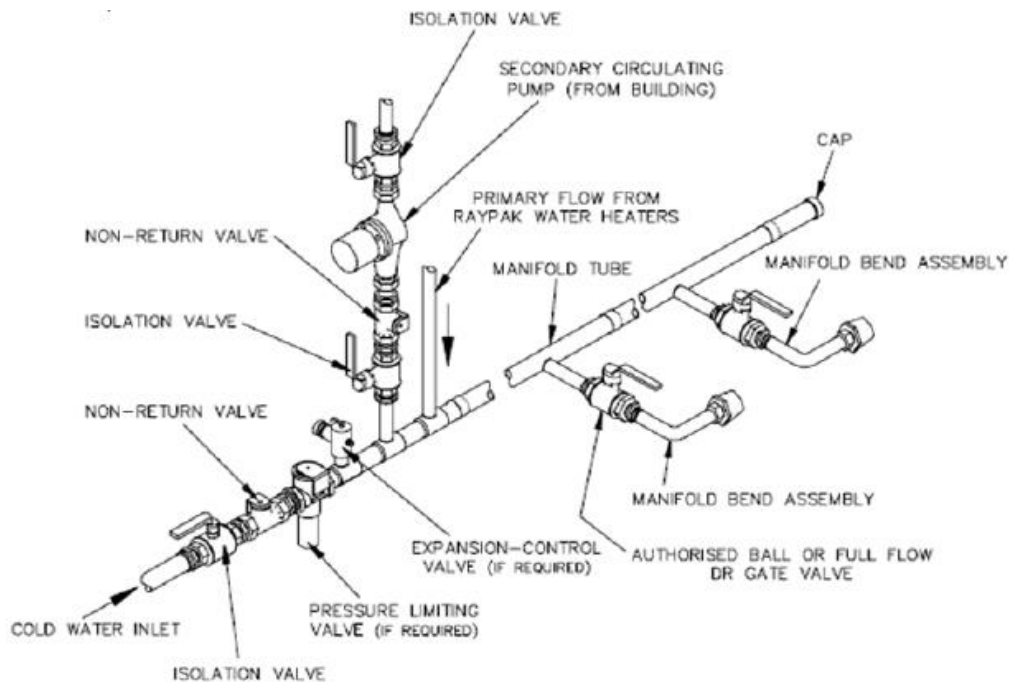


Fig 5: Storage Tank Inlet Manifold Arrangement

2. The **heating** water manifold (primary return header assembly) must be designed to balance the flow from each water heater and/or storage tank 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). Water must exit from the opposite end to which it enters the manifold.

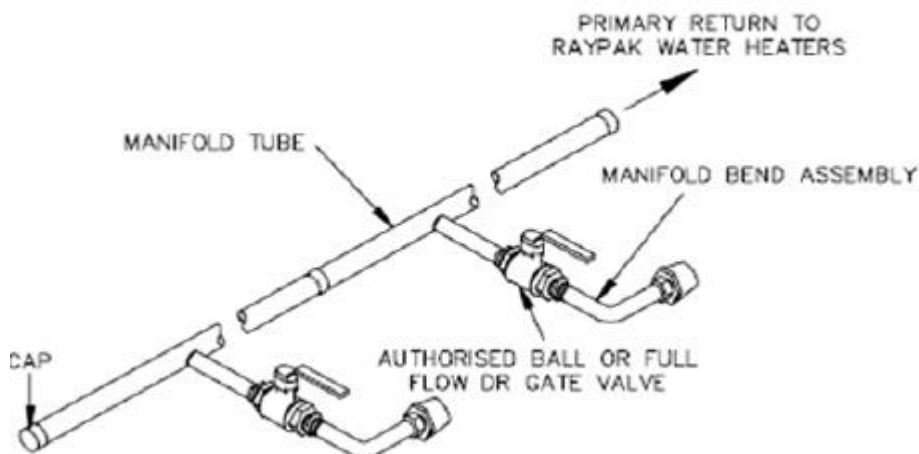


Fig 6: Storage Tank Primary Return Manifold Arrangement

3. The **hot** water manifold (hot header assembly) must be designed to balance the flow from each storage tank 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).

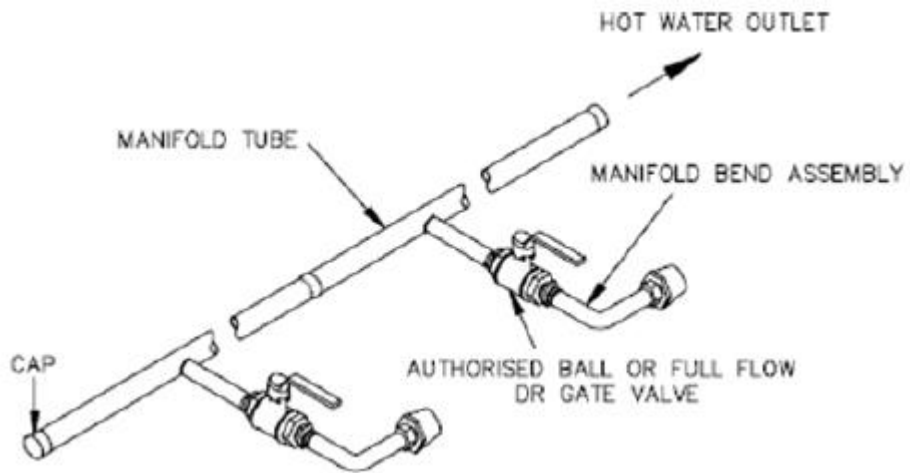


Fig 7: Storage Tank Hot Water Manifold Arrangement

Plumbing Diagrams

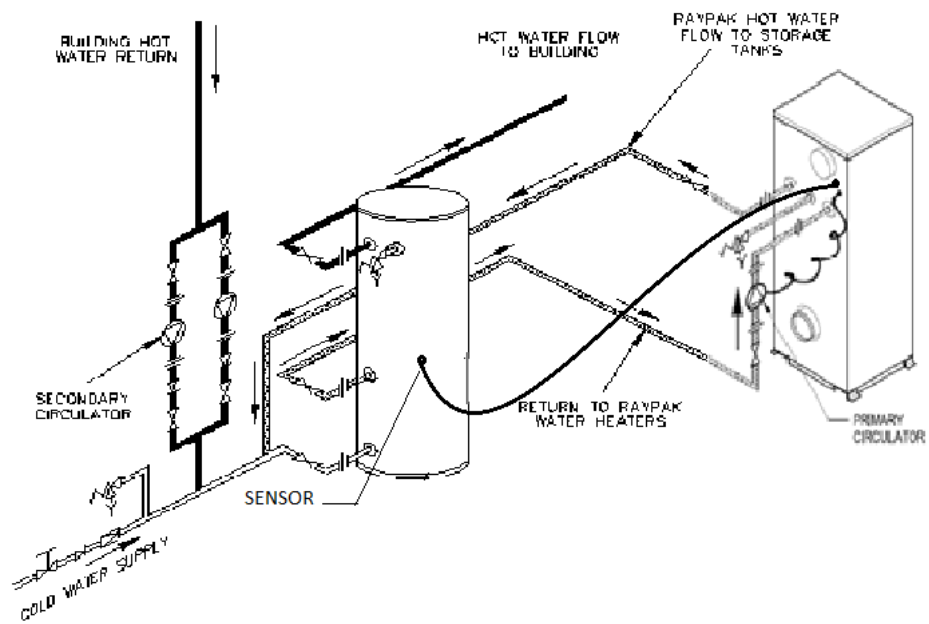


Fig 8: Typical Installation – One Water Heater, One Storage Tank

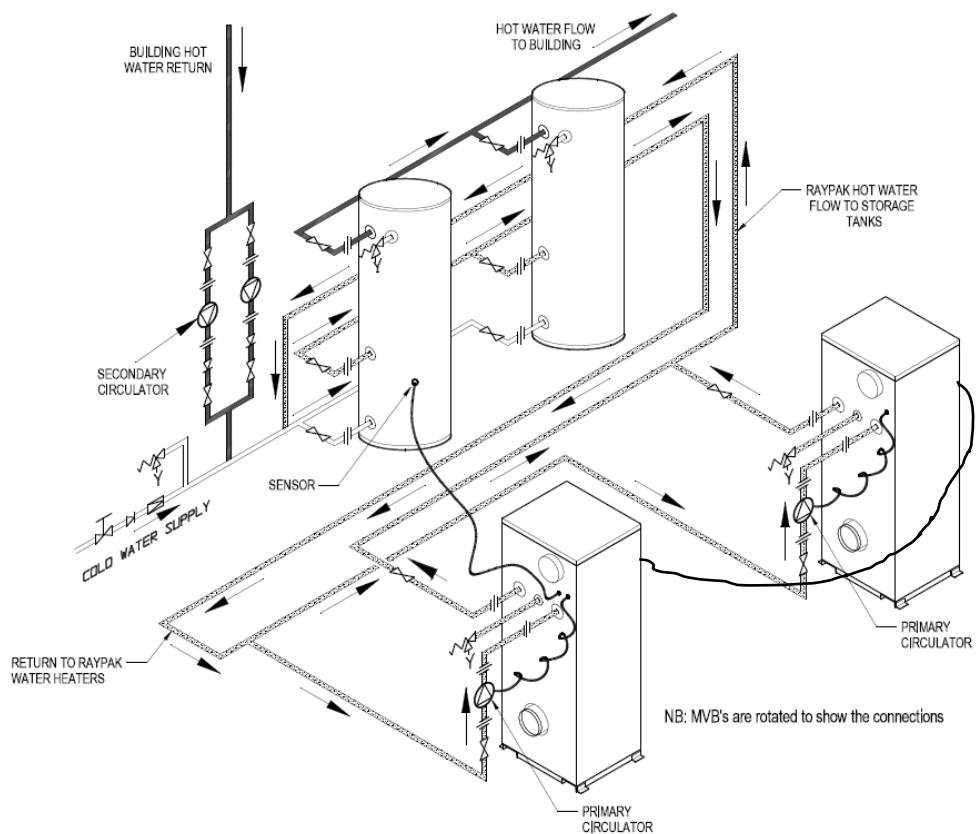


Fig 9: Typical Installation Multiple Water Heaters, Multiple Storage Tanks

Mechanical, Hydronic and Process Heating Applications

Piping

NOTE: Hot water heating systems all have unique levels of operating diversity that must be accounted for in the system design. The system should always include adequate system flow in excess of the connected water heater flow for proper operation. Where the system flow may drop below the connected water heater flow a buffer / de-coupler may be needed. Failure to design for adequate flow (i.e. bypasses, 3 way control valves, flow limiting balance devices, buffer tanks, etc.) will result in water heater short cycling and may reduce water heater life. Consult Rheem for system design assistance to avoid these issues.

All high points should be vented. This heater, when used in connection with a refrigeration system, must be installed so that the chilled medium is piped in parallel with the heater with appropriate valves to prevent the chilled medium from entering the heater.

The piping system of a water heater connected to heating coils located in air handling units where they may be exposed to circulating refrigerated air, must be equipped with flow control valves or other automatic means to prevent gravity circulation of the heater water during the cooling cycle. It is highly recommended that the piping be insulated.

Air-Separation/Expansion Vessel

All heaters should be equipped with a properly sized expansion vessel and air separator fitting as shown in [Fig. 10](#) on page 53.

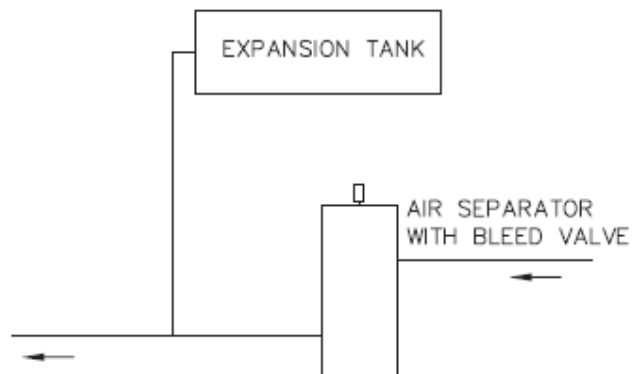


Fig 10: Air-Separation/Expansion Tank

Piping

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 33.
- The water heater/s **MUST** operate on their own primary flow and return circuit, separate to the system heating circuit. The primary return branch to the water heaters and the primary flow branch from the water heaters **MUST** be separated by a distance not exceeding 4 x system pipe diameters or 300mm, whichever is the smaller. Refer to [Fig 11](#) on page 51
- 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 **MUST** be fitted with an air bleed valve or automatic air eliminator.

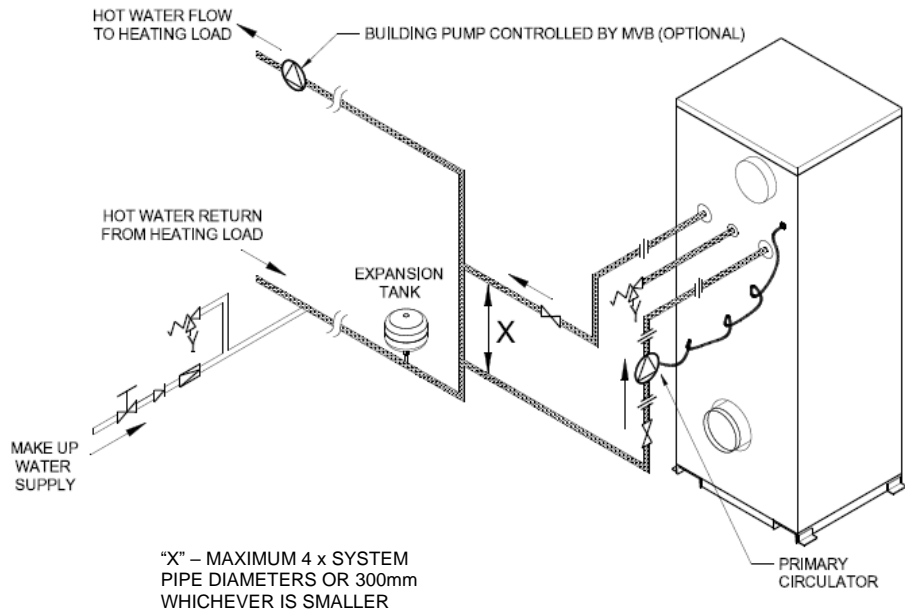


Fig 11: Typical Installation – Mechanical Heating Primary Flow and Return

Closed Loop Water Source Heat Pump Applications

- The bypass pipe diameter **MUST** be the same as the inlet and outlet pipes.
- 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).
- Install the correct pump. The temperature rise must be between 10°C and 15°C. Refer to [Table 10](#) on page 30 for pump selection for 15°C temperature rise or [Table 11](#) on page 30 for flow rate and friction loss data for 10°C temperature rise.

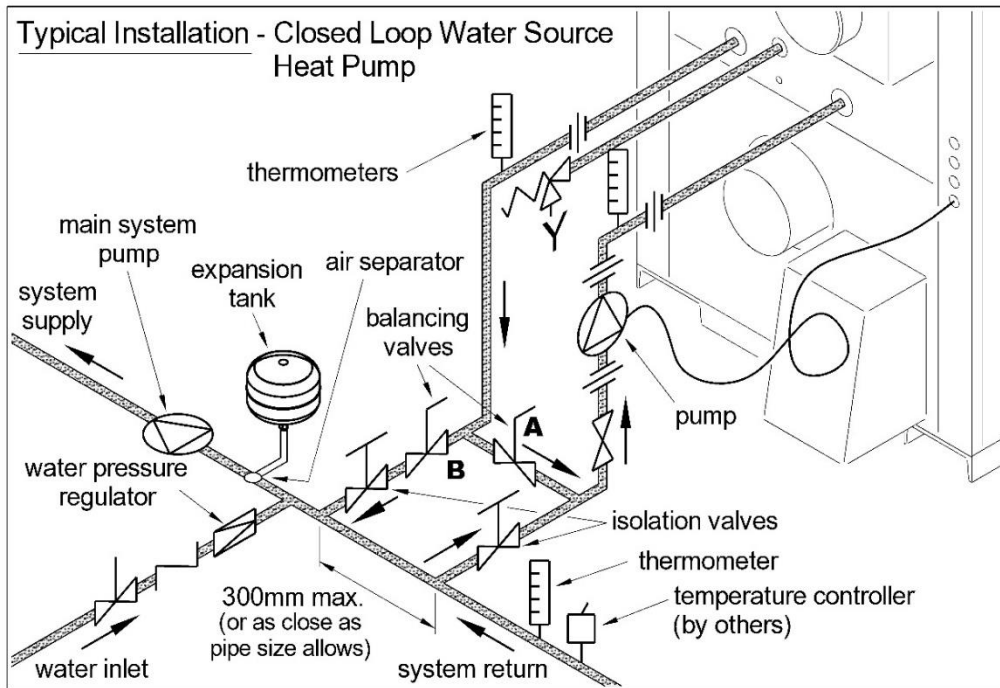


Fig 12: Typical Installation – Closed Loop Water Source Heat Pump

CONNECTIONS – GAS

GAS INLET

All gas work must be carried out by a qualified person and in accordance with the Australian Gas Installations Standard AS/NZS 5601.1, AS 3814 and local authority requirements.

DANGER: Make sure the gas on which the heater will operate is the same type as specified on the heater's rating plate.

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.

Gas piping **MUST** have a sediment trap ahead of the heater gas controls, refer to [Fig 13](#) on page 38. An isolation valve and disconnection union must be installed to allow servicing and removal of the water heater. Refer to AS/NZS 5601.1 for the correct pipe sizing.

GAS CONNECTIONS

MVB Model	910500	910750	911000	911250	911500	911750	912000
Gas Connection*	R1	R1	R1¼	R1¼	R1¼	R2	R2

*Water and gas connections on the MVB are NPT threaded and will not seal against ISO 7 (BSP) threads. The NPT/BSP adaptors supplied **MUST** be fitted in order to make further connections to the system.

Table 13: Gas Connection Sizes

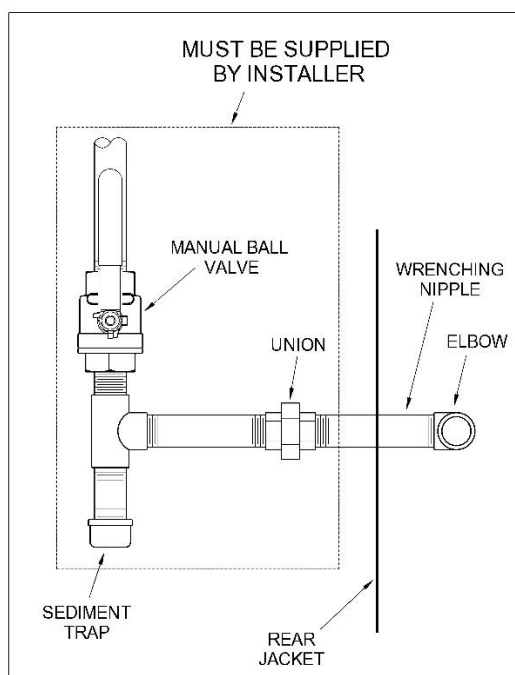


Fig. 13: Gas Supply Connection

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. Relieve test pressure in the gas supply line prior to re-connecting the heater and its manual shut-off valve to the gas supply line. **FAILURE TO FOLLOW THIS PROCEDURE MAY DAMAGE THE GAS VALVE.** 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.

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.

GAS SUPPLY PRESSURE

The following maximum and minimum gas supply pressures apply:

Gas Type	Natural Gas	Propane	
Minimum Pressure (kPa)	1.13KPa	1.13KPa	Upstream gas pressure under full load
Maximum Pressure (kPa)	2.6 kPa	3.2 kPa	Gas supply pressure set point under load and no-load conditions

Table 14: Maximum and Minimum Gas Supply Pressures

If upstream pressure exceeds 3.5 kPa at any time, an appliance gas pressure regulator must be installed. This regulator should be placed a minimum distance of 10 times the pipe diameter upstream of the heater gas controls.

When connecting additional gas utilization equipment to the gas piping system, the existing piping must be checked to determine if it has adequate capacity for the combined load.

The gas valve pressure regulator on the heater is nominally preset as noted in [Table 15](#) on page 39.

MVB Model	Manifold Gas Pressure Setting High Fire Values (kPa)	
	Nat. Gas	Propane
910500	-1.17	-1.32
910750	-1.15	-1.44
911000	-1.15	-1.87
911250	-1.57	-2.07
911500	-2.07	-2.69
911750	-1.12	-1.89
912000	-1.59	-2.59

Table 15: Manifold Gas Pressure Settings

During normal operation, carbon dioxide should be $9.0\% \pm 0.2\%$ at full fire for natural gas and $10.2\% \pm 0.2\%$ for propane gas. Carbon monoxide should be $<100\text{ppm}$ at all firing rates, measured at the test port, 300mm above the flue collar.

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: For proper operation, no more than a 30% drop in gas supply pressure from no-load to full load conditions is acceptable. Under no circumstances should the pressure be outside the listed operational range.

CAUTION: Do not use Teflon tape on gas line pipe thread. A pipe compound rated for use with natural and propane gases is recommended. Apply sparingly only on male pipe ends, leaving the two end threads bare.

CAUTION: Support gas supply piping with hangers, not by the heater or its accessories. Make sure the gas piping is protected from physical damage and freezing, where required.

CONNECTIONS – FLUE

FLUEING

The MVB is supported by a range of stainless steel flue components suitable for positive pressure condensing operation.

Dia 150mm suits 910500, 910750 and 911000.

Dia 2000mm suits 911250, 911500, 911750 and 912000.

The following parts are available:

<p>Flue Adaptor & Clamp Kit Dia 150 - AQ94200106 Dia 200 - AQ94200127</p>	<p>87 deg Elbow Dia 150 - AQ94200108 Dia 200 - AQ94200129</p>	<p>45 deg Elbow Dia 150 - AQ94200109 Dia 200 - AQ94200130</p>
<p>Flue Drain/Test Port (2 Per MVB) Dia 150 - AQ94200107 Dia 200 - AQ94200128</p>	<p>Top Stub (vertical discharge) Dia 150 - AQ94200120 Dia 200 - AQ94200143</p>	<p>250mm Straight Dia 150 - AQ94200112 Dia 200 - AQ94200133</p>
<p>500mm Straight Dia 150 - AQ94200111 Dia 200 - AQ94200132</p>	<p>1000mm Straight Dia 150 - AQ94200110 Dia 200 - AQ94200131</p>	<p>Adjustable Straight Dia 150 - AQ94200113 Dia 200 - AQ94200134</p>

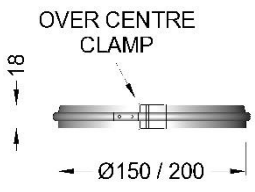
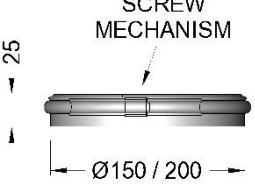
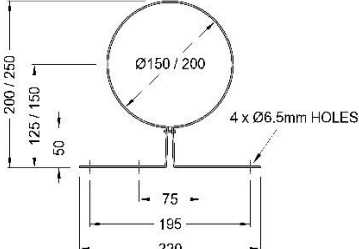
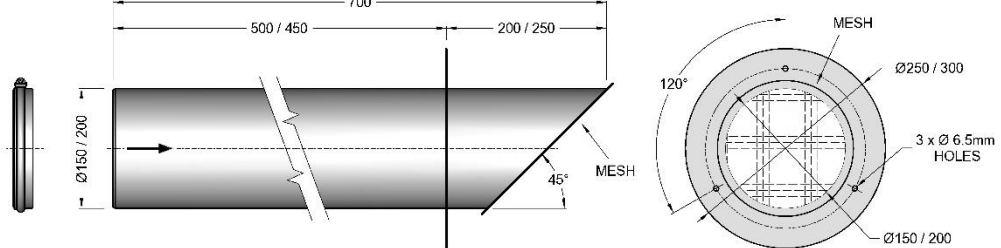
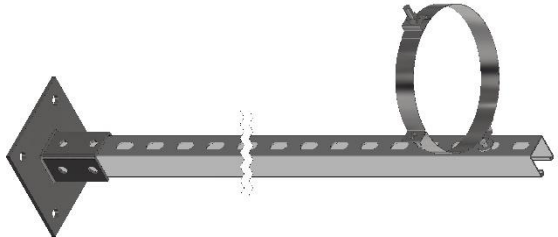

		
<p>Lock Band Clamp (1 per flue piece) Dia 150 - AQ94200114 Dia 200 - AQ94200135</p>	<p>Lock Band Screw Dia 150 - AQ94200115 Dia 200 - AQ94200136</p>	<p>Mounting Band (1 per 1.5m of run) Dia 150 - AQ94200116 Dia 200 - AQ94200137</p>
		
<p>Horizontal Terminal (can be cut to length) Dia 150 - AQ94200121 Dia 200 - AQ94200144</p>		
		
<p>Outdoor Flue Stand (can be cut to length) Dia 150 – AQ94200223 Dia 200 – AQ94200224</p>	<p>Lubricating Grease 250g (approx. 1 required per 15 sections of flue) AQ0080503</p>	

Table 16: MVB Flue Components

FLUE CLEARANCES

The following distances extracted from the Australian Gas Installations Standard AS/NZS 5601.1 relate to outdoor installations and indoor installations with horizontally terminating flues and 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.

It is recommended that a distance not less than 1.5m be maintained directly in front of a horizontal discharge terminal to avoid condensate forming on the opposing structure. Flue gasses are corrosive. It is recommended that any obstructing surface be clad with a rust-resistant sheet to prevent any damage that may otherwise result from condensation.

FLUE TERMINAL LOCATION

In addition to the requirements of AS/NZS 5601.1, the following should be observed:

NOTE: During winter months check the flue terminal and make sure no blockage occurs from build-up of snow or ice.

1. Condensate can freeze on the flue terminal. Frozen condensate on the flue terminal can result in a blocked flue condition.
2. Give special attention to the location of the flue terminal location to avoid possibility of property damage or personal injury.
3. Gases may form a white vapour plume in winter. The plume could obstruct a window view if the termination is installed near windows.
4. Prevailing winds, in combination with below-freezing temperatures, can cause freezing of condensate and water/ice build-up on buildings, plants or roofs.
5. The bottom of the flue terminal and the air intake shall be located at least 300mm above grade, including normal snow line.
6. Through-the-wall flue terminals shall not terminate over public walkways or over an area where condensate or vapour could create a nuisance or hazard or could be detrimental to the operation of regulators, relief valves, or other equipment.
7. Locate and guard flue termination to prevent accidental contact by people or pets.
8. DO NOT terminate flue in window well, stairwell, alcove, courtyard or other recessed area.
9. DO NOT terminate flue above any door, window, or gravity air intake. Condensate can freeze, causing ice formations.
10. Locate or guard flue terminal to prevent condensate from damaging exterior finishes. Use a rust-resistant sheet metal backing plate against brick or masonry surfaces.
11. DO NOT extend exposed flue pipe outside of building beyond the minimum distance required for the flue termination. Condensate could freeze and block flue.

OUTDOOR INSTALLATION

The water heater must be installed with service access in mind.

AIR INTAKE

Ensure the air intake hood is attached to the water heater pointing downwards. Refer to [Fig 14](#) on page 42.

OUTDOOR FLUEING

CAUTION: Proper installation of flue is critical for the safe and efficient operation of the water heater. Refer to [Table 17](#) on page 47

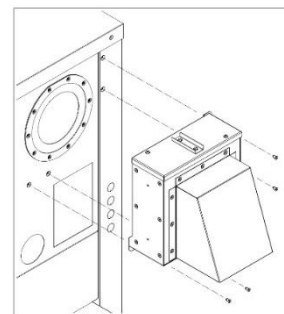


Fig 14 – Air Filter Box

Table 6 for maximum flue lengths and flue sizes. Under no circumstances is the flue diameter size to be reduced.

WARNING: Due to the high operating efficiency of the MVB, the flue gasses may condense in the flue. The flue **MUST** be of stainless steel, minimum 316L grade. Use of other materials can result in personal injury, death or property damage.

WARNING: Condensate traps and drains for the flue piping are required for installations of the MVB.

A condensate trap **MUST** be fitted at the flue outlet of the water heater, regardless of the flue termination type. The condensate drain must be primed with water to prevent gas flue leak and must be routed to drain in accordance with local codes and regulations.

WARNING: The MVB operates with a positive pressure flue. All joints must be sealed to prevent spillage at the joints which could contaminate the air supply to the water heater.

Support horizontal runs at 1.5m max, use braces for vertical runs and support under or near elbows.

NOTE: The MVB is supported by a range of stainless steel flue components (refer to [Table 16](#) on page 41). Contact Rheem for further details.

The flue **MUST** vent **VERTICALLY**, and the terminal must be at least 250mm above the top of the water heater and 900mm above the air intake.

The exception is when the flue will terminate **HORIZONTALLY** and a wall exists between the flue terminal and the air intake, and flue gasses cannot be recycled back to the air intake.

VERTICAL TERMINATING FLUES

Lubricant is available to lubricate the flue gaskets for ease of installation. **DO NOT** use soapy water.

1. Fit the flue adaptor to the flue outlet located at the bottom back of the water heater and secure with the screw clamp (supplied).
2. Fit one of the flue condensate drain/port sections with the drain pointing towards the ground and secure to the adaptor with the clamp.

Note: the clamp will only fit one way. DO NOT try to force the clamp to close. If it is not closing, it is the wrong way. If forced, be careful to use a screwdriver to release the clamp as the releasing pressure may cause injury if attempting to release by hand.

3. Depending on the plumbing arrangement, it may be necessary to fit a 250mm or 500mm straight flue section after the condensate drain. Secure to the condensate drain with the clamp.
4. Fit the 87 degree bend so that the flue is now pointing vertically upwards and secure to the adaptor or straight section with the clamp.
5. Fit the second flue drain/port section after the bend with the port pointing away from the water heater. This will be used to analyse the products of combustion during commissioning. Secure to the bend with the clamp.

6. Fit the outdoor mounting bracket behind the flue and secure to the ground. Refer to the instructions supplied with the bracket for details.
7. The base of the flue terminal must be at least 250mm above the top of the MVB and 900mm above the air intake to the MVB. Use appropriate lengths or adjustable length to achieve the desired flue termination height.
8. Secure the vertical sections to the outdoor flue stand at least half way up the total height of the flue using the clamp supplied with the stand. The stand may be cut to length.
9. Fit the vertical flue terminal (Top Stub with Mesh) to the straight section and secure with the clamp.

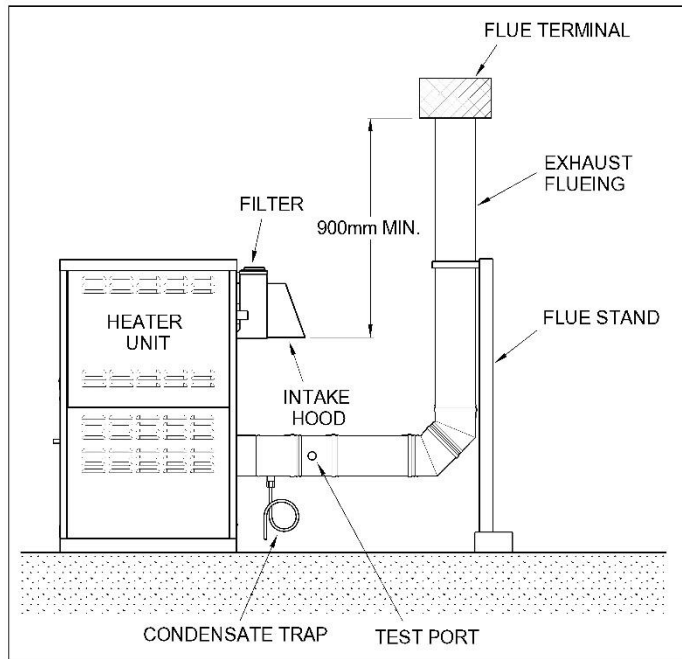


Fig. 15: Outdoor Vertical Flueing

10. Fit the condensate trap to the condensate drain section and fill with water.

Refer to [Fig 15](#) on page 44.

HORIZONTAL TERMINATING FLUES

Lubricant is available to lubricate the flue gaskets for ease of installation. DO NOT use soapy water.

CAUTION: Proper installation of flue is critical for the safe and efficient operation of the water heater. Refer to [Table 17](#) on page 47 for maximum flue lengths and flue sizes. Under no circumstances is the flue diameter size to be reduced.

1. Fit the flue adaptor to the flue outlet located at the bottom back of the water heater and secure with the screw clamp (supplied).
2. Fit one of the flue condensate drain/port sections with the drain pointing towards the ground and secure to the adaptor with the clamp.

Note: the clamp will only fit one way. DO NOT try to force the clamp to close. If it is not closing, it is the wrong way. If forced, be careful to use a screwdriver to release the clamp as the releasing pressure may cause injury if attempting to release by hand.

3. The second flue drain/port section will be used to analyse the products of combustion during commissioning and the port must be a minimum of 300mm away from the water heater flue outlet. Fit the drain/port section (with the port NOT pointing towards the ground), straight flue lengths and/or elbows and run to the terminal location. Secure each joint with the clamp.
4. Horizontal flue runs must have an upward slope towards the flue terminal of not less 1 in 20 or 50mm per linear meter. The horizontal portions of the flue shall also be supported at maximum 1.5m intervals to maintain clearances and to prevent physical damage or separation of joints.
5. Use appropriate flue lengths or adjustable lengths to achieve the desired outcome. DO NOT cut the flue.
6. Install a rust-resistant sheet metal backing plate against the outside face of masonry or other surfaces subject to corrosion from flue condensate.

7. The Rheem supplied horizontal flue terminal MUST be used. Fit the horizontal flue terminal on the other side of the wall and secure to the flue pipe with the supplied screw clamp. The flue terminal can be cut to length as required and debur.
8. The flue terminal must be installed at least 300mm above ground level and above normal snow levels and must not be installed in a well or below grade. The flue terminal must be located NO CLOSER than 300mm off the wall. An obstruction in the direction of discharge must be no closer than 1.5m.
9. Fit the condensate trap to the flue drain section and fill with water.
10. For multiple water heater installations, observe the terminal clearances as shown in [Fig 18](#) on page 45.

Refer to [Fig16](#) and [17](#) on page 45.

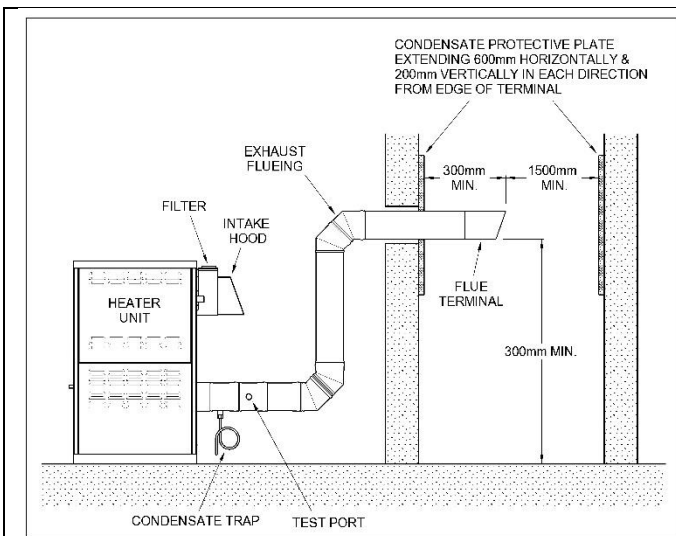


Fig. 16: Horizontal Through-the-Wall Flueing

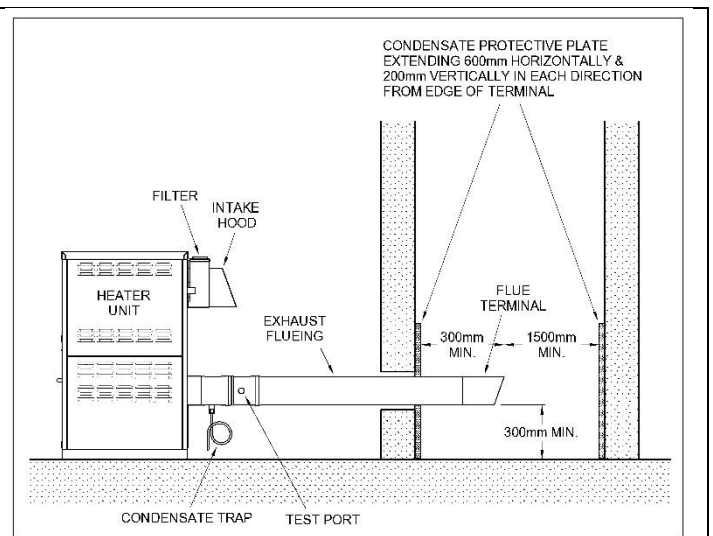


Fig. 17: Alt. Horizontal Through-the-Wall Flueing

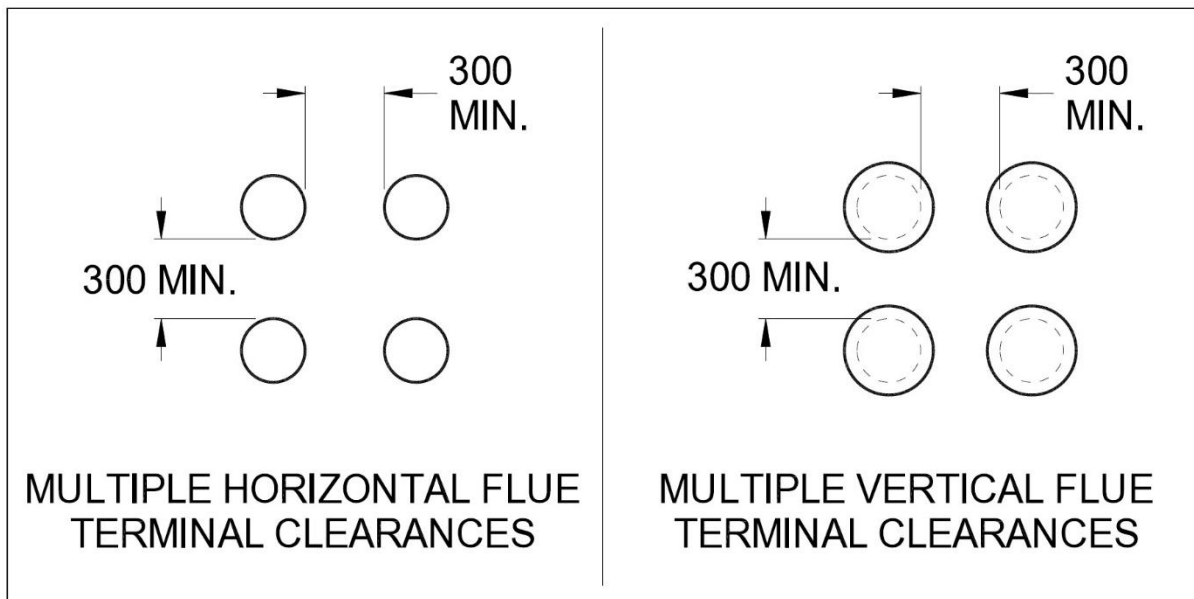


Fig.18: Horizontal Flue Terminal Configurations

INDOOR INSTALLATION

The water heater must be installed with service access in mind.

This heater must be supplied with sufficient quantities of non-contaminated air to support proper combustion and equipment ventilation. Combustion air can be supplied via conventional means where air is drawn from the area immediately surrounding the water heater (room sourced), or via direct vent, where combustion air is drawn directly from outside (room sealed).

INSIDE AIR CONTAMINATION

All heaters experience some condensation during start-up. The condensate from flue gas is acidic. Combustion air can be contaminated by certain vapours in the air which raise the acidity of the condensate. Higher acidity levels attack many materials including stainless steel, which is commonly used in high efficiency systems.

You may choose to use outside combustion air (room sealed option) for one or more of these reasons:

1. Installation is in an area containing contaminants listed below which will induce acidic condensation.
2. Reduce infiltration into the building through openings and ventilation.

Products causing contaminated combustion air:

- spray cans containing chloro/fluorocarbons
- permanent wave solutions
- chlorinated waxes/cleaners
- chlorine-based swimming pool chemicals
- calcium chloride used for thawing
- sodium chloride used for water softening
- refrigerant leaks
- paint or varnish removers
- hydrochloric acid/muriatic acid
- cements and glues
- antistatic fabric softeners used in clothes dryers
- chloride-type bleaches, detergents, and cleaning solvents found in household laundry rooms
- adhesives used to fasten building products
- similar products

Areas where contaminated combustion air commonly exists:

- dry cleaning/laundry areas
- metal fabrication plants
- beauty shops
- refrigeration repair shops
- photo processing plants
- auto body shops
- plastic manufacturing plants
- furniture refinishing areas and establishments
- new building construction
- remodelling areas
- open pit skimmers

Check for areas and products listed above before installing heater. If found:

- remove products permanently, OR
- install a room sealed fluing system

ROOM SOURCED AIR SUPPLY

CAUTION: Combustion air must not be contaminated by corrosive chemical fumes which can damage the heater and void the warranty. (Refer to "[Inside Air Contamination](#)" on page 46.)

Water heaters located indoors must be installed in a protective enclosure or properly constructed plant room with adequate ventilation in accordance with 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/NZS 5601.1 for ventilation requirements and calculations.

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 asphyxiation, explosion or fire.

NOTE: Use of this heater in construction areas where fine particulate matter, such as concrete or dry-wall dust, is present may result in damage to the heater that is not covered by the warranty. If operated in a construction environment, a clean source of combustion air must be provided directly to the heater.

INDOOR FLUEING

CAUTION: Proper installation of flue is critical for the safe and efficient operation of the water heater. Refer to [Table 17](#) on page 47 for maximum flue lengths and flue sizes. Under no circumstances is the flue diameter size to be reduced.

WARNING: Due to the high operating efficiency of the MVB, the flue gasses may condense in the flue. The flue MUST be of stainless steel, minimum 316L grade. Use of other materials can result in personal injury, death or property damage.

WARNING: Condensate traps and drains for the flue piping are required for installations of the MVB. The condensate drain must be primed with water to prevent gas flue leak and must be routed to drain in accordance with local codes and regulations.

WARNING: The MVB operates with a positive pressure flue. All joints must be sealed to prevent spillage at the joints which could contaminate the air supply to the water heater.

Support horizontal runs at 1.5m max, use braces for vertical runs and support under or near elbows.

The MVB is supported by a range of stainless steel flue components suitable for positive pressure condensing operation. Refer to [Table 16](#) on page 41 for a list of components.

MVB Model	Flue Material	Flue Size (mm)	Max. Flue Length** (m)	Combustion Air Intake Pipe Material	Max Air Inlet Length** (m)		
					Ø 150 mm	Ø 200 mm	Ø 250 mm
910500	316L Stainless Steel minimum	150	23	Stainless Steel, Galvanized Steel, PVC, ABS, CPVC	14	30	N/A
910750							
911000							
911250	316L Stainless Steel minimum	200	23	Stainless Steel, Galvanized Steel, PVC, ABS, CPVC	N/A	14	26
911500							
911750							
912000							

**Subtract 3m for every elbow. Max 4 x elbows. Flue terminal not considered as part of the overall length of the flue system.

Table 17: Vertical and Horizontal Vent & Direct Vent

VERTICAL TERMINATING FLUES

Refer to [Table 17](#) on page 47 for the maximum length of flue run.

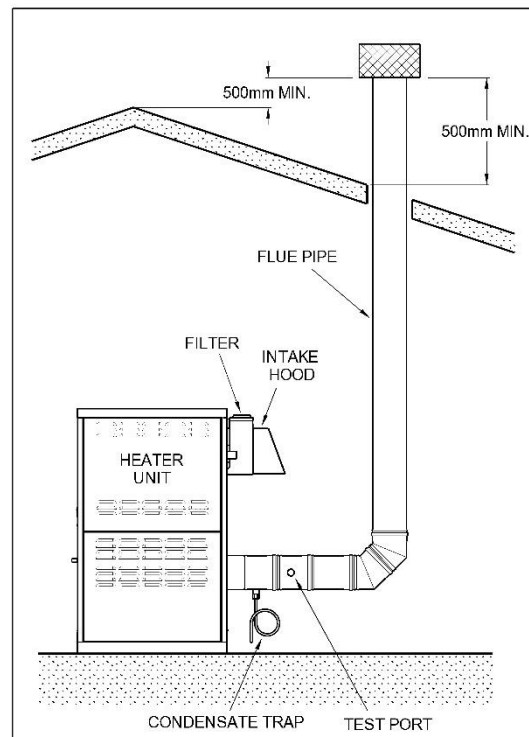
Lubricant is available to lubricate the flue gaskets for ease of installation. **DO NOT** use soapy water.

1. The connection from the water heater to the vertical stack must be as direct as possible and shall be the same diameter as the water heater flue outlet.
2. Fit the flue adaptor to the flue outlet located at the bottom back of the water heater and seal with the screw clamp (supplied).
3. Fit one of the condensate drain/port sections with the drain pointing towards the ground and secure to the adaptor with the clamp.

Note: the clamp will only fit one way. DO NOT try to force the clamp to close. If it is not closing, it is the wrong way. If forced, be careful to use a screwdriver to release the clamp as the releasing pressure may cause injury if attempting to release by hand.

4. The second flue drain/port section will be used to analyse the products of combustion during commissioning and the port must be a minimum of 300mm away from the water heater flue outlet. Fit the drain/port section (with the port **NOT** pointing towards the ground or the heater), straight flue lengths and/or elbows and run to the terminal location. Secure each joint with the clamp.
5. Horizontal flue runs must have an upward slope towards the flue terminal of not less 1 in 20 or 50mm per linear meter. The horizontal portions of the flue shall also be supported every 1.5m to maintain clearances and to prevent physical damage or separation of joints.
6. Use appropriate flue lengths or adjustable lengths to achieve the desired outcome. **DO NOT** cut the flue.
7. Install the vertical terminal (Top Stub with Mesh) vertically and terminate outside the building at least 500mm above the highest point of the roof that is within 2.5m of the flue terminal.
8. Flue penetrations through the roof shall use flashing to prevent water ingress to the building (not supplied) and if extended above the roof more than 1.5m should be secured with guy wires (not supplied) or braced.
9. Fit the flue terminal to the straight section and secure with the clamp.
10. Fit the condensate trap to the condensate drain section and fill with water.

Refer to [Fig 19](#) on page 48.



**Fig. 19: Vertical Flueing
Room Sourced Air Supply**

HORIZONTAL TERMINATING FLUES

These installations utilise the heater-mounted blower to vent the combustion products to the outdoors. Combustion air is taken from inside the room and the flue terminal is installed horizontally through the wall to the outdoors. Adequate combustion and ventilation air must be supplied to the equipment room in accordance with AS/NZS 5601.1.

Refer to [Table 17](#) on page 47 for the maximum length of flue run.

Lubricant is available to lubricate the flue gaskets for ease of installation. DO NOT use soapy water.

1. Fit the flue adaptor to the flue outlet located at the bottom back of the water heater and seal with the screw clamp (supplied).
2. Fit one of the condensate drain/port sections with the drain pointing towards the ground and secure to the adaptor with the clamp.

Note: the clamp will only fit one way. DO NOT try to force the clamp to close. If it is not closing, it is the wrong way. If forced, be careful to use a screwdriver to release the clamp as the releasing pressure may cause injury if attempting to release by hand.

3. The second flue drain/port section will be used to analyse the products of combustion during commissioning and the port must be a minimum of 300mm away from the water heater flue outlet. Fit the drain/port section (with the port NOT pointing towards the ground), straight flue lengths and/or elbows and run to the terminal location. Secure each joint with the clamp.
4. Horizontal flue runs must have an upward slope towards the flue terminal of not less 1 in 20 or 50mm per linear meter. The horizontal portions of the flue shall also be supported every 1.5m to maintain clearances and to prevent physical damage or separation of joints.
5. Use appropriate flue lengths or adjustable lengths to achieve the desired outcome. DO NOT cut the flue.
6. Install a rust-resistant sheet metal backing plate against the outside face of brick or masonry surfaces.
7. The Rheem supplied horizontal flue terminal MUST be used. Fit the horizontal flue terminal on the other side of the wall and secure to the flue pipe with the supplied screw clamp. The flue terminal can be cut to length as required and debur.
8. The flue terminal must be installed at least 300mm above ground level and above normal snow levels and must not be installed in a well or below grade. The flue terminal must be located NO CLOSER than 300mm off the wall. An obstruction in the direction of discharge must be no closer than 1.5m.
9. For multiple water heater installations, observe the clearances as shown in [Fig 18](#) on page 45.
10. Fit the condensate trap to the condensate drain section and fill with water.

Refer to [Fig 16 and 17](#) on page 45.

ROOM SEALED AIR SUPPLY

These installations utilise the heater-mounted blower to draw combustion air in from the outdoors and vent the combustion products to the outdoors.

Combustion air and flue venting may terminate horizontally or vertically and do not need to be located on the same face of the building. The air intake MUST be at least 900mm below the bottom of the flue terminal. Failure to observe this may allow products of combustion to be drawn back into the air inlet of the water heater and will void warranty. Whilst air supply for combustion is drawn directly from the outdoors, ventilation may still be required to maintain temperatures within the room per AS/NZS 5601.1.

CAUTION: Combustion air must not be contaminated by corrosive chemical fumes which can damage the heater and void the warranty. (Refer to [“Inside Air Contamination”](#) on page 46.)

Water heaters located indoors must be installed in a protective enclosure or properly constructed plant room.

The following materials may be used to supply air to the water heater: Stainless steel, galvanized steel, PVC, ABS, CPVC. Refer to [Table 17](#) on page 47 for diameters and lengths of air intake and flue.

The following procedure refers to Rheem supplied stainless steel flue components but the principles apply to any flue system.

1. Install combustion air intake pipe in accordance with [Fig. 20 \(horizontal\)](#) or [Fig. 21 \(vertical\)](#) on page 51.
2. Remove the hood and screen assembly from the air intake before attaching any air duct. Attach the air intake directly to the collar located on the inline Air Filter Box.
3. Fit the straight flue length and/or elbows to the adaptor and run to the air intake location, securing each joint with the clamp.
4. Penetrations through the roof or wall shall use flashing to prevent water ingress to the building (not supplied) and if extended above the roof more than 1.5m should be secured with guy wires or braced.
5. The air intake must be terminated with a downward facing 90 degree elbow, the bottom of which must be at least 300mm above grade. Refit the screen assembly with screws (not provided). Alternatively, the air intake hood may be repositioned on the wall with the air intake pointing downwards.
6. It is recommended that the air intake pipe be insulated to minimize sweating should this occur.
7. Install flueing according to the instructions supplied for [Vertical Terminating Flues](#) on page 48 or [Horizontal Terminating Flues](#) on page 49.

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 asphyxiation, explosion or fire.

NOTE: Use of this heater in construction areas where fine particulate matter, such as concrete or dry-wall dust, is present may result in damage to the heater that is not covered by the warranty. If operated in a construction environment, a clean source of combustion air must be provided directly to the heater.

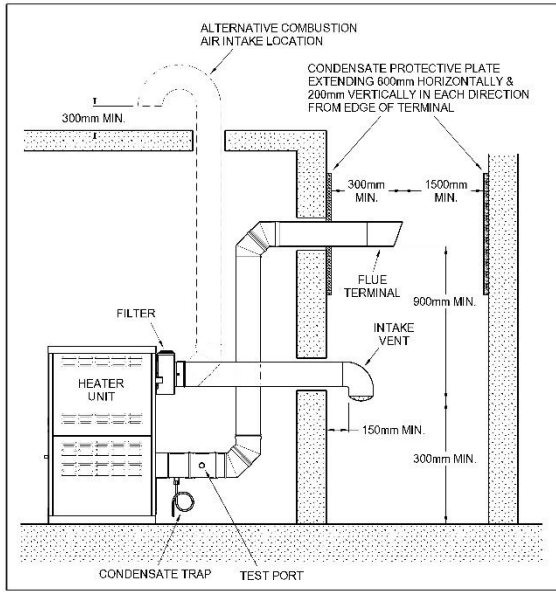


Fig 20: Horizontal Room Sealed Flueing

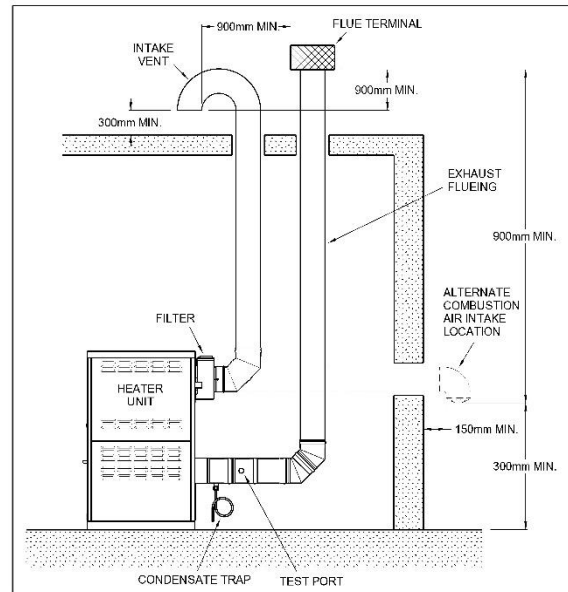


Fig 21: Vertical Room Sealed Flueing

MOTORIZED COMBUSTION AIR DAMPERS OR LOUVERS

When dampers or louvers are communicating directly with outside combustion air, they must be interlocked with each appliance in the equipment room, to ensure proper operation. See “Extra Low Voltage and Ancillary Connections” on page 68 for proper wiring instructions, using external interlock.

APPLICATIONS AND MODES

The VERSA IC Control system employed in the MVB is designed for a wide range of applications. The installer/design engineer should refer to the following Modes to determine which best fits the intended application and functionality for the unit being installed. Type H models have three modes available. Type W models will only have the W configuration available to them for use with potable water applications when directly connected to a hot water storage tank.

Refer to the explanations and diagrams on the following pages for description of system mode operation.

W Models– Direct Domestic Hot Water Configuration up to 71°C

Refer to [Fig 22 and 23](#) on page 52.

When a “W” model is ordered the only application available is direct DHW with single or multiple heaters (Maximum 4 heaters). The tank temperature is controlled by the System sensor (S3). The maximum setpoint temperature available is 71°C. For DHW applications requiring higher temperatures up to 82°C, an “H” model will be required. Refer to [H Models – Direct Domestic Hot Water Configuration 72°C to 82°C](#) on page 53.

The Water Heater Pump (P1) runs during any call for heat.

The Water Heater Pump is delayed “off” after the Tank Target temperature is achieved and as user defined in the **ADJUST** menu. (Refer to [Direct Domestic Hot Water ADJUST Menu](#) on page 53 for parameter settings and [Adjust Menu](#) on page 88.)

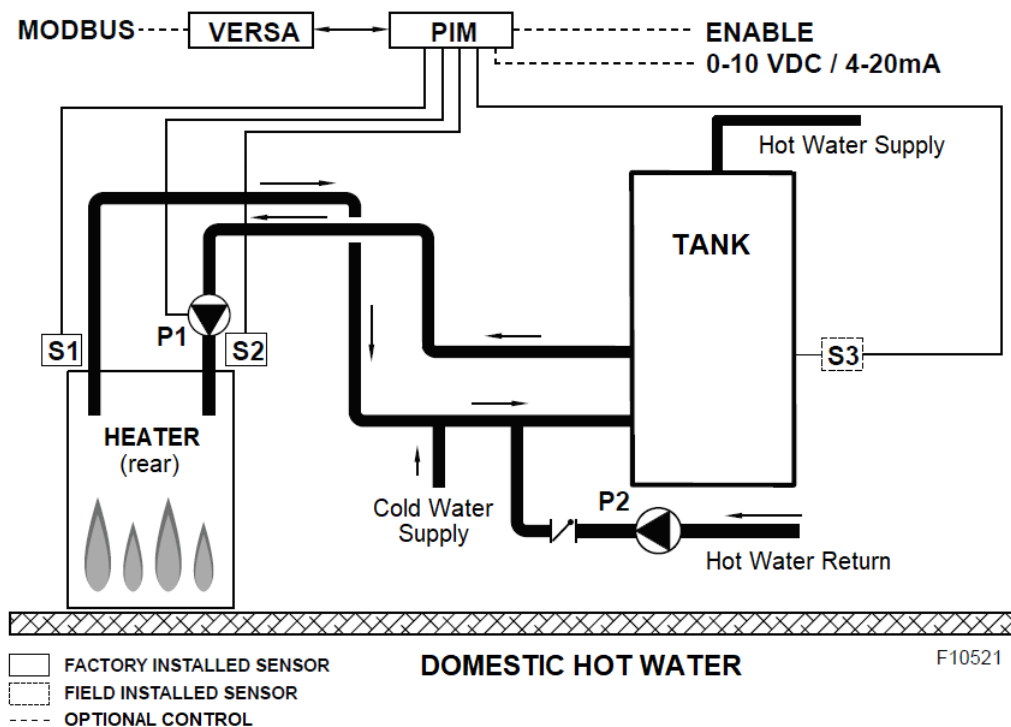


Fig. 22: W Models - Single Water Heater with Tank

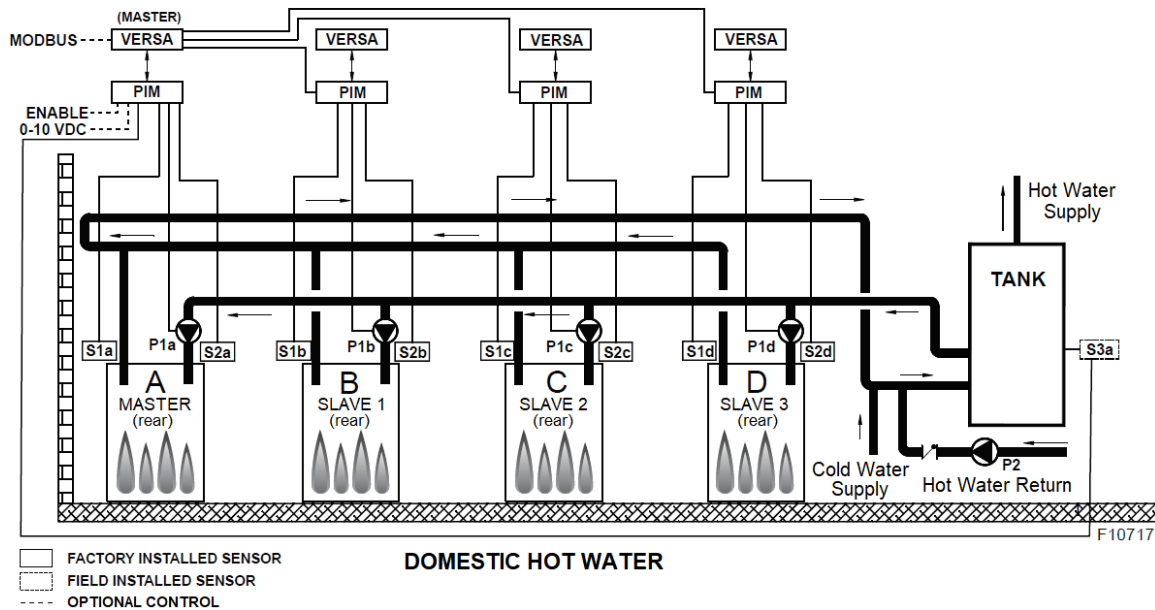


Fig. 23: W Models - Master/Slave with Tank

Operational Notes

- Heater A VERSA control board DIP switch 2 must be set to ON (Master). Heaters B, C and D VERSA control board DIP switch 2 must be set to OFF (slave). Refer to Cascade System Connections on page 77.
- Set auto reset high limit switch to 15°C > Tank Setpoint on each heater.
- The PIM operator setpoint dial on each heater **MUST** also be set to the Setpoint temperature to prevent an over temperature condition from occurring when operating in limp mode.



Direct Domestic Hot Water up to 71°C - ADJUST Menu Settings

- 'Default' column shows factory default settings. Actual values will depend on installation. Required (Rqd) value shown bracketed in bold should be used.
- Parameters can only be changed if VERSA control board DIP switch 1 is set to ON (up).
- Some parameters are only available if controlling parameter/device is set as indicated in 'Description'.

Parameter	Range	Description	Default (Rqd)
Tank Setpoint	10.0 ~ 71.0°C	Tank setpoint (only avail if Modbus Mode = Off or Monitor)	51.5°C
Tank Diff	1.0~ 5.0°C	Differential for Target Setpoint .i.e. 2.5°C diff = CFH at 2.5°C below Target Setpoint & CFH end at Target Setpoint	2.5°C (3°C)
System Purge Time	OFF, 0:20 ~ 20:00 min	Sets the length of system pump (P2) post purge i.e. pump run on (only when Modbus Mode para = Temp or Rate and if PIM DIP switch 3 is ON - Default DIP 3 setting is ON)	0:20 min
Modbus Mode	Off, Monitor, Temp, Rate	BMS Modbus operating mode (Temp = Temp control, Rate = Rate control)	Monitor
Address	1 ~ 170	Modbus slave address (not avail if Modbus Mode para = OFF)	1
Data Type	RTU, ASCH	Modbus data type (not avail if Modbus Mode para = OFF)	RTU
Parity	None, Odd, Even	Modbus parity (not avail if Modbus Mode para = OFF)	Even
Baud Rate	2400, 9600, 19200, 57600, 115000	Modbus baud rate (not avail if Modbus Mode para = OFF)	19200

H Models – Direct Domestic Hot Water Configuration 72°C to 82°C

Refer to [Fig 24 and 25](#) on page 54.

This mode selection is for domestic hot water systems with single or multiple water heaters (Maximum 4 water heaters) with set point temperature between 72°C and 82°C.

The system temperature is controlled by an aquastat (Pump C Controller) located in the bottom of the storage tank.

The burner firing rate is controlled by the Indirect DWH sensor (S6) located within the storage tank.

An additional ECO provided by the Pump C controller is fitted in the top of the storage tank.

The System sensor (S3) is replaced by a 10 kOhm resistor. As the 'H' model relies on the System sensor to enable a CFH, the 10k Ohm resistor puts the heater in a constant active state, whilst the Pump C controller determines the call for heat.

The Water Heater Pump (P1) runs during any call for heat.

The System Pump (P2) (if connected to the MVB) runs whenever the system is enabled for heating.

The Water Heater Pump (mandatory) and System Pump (optional) are delayed "off" as user defined in the **ADJUST** menu.

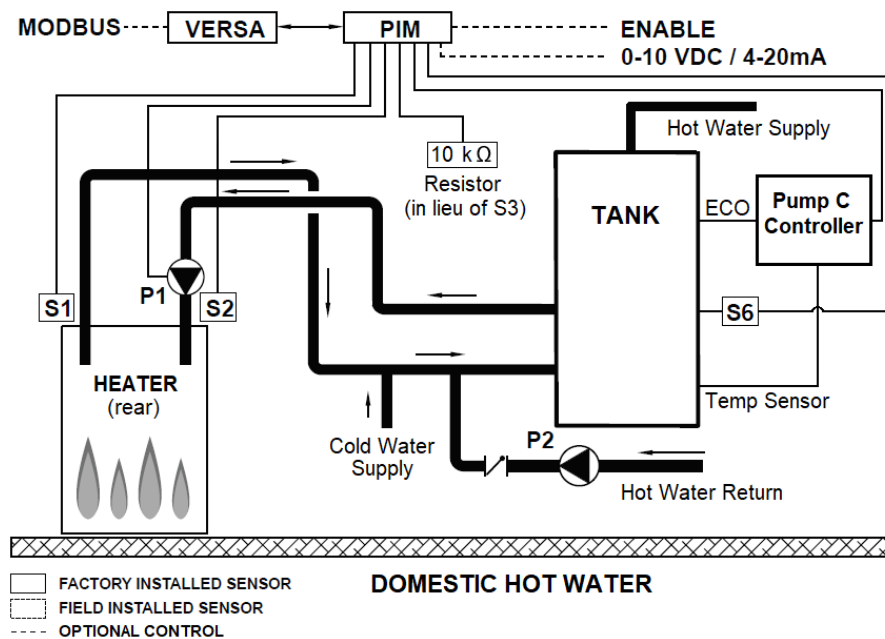


Fig 24: MODE 1 – Single Water Heater DHW >71°C

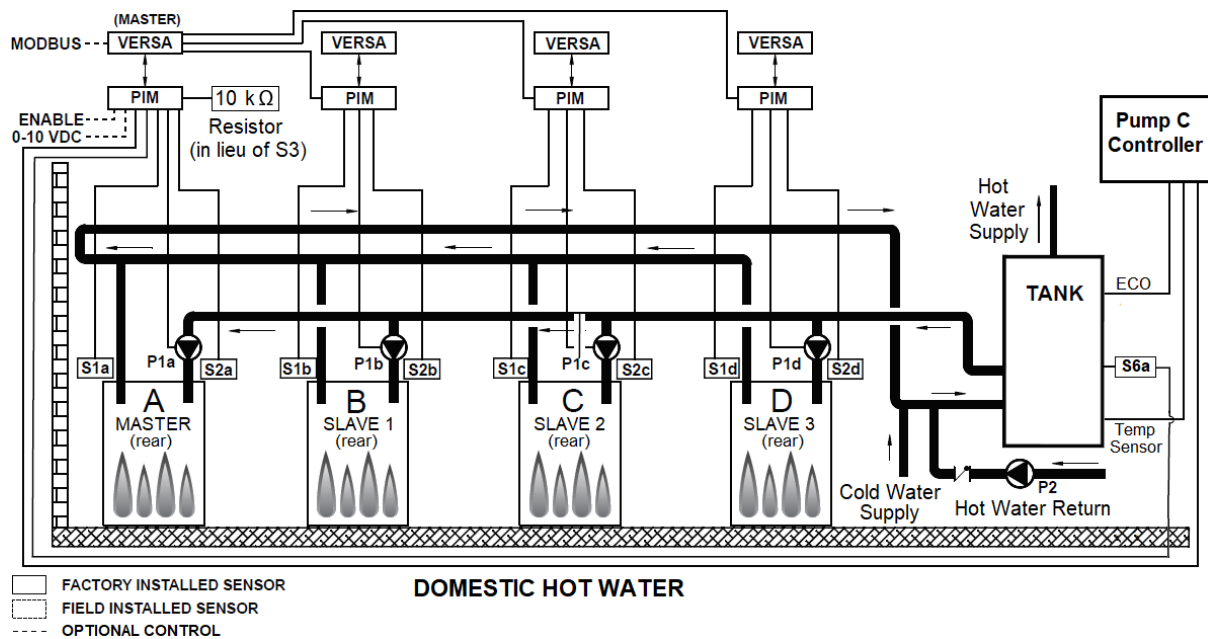


Fig 25: MODE 1 – Master/Slave with DHW >71°C

Operational Settings

- Operation Mode parameter in ADJUST menu must be set to 3 (refer to [H Model High Temp DHW \(82°C Max\) - ADJUST Menu Settings](#) on page 55 for parameter settings and [Adjust Menu](#) on page 88).
- Heater A VERSA control board DIP switch 2 must be set to ON (Master). Heaters B, C and D VERSA control board DIP switch 2 must be set to OFF (slave). Refer to [Cascade System Connections](#) on page 77.
- Set MVB auto reset high limit switch to 93°C (200°F) on each heater.
- The PIM operator setpoint dial on each heater **MUST** also be set to the Pump C Controller thermostat setpoint temperature to prevent an over temperature condition from occurring when operating in limp mode.



H Models High Temp DHW (82°C Max) - ADJUST Menu Settings

- 'Default' column shows factory default settings. Actual values will depend on installation. Required (Rqd) values shown bracketed in bold must be used.
- Parameters can only be changed if VERSA control board DIP switch 1 is set to ON (up).
- Some parameters are only available if controlling parameter/device is set as indicated in 'Description'.

Parameter	Range	Description	Default (Rqd)
Operation Mode	1, 2, 3	Selects heater operating mode	1 (3)
Target Mode	SETP, RSET, EMS, Modbus	SETP = Setpoint RSET = Outdoor Reset (outdoor air compensation) EMS = Energy Management System (if PIM DIP switch 5 is ON - Default DIP 5 setting is OFF) Modbus only if Modbus Mode para = Temp or Rate)	SETP
Target Setpoint	10.0 ~ 115.0°C	Target setpoint (only avail if Target Mode para = SETP)	82.0°C (10°C)

Manual Diff	1.0 ~ 23.0°C	Only available to be viewed/changed if PIM DIP switch 1 is ON N/A for Mode 3 high temp DHW i.e. PIM DIP switch 1 must be set to OFF.	N/A
System Purge Time	OFF, 0:20 ~ 20:00 min	Sets the length of system pump (P2) post purge i.e. pump run on (only when Modbus Mode para = Temp or Rate and if PIM DIP switch 3 is ON - Default DIP 3 setting is ON)	0:20 min
Glycol %	0 ~ 50%	Not used for MVB	0%
Ind DHW Sensor S5	OFF, ON	Select ON if an indirect DHW tank sensor S5 is used in lieu of an indirect DHW tankstat (only avail if Mode para = 2 or 3).	OFF
Ind Supply Setpoint	300.0, 0.5 ~ 93.0°C	Indirect DHW tank target setpoint temp when a tankstat is used in lieu of tank sensor S5 (only avail if MODE para = 2 or 3 and Ind DHW Sensor S5 para = OFF)	82.0°C (90°C)
Priority Ovr Timer	AUTO, 0:10 ~ 2:00 hr	Sets length of priority override time (only avail if Mode para = 3 or if Mode para = 2 and Ind Priority Enable para is set to ON)	2:00 hr
Modbus Mode	Off, Monitor, Temp, Rate	BMS Modbus operating mode (Temp = Temp control, Rate = Rate control)	Monitor
Address	1 ~ 170	Modbus slave address (not avail if Modbus Mode para = OFF)	1
Data Type	RTU, ASCH	Modbus data type (not avail if Modbus Mode para = OFF)	RTU
Parity	None, Odd, Even	Modbus parity (not avail if Modbus Mode para = OFF)	Even
Baud Rate	2400, 9600, 19200, 57600, 115000	Modbus baud rate (not avail if Modbus Mode para = OFF)	19200

H Models – Hydronic Heating and Combination Hydronic/Indirect DHW

Mode 1 (Type H Units Only) - Hydronic Heating Only

Refer to [Fig 26 and 27](#) on page 56.

This mode selection is for hydronic heating systems with single or multiple water heaters (Maximum 4 water heaters) in primary/secondary piping configuration with or without Outdoor Air Reset (S4).

The system temperature is controlled by the System sensor (S3).

The Water Heater Pump (P1) runs during any call for heat.

The System Pump (P2) (if connected to the MVB) runs whenever the system is enabled for heating and the outdoor air temperature is lower than the warm weather shut down (WWSD) temperature setting (if utilized).

The Water Heater Pump (mandatory) and System Pump (optional) are delayed “off” as user defined in the **ADJUST** menu.

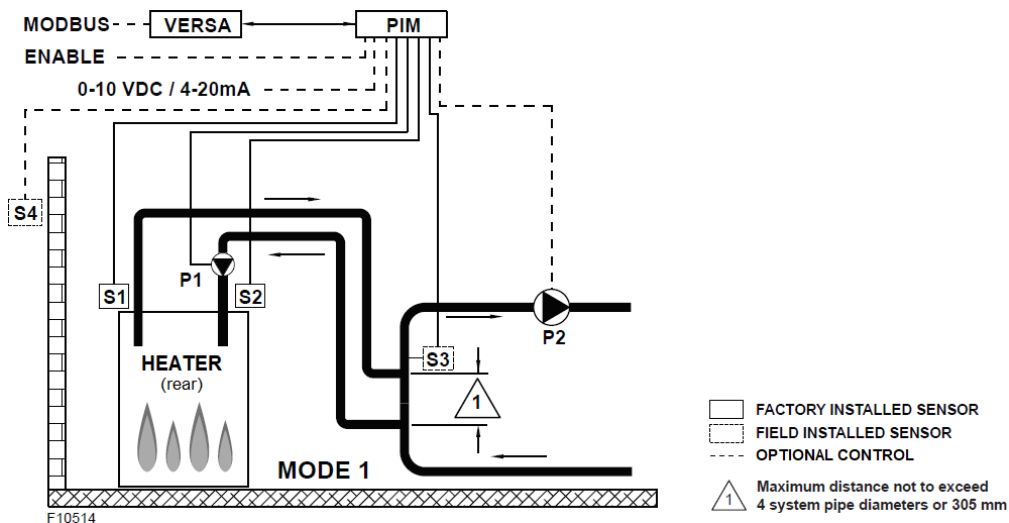


Fig 26: MODE 1 – Single Water Heater with Primary/Secondary Piping

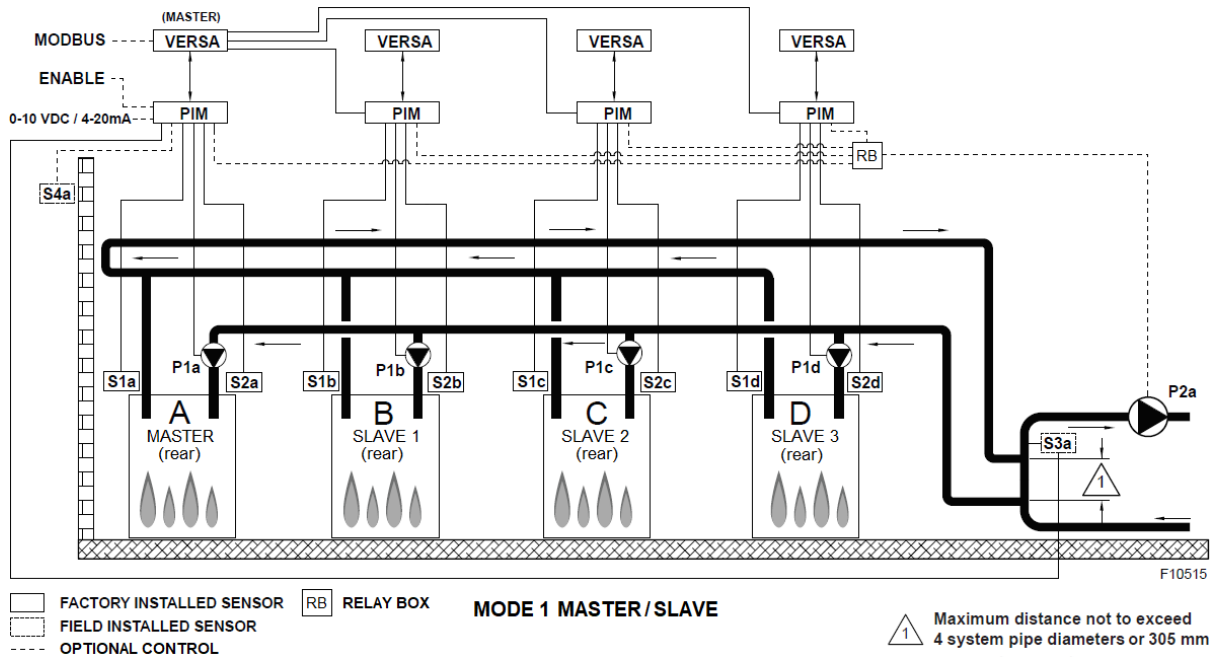


Fig. 27: MODE 1 - Master/Slave with Primary/Secondary Piping

Operational Settings

- Operation Mode parameter in ADJUST menu must be set to 1 (refer to [Mode 1 ADJUST Menu Settings](#) on page 57 for parameter settings and [Adjust Menu](#) on page 88).
- Heater A VERSA control board DIP switch 2 must be set to ON (Master). Heaters B, C and D VERSA control board DIP switch 2 must be set to OFF (slave). Refer to [Cascade System Connections](#) on page 77.
- Set auto reset high limit switch to 90°C (194°F) on each heater.
- The PIM operator setpoint dial on each heater **MUST** also be set to the Setpoint temperature to prevent an over temperature condition from occurring when operating in limp mode.



Mode 1 for Hydronic Systems without DHW – ADJUST Menu Settings

- 'Default' column shows factory default settings. Actual values will depend on installation. Required (Rqd) values shown bracketed in bold must not be exceeded.
- Parameters can only be changed if VERSA control board DIP switch 1 is set to ON (up).
- Some parameters are only available if controlling parameter/device is set as indicated in 'Description'.

Parameter	Range	Description	Default (Rqd)
Operation Mode	1, 2, 3	Selects heater operating mode	1
Target Mode	SETP, RSET, EMS, Modbus	SETP = Setpoint RSET = Outdoor Reset (outdoor air compensation) EMS = Energy Management System (if PIM DIP switch 5 is ON - Default DIP 5 setting is OFF) Modbus only if Modbus Mode para = Temp or Rate)	SETP
Target Setpoint	10.0 ~ 115.0°C	Target setpoint (only avail if Target Mode para = SETP)	82.0°C (80°C Max)
Target Max	32.0 ~ 110.0°C	Max heating value for indirect DHW @ 10.0vdc input when Target Mode para = EMS or Modbus	98.0°C (82.0°C Max)
Target Min	10.0 ~ 82.0°C	Min heating value for indirect DHW @ 1.0vdc input when Target Mode para = EMS or Modbus	10.0°C

Manual Diff (1)	1.0 ~ 23.0°C	Only available to be viewed/changed if PIM DIP switch 1 is ON. PIM DIP switch 1 should be set to OFF.	5.0°C
System Purge Time	OFF, 0:20 ~ 20:00 min	Sets the length of system pump (P2) post purge i.e. pump run on (only when Modbus Mode para = Temp or Rate and if PIM DIP switch 3 is ON - Default DIP 3 setting is ON)	0:20 min
Glycol %	0 ~ 50%	Not used for MVB	0%
WWSD	4.0 ~ 37.5°C OFF	Warm weather heating shut down temp (only avail if Target Mode para = RSET) Note: Indirect DHW CFH will override	21.0°C
Outdoor Start	1.6 ~ 29.4°C	Outdoor reset start temp (only avail if Target Mode para = RSET)	21.1°C
Outdoor Design	-51.1 ~ 7.2°C	Outdoor reset design temp (only avail if Target Mode para = RSET)	-12.2°C
Boiler Start	1.6 ~ 65.5°C	Starting heater target temp when outdoor temp is at Outdoor Start temp (only avail if Target Mode para = RSET)	21.0°C
Boiler Design	21.1 ~ 93.3°C	RSET target setpoint. Calculated when outdoor temp is as cold as Outdoor Design temp (only avail if Target Mode para = RSET)	82.2°C (80°C Max)
Modbus Mode	Off, Monitor, Temp, Rate	BMS Modbus operating mode (Temp = Temp control, Rate = Rate control)	Monitor
Address	1 ~ 170	Modbus slave address (not avail if Modbus Mode para = OFF)	1
Data Type	RTU, ASCH	Modbus data type (not avail if Modbus Mode para = OFF)	RTU
Parity	None, Odd, Even	Modbus parity (not avail if Modbus Mode para = OFF)	Even
Baud Rate	2400, 9600, 19200, 57600, 115000	Modbus baud rate (not avail if Modbus Mode para = OFF)	19200

(1) Split differential for hydronic Target Setpoint e.g. 5.0°C diff = CFH at 2.5°C below Target Setpoint & CFH end at 2.5°C above Target Setpoint (only available to be viewed/changed if PIM DIP switch 1 is ON otherwise hydronic differential is 12°C split (6°C above/below setpoint) and parameter is not displayed – Default DIP 1 setting is OFF).

Mode 2 (Type H Units Only) – Hydronic Heating with Indirect DHW on the System Loop

Refer to [Fig 28 and 29](#) on page 59.

This mode selection is for hydronic heating systems with single or multiple water heater (Maximum 4 water heaters) in primary/secondary piping configuration with or without Outdoor Air Reset (S4) with indirect DHW on the **system loop** (with or without priority). The system temperature is controlled by the System sensor (S3). The Indirect DHW sensor (S5) determines the indirect tank set point.

The system temperature is boosted by 20 ~ 50% during an indirect call for heat (depending on Indirect DHW setpoint value) to facilitate faster heating of the indirect DHW tank.

Priority mode toggles off the System Pump (P2) when an indirect call for heat is present. The Water Heater Pump (P1) runs during any call for heat.

The Indirect DHW Pump (P3) runs during an indirect call for heat with no “off” delay.

The Water Heater Pump (P1) and System Pump (P2) delay “off” as user defined in the **ADJUST** menu.

The System Pump (P2) runs whenever the system is enabled for heating and the outdoor air temperature is lower than the WWSD temperature setting (if utilized) unless an indirect call for heat is present with priority.

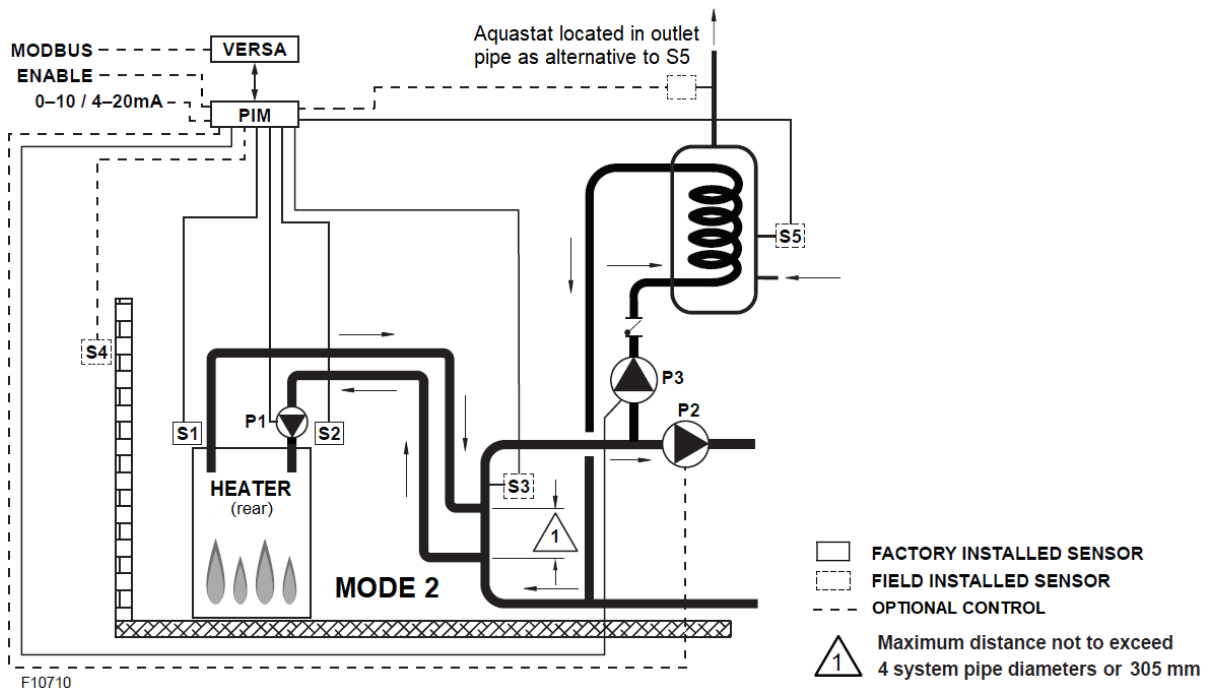


Fig. 28: MODE 2 - Single Water Heater with Indirect DHW on System Loop

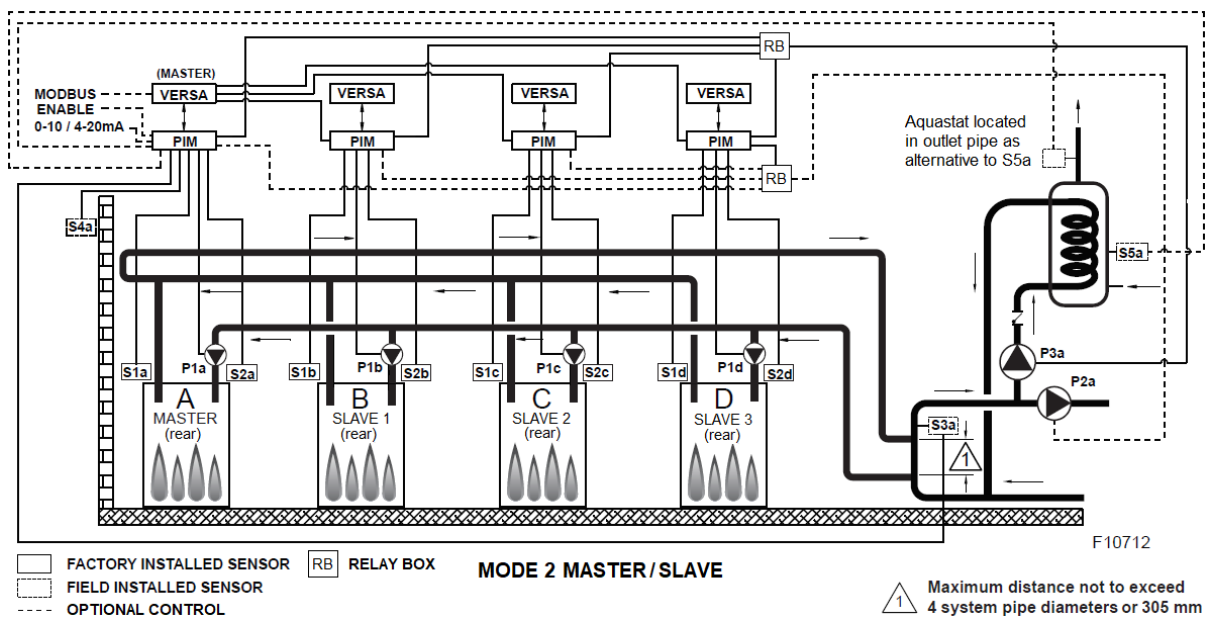


Fig. 29: MODE 2 – Master/Slave with Indirect DHW on System Loop

Operation Notes:

- Hydronic CFH and burner firing rate is determined by system sensor S3a (master S3).
- Indirect DHW CFH is determined by indirect DHW tank sensor S5a (master S5), however burner firing rate is controlled by system sensor S3a (master S3). **NOTE:** The target temperature is boosted by 20 ~ 50% during an indirect DHW CFH (depending on Indirect DHW setpoint value) to facilitate faster heating of the indirect DHW tank. e.g. for an Indirect DHW Setpoint of 65°C the target temperature will be 88°C, and heating will continue until the indirect DHW tank sensor S5a detects 65°C at which time the indirect DHW CFH will be satisfied. **The boosted target temperature (not the Indirect DHW Setpoint parameter value) will be displayed as the Target temperature in the view menus.**

- Heater pumps P1a, P1b, P1c and P1d operate during the relevant heaters CFH and are delayed 'OFF' (according to Post Purge parameter in BOILER menu) after the burner has shut down.
- If system pump P2a is controlled by the heaters, P2a operates whenever the enable/disable switch (if fitted) is closed or a switch bridging wire (default) is present between field wiring terminal strip 'Enable/Disable' terminals 11 & 12. Note: If indirect DHW priority is activated (Indirect Priority Enable parameter = ON), system pump P2a will turn off whenever an indirect DHW CFH is present for the programmed time period (Priority Ovr Timer parameter). Indirect DHW priority is optional for operation mode 2, however system pump P2a must be controlled by the Master to enable indirect DHW priority.
- Indirect DHW pump P3a operates during an indirect DHW tank CFH and turns off after indirect DHW CFH is satisfied (with no delay 'OFF').
- Optional outdoor air compensation: Optional outdoor air sensor S4 can be utilised to automatically adjust the target water temperature as the outdoor air temperature changes. For outdoor air compensation to operate, Target Mode parameter must be set to RSET. The CFH for heat target is then calculated and determined according to Boiler Start and Boiler Design parameters and the outdoor air temperature detected by outdoor air sensor S4.

Operational Settings

- Operation Mode parameter in ADJUST menu must be set to 2 (refer to [Mode 2 ADJUST Menu Settings](#) on page 60 for parameter settings and [Adjust Menu](#) on page 88). Note: Indirect DHW priority is selectable for operation mode 2 and can be configured to override for an adjustable time period.
- A bridging wire (or optional aquastat) must be installed between field wiring terminal strip 'Indirect DHW Override' terminals 10 & 12 to permit indirect DHW operation.
- Set auto reset high limit switch to 90°C (194°F) on each heater.
- The PIM operator setpoint dial **MUST** be set to the Indirect DHW Setpoint temperature on each heater to prevent a DHW over temperature condition from occurring when operating in limp mode.
- Heater A VERSA control board DIP switch 2 must be set to ON (Master). Heaters B, C and D VERSA control board DIP switch 2 must be set to OFF (slave). Refer to [Cascade System Connections](#) on page 77.



Mode 2 – ADJUST Menu Settings for Hydronic System with Indirect DHW

- 'Default' column shows factory default settings. Actual values will depend on installation. Required (Rqd) values shown bracketed in bold must be used or not exceeded where 'Max' is shown.
- Parameters can only be changed if VERSA control board DIP switch 1 is set to ON (up).
- Some parameters are only available if controlling parameter/device is set as indicated in 'Description'.

Parameter	Range	Description	Default (Rqd)
Operation Mode	1, 2, 3	Selects heater operating mode	1 (2)
Target Mode	SETP, RSET, EMS, Modbus	SETP = Setpoint RSET = Outdoor Reset (outdoor air compensation) EMS = Energy Management System (if PIM DIP switch 5 is ON - Default DIP 5 setting is OFF) Modbus only if Modbus Mode para = Temp or Rate)	SETP
Target Setpoint	10.0 ~ 115.0°C	Target setpoint (only avail if Target Mode para = SETP)	82.0°C (80°C Max)
Target Max	32 .0~ 110.0°C	Max heating value for indirect DHW @ 10.0vdc input when Target Mode para = EMS or Modbus	98.0°C (82.0°C Max)
Target Min	10.0 ~ 82.0°C	Min heating value for indirect DHW @ 1.0vdc input when Target Mode para = EMS or Modbus	10.0°C
Manual Diff ⁽¹⁾	1.0 ~ 23.0°C	Only available to be viewed/changed if PIM DIP switch 1 is ON. PIM DIP switch 1 should be set to OFF.	5.0°C

System Purge Time	OFF, 0:20 ~ 20:00 min	Sets the length of system pump (P2) post purge i.e. pump run on (only when Modbus Mode para = Temp or Rate and if PIM DIP switch 3 is ON - Default DIP 3 setting is ON)	0:20 min
Glycol %	0 ~ 50%	Not used for MVB	0%
Ind DHW Sensor S5	OFF, ON	Select ON if an indirect DHW tank sensor S5 is used in lieu of an indirect DHW tankstat (only avail if Mode para = 2 or 3)	OFF
Ind Supply Setpoint	300.0, 0.5 ~ 93.0°C	Indirect DHW tank target setpoint temp when a tankstat is used in lieu of tank sensor S5 (only avail if MODE para = 2 or 3 and Ind DHW Sensor S5 para = OFF)	82.0°C
Ind DHW Setpoint	OFF, 10.0 ~ 82.0°C	Indirect DHW target setpoint temp (only avail if Mode para = 2 or 3 and Ind DHW Sensor S5 para = ON)	60.0°C (82°C Max)
Ind Differential	1.0 ~ 5.0°C	Subtractive differential for Ind DHW Setpoint para i.e. 3° diff = CFH at 3° below Ind DHW Setpoint and CFH end at Ind DHW Setpoint (only avail if Mode para = 2 or 3 and Ind DHW Sensor S5 para = ON)	3°C
Ind Priority Enable	OFF, ON	Select ON if indirect DHW priority is required during an indirect DHW tank CFH (only avail if Mode para = 2. Indirect priority is always on for mode 3)	OFF
Priority Ovr Timer	AUTO, 0:10 ~ 2:00 hr	Sets length of priority override time (only avail if Mode para = 3 or if Mode para = 2 and Ind Priority Enable para is set to ON)	1:00 hr
WWSD	4.0 ~ 37.5°C OFF	Warm weather heating shut down temp (only avail if Target Mode para = RSET) Note: Indirect DHW CFH will override	21.0°C
Outdoor Start	1.6 ~ 29.4°C	Outdoor reset start temp (only avail if Target Mode para = RSET)	21.1°C
Outdoor Design	-51.1 ~ 7.2°C	Outdoor reset design temp (only avail if Target Mode para = RSET)	-12.2°C
Boiler Start	1.6 ~ 65.5°C	Starting heater target temp when outdoor temp is at Outdoor Start temp (only avail if Target Mode para = RSET)	21.0°C
Boiler Design	21.1 ~ 93.3°C	RSET target setpoint. Calculated when outdoor temp is as cold as Outdoor Design temp (only avail if Target Mode para = RSET)	82.2°C (80°C Max)
Modbus Mode	Off, Monitor, Temp, Rate	BMS Modbus operating mode (Temp = Temp control, Rate = Rate control)	Monitor
Address	1 ~ 170	Modbus slave address (not avail if Modbus Mode para = OFF)	1
Data Type	RTU, ASCH	Modbus data type (not avail if Modbus Mode para = OFF)	RTU
Parity	None, Odd, Even	Modbus parity (not avail if Modbus Mode para = OFF)	Even
Baud Rate	2400, 9600, 19200, 57600, 115000	Modbus baud rate (not avail if Modbus Mode para = OFF)	19200

(¹) Split differential for hydronic Target Setpoint e.g. 5.0°C diff = CFH at 2.5°C below Target Setpoint & CFH end at 2.5°C above Target Setpoint (only available to be viewed/changed if PIM DIP switch 1 is ON otherwise hydronic differential is 12°C split (6°C above/below setpoint) and parameter is not displayed – Default DIP 1 setting is OFF).

Mode 3 (Type H Units Only) - Hydronic Heating with Indirect DHW on the Water Heater Loop

Refer to [Fig 30 and 31](#) on page 62.

This mode selection is for hydronic heating systems with single or multiple water heaters (Maximum 4 water heaters) in primary/secondary piping configuration with or without Outdoor Air Reset (S4) with indirect DHW on the **water heater** loop (with priority).

The system temperature is controlled by the Supply sensor (S3) whenever the indirect call for heat is **not active**.

The DHW Supply sensor (S5) determines the indirect tank set point. During an indirect call for heat the water heater firing rate is determined by the water temperature at the Indirect Supply Sensor (S6) and the Target Max setting when using the Indirect DHW sensor (S5).

The Water Heater Pump (P1) runs during all heat calls regardless of priority.

The Indirect DHW Pump (P3) runs during an indirect call for heat with no “off” delay.

The Water Heater Pump (P1) and System Pump (P2) delay “off” as user defined in the **ADJUST** menu.

The System Pump (P2) runs whenever the system is enabled for heating and the outdoor air temperature is lower than the WWSD temperature setting (if utilized) unless an indirect call for heat is present.

NOTE: A Tank Aquastat can be used in lieu of the Indirect DHW Sensor (S5). See Operational Settings below for additional details.

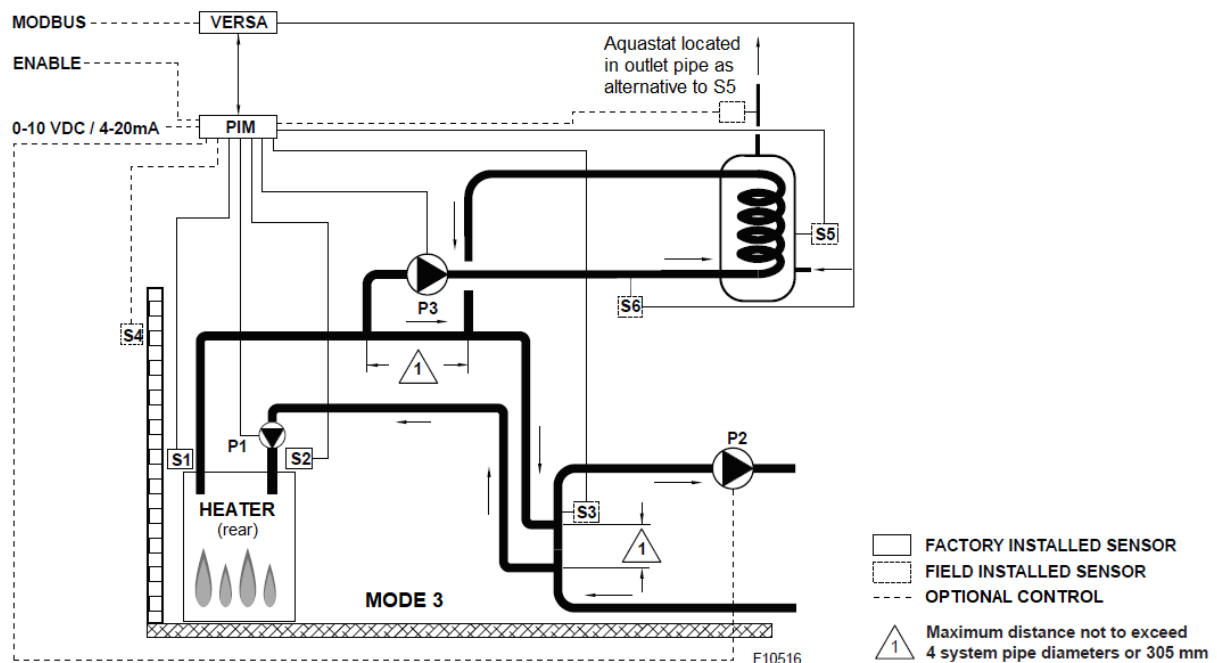


Fig. 30: MODE 3 - Single Water Heater with Indirect DHW on Water Heater Loop

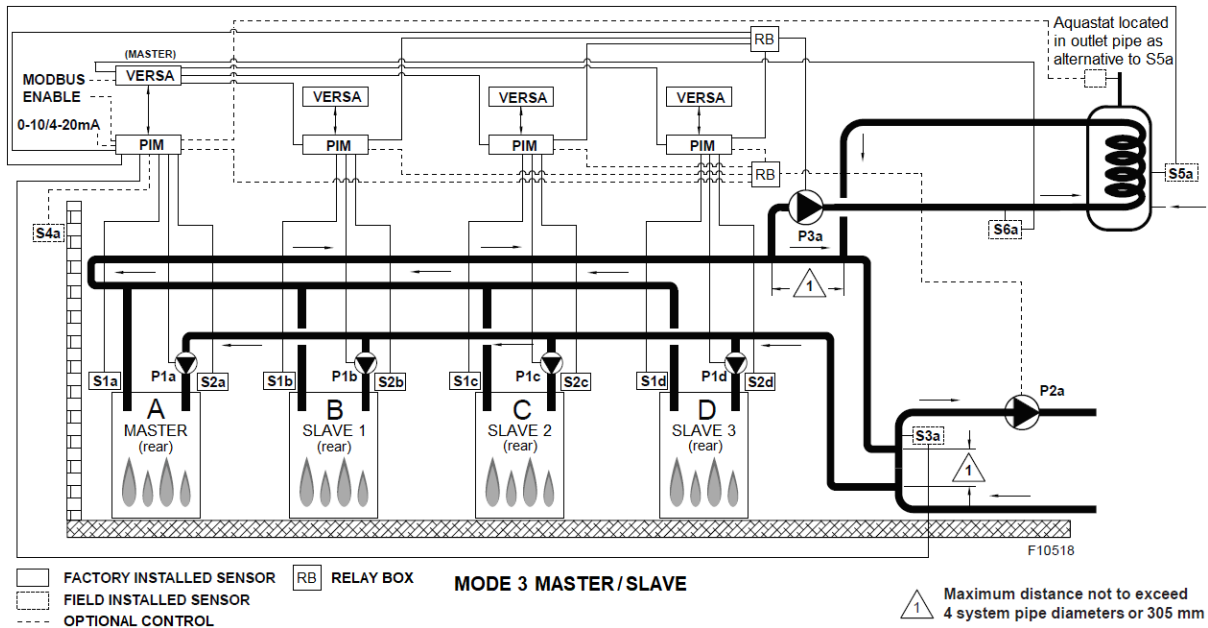


Fig. 31: MODE 3 – Master/Slave with Indirect DHW on Water Heater Loop

Operation Notes:

- Hydronic CFH and burner firing rate is determined by system sensor S3a (Master S3).
- Indirect DHW CFH is determined by indirect DHW tank sensor S5a (Master S5), however burner firing rate is controlled by indirect DHW flow line sensor S6a. **NOTE:** The target temperature is boosted by 20 ~ 50% during an indirect DHW CFH (depending on Indirect DHW setpoint value) to facilitate faster heating of the indirect DHW tank. e.g. for an Indirect DHW Setpoint of 65°C the target temperature will be 88°C, and heating will continue until the indirect DHW tank sensor S5a detects 65°C at which time the indirect DHW CFH will be satisfied. **The boosted target temperature (not the Indirect DHW Setpoint parameter value) will be displayed as the Target temperature in the view menus.**
- Heater pumps P1a, P1b, P1c and P1d operate during the relevant heaters CFH and are delayed 'OFF' (according to Post Purge parameter in BOILER menu) after the burner has shut down.
- System pump P2a must be controlled by the Master to enable indirect DHW priority. P2a operates whenever the enable/disable switch is closed (if fitted) or a switch bridging wire (default) is present between field wiring terminal strip 'Enable/Disable' terminals 11 & 12. Note: indirect DHW priority is always activated for operation mode 3 and system pump P2a will turn off whenever an indirect DHW CFH is present for the programmed time period (Priority Ovr Timer parameter).
- Indirect DHW pump P3a operates during an indirect DHW tank CFH and turns off after indirect DHW CFH is satisfied (with no delay 'OFF').
- Optional outdoor air compensation: Optional outdoor air sensor S4 can be utilised to automatically adjust the target water temperature as the outdoor air temperature changes. For outdoor air compensation to operate, Target Mode parameter must be set to RSET. The CFH target is then calculated and determined according to Boiler Start and Boiler Design parameters and the outdoor air temperature detected by outdoor air sensor S4.

Operational Settings

- Operation Mode parameter in ADJUST menu must be set to 3 (refer to [Mode 3 ADJUST Menu Settings](#) on page 64 for parameter settings and [Adjust Menu](#) on page 88). Note: Indirect DHW has priority and is not selectable for operation mode 3.
- A bridging wire (or optional Aquastat) must be installed between field wiring terminal strip 'Indirect DHW Override' terminals 10 & 12 to permit indirect DHW operation.
- Heater A VERSA control board DIP switch 2 must be set to ON (Master). Heaters B, C and D VERSA control board DIP switch 2 must be set to OFF (slave). Refer to [Cascade System Connections](#) on page 77.

- Set auto reset high limit switch to 90°C (194°F) on each heater.
- The PIM operator setpoint dial on each heater **MUST** be set to the Indirect DHW Setpoint temperature to prevent a DHW over temperature condition from occurring when operating in limp mode.



Mode 3 – ADJUST Menu Settings for Hydronic System with Indirect DHW

- 'Default' column shows factory default settings. Actual values will depend on installation. Required (Rqd) values shown bracketed in bold must be used or not exceeded where 'Max' is shown.
- Parameters can only be changed if VERSA control board DIP switch 1 is set to ON (up).
- Some parameters are only available if controlling parameter/device is set as indicated in 'Description'.

Parameter	Range	Description	Default (Rqd)
Operation Mode	1, 2, 3	Selects heater operating mode	1 (3)
Target Mode	SETP, RSET, EMS, Modbus	SETP = Setpoint RSET = Outdoor Reset (outdoor air compensation) EMS = Energy Management System (if PIM DIP switch 5 is ON - Default DIP 5 setting is OFF) Modbus only if Modbus Mode para = Temp or Rate)	SETP
Target Setpoint	10.0 ~ 115.0°C	Target setpoint (only avail if Target Mode para = SETP)	82.0°C (80°C Max)
Target Max	32.0 ~ 110.0°C	Max heating value for indirect DHW @ 10.0vdc input when Target Mode para = EMS or Modbus	98.0°C (82.0°C Max)
Target Min	10.0 ~ 82.0°C	Min heating value for indirect DHW @ 1.0vdc input when Target Mode para = EMS or Modbus	10.0°C
Manual Diff ⁽¹⁾	1.0 ~ 23.0°C	Only available to be viewed/changed if PIM DIP switch 1 is ON. PIM DIP switch 1 should be set to OFF.	5.0°C
System Purge Time	OFF, 0:20 ~ 20:00 min	Sets the length of system pump (P2) post purge i.e. pump run on (only when Modbus Mode para = Temp or Rate and if PIM DIP switch 3 is ON - Default DIP 3 setting is ON)	0:20 min
Glycol %	0 ~ 50%	Not used for MVB	0%
Ind DHW Sensor S5	OFF, ON	Select ON if an indirect DHW tank sensor S5 is used in lieu of an indirect DHW tankstat (only avail if Mode para = 2 or 3)	OFF
Ind Supply Setpoint	300.0, 0.5 ~ 93.0°C	Indirect DHW tank target setpoint temp when a tankstat is used in lieu of tank sensor S5 (only avail if MODE para = 2 or 3 and Ind DHW Sensor S5 para = OFF)	82.0°C
Ind DHW Setpoint	OFF, 10.0 ~ 82.0°C	Indirect DHW target setpoint temp (only avail if Mode para = 2 or 3 and Ind DHW Sensor S5 para = ON)	60.0°C (82°C Max)
Ind Differential	1.0 ~ 5.0°C	Subtractive differential for Ind DHW Setpoint para i.e. 3° diff = CFH at 3° below Ind DHW Setpoint and CFH end at Ind DHW Setpoint (only avail if Mode para = 2 or 3 and Ind DHW Sensor S5 para = ON)	3°C
Priority Ovr Timer	AUTO, 0:10 ~ 2:00 hr	Sets length of priority override time (only avail if Mode para = 3 or if Mode para = 2 and Ind Priority Enable para is set to ON)	2:00 hr
WWSD	4.0 ~ 37.5°C OFF	Warm weather heating shut down temp (only avail if Target Mode para = RSET) Note: Indirect DHW CFH will override	21.0°C
Outdoor Start	1.6 ~ 29.4°C	Outdoor reset start temp (only avail if Target Mode para = RSET)	21.1°C
Outdoor Design	-51.1 ~ 7.2°C	Outdoor reset design temp (only avail if Target Mode para = RSET)	-12.2°C
Boiler Start	1.6 ~ 65.5°C	Starting heater target temp when outdoor temp is at Outdoor Start temp (only avail if Target Mode para = RSET)	21.0°C
Boiler Design	21.1 ~ 93.3°C	RSET target setpoint. Calculated when outdoor temp is as cold as Outdoor Design temp (only avail if Target Mode para = RSET)	82.2°C (80°C Max)

Modbus Mode	Off, Monitor, Temp, Rate	BMS Modbus operating mode (Temp = Temp control, Rate = Rate control)	Monitor
Address	1 ~ 170	Modbus slave address (not avail if Modbus Mode para = OFF)	1
Data Type	RTU, ASCH	Modbus data type (not avail if Modbus Mode para = OFF)	RTU
Parity	None, Odd, Even	Modbus parity (not avail if Modbus Mode para = OFF)	Even
Baud Rate	2400, 9600, 19200, 57600, 115000	Modbus baud rate (not avail if Modbus Mode para = OFF)	19200

⁽¹⁾ Split differential for hydronic Target Setpoint e.g. 5.0°C diff = CFH at 2.5°C below Target Setpoint & CFH end at 2.5°C above Target Setpoint (only available to be viewed/changed if PIM DIP switch 1 is ON otherwise hydronic differential is 12°C split (6°C above/below setpoint) and parameter is not displayed – Default DIP 1 setting is OFF).

CONNECTIONS – ELECTRICAL

The electrical installation must comply with AS/NZS 3000, AS 3814, 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/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.

LOW VOLTAGE CONNECTIONS

All 240 voltage connections are made inside the rear wiring box. Cut outs are provided for up to 4 cables to be connected. Locator dimples are provided for additional components if required. Refer to [Fig. 32 and 33](#) on page 66.

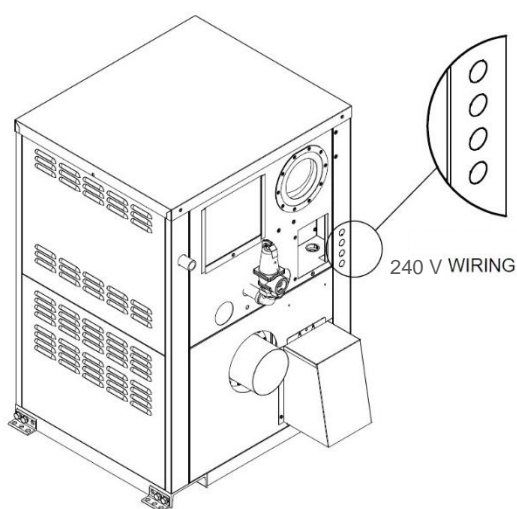


Fig 32: 240V Voltage Wiring Location

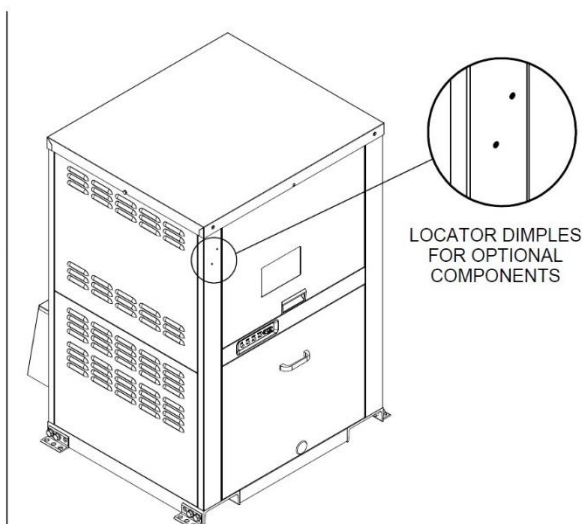


Fig 33: Locator Dimples for Optional Components

POWER SUPPLY

Connect mains power to the terminals marked L, N, E as shown in [Fig 34](#) on page 67.

The maximum power and current draw, excluding pumps is as shown in [Table 18](#) on page 66. Refer to [Table 19](#) on page 67 for maximum pump power and current draw.

MVB Model Range	910500, 910750, 911000, 911250, 911500	911750, 912000
Maximum power (excluding pumps)	1500W	2000W
Max current (excluding pumps)	6.25A	8.5A

Table 18: MVB Electrical Requirements

Power for up to 3 pumps – DHW Pump, Water Heater Pump and System Pump - can be supplied from the MVB.

The maximum current draw will depend on the number of pumps used, the size of pumps employed and the manner in which they are connected, ie directly powered by the MVB for single phase pumps up to 8A each or indirectly powered via a contactor for 3 phase pumps or single phase pumps exceeding 8A each. Refer to [Table 19](#) on page 67 for pump electrical requirements.

Note: whilst the MVB can control the System Pump in hydronic applications, this will only be on an on/off basis and not variable speed control.

MVB Model	Applications up to 71°C		Applications >71°C	
	Water Heater Pump Model	Electrical Requirements	Water Heater Pump Model	Electrical Requirements
910500	UPS 32-80	220W / 0.98A	UPS 32-80	220W / 0.98A
910750	UPS 32-80	220W / 0.98A	Magna 1 40-120	463W / 2.05A
911000	Magna 1 40-120	463W / 2.05A	Magna 1 40-120	463W / 2.05A
911250	Magna 1 40-120	463W / 2.05A	Magna 1 40-120	463W / 2.05A
911500	Magna 1 40-120	463W / 2.05A	Magna 1 65-150	1263W / 5.53A
911750	Magna 1 65-150	1263W / 5.53A	Magna 1 65-150	1263W / 5.53A
912000	Magna 1 65-150	1263W / 5.53A	Magna 1 65-150	1263W / 5.53A

Table 19: Pump Electrical Requirements

PUMP CONNECTIONS

Connect pumps to the terminals marked R1, R2, R3 as appropriate:

R1 = Water Heater (Boiler) Pump – Primary pump for W models directly connected to a storage tank in DHW applications and primary pump for all H model applications.

R2 = DHW Pump – Indirect DHW pump for H models where an indirect DHW system is connected.

R3 = System Pump (optional) - H models for controlling the flow of water in the system (refer to System Modes). Optional for W models for controlling the building return pump (operates only on a tank call for heat).

Refer to [Applications and Modes](#) commencing on page 52 for description of pumps and their use.

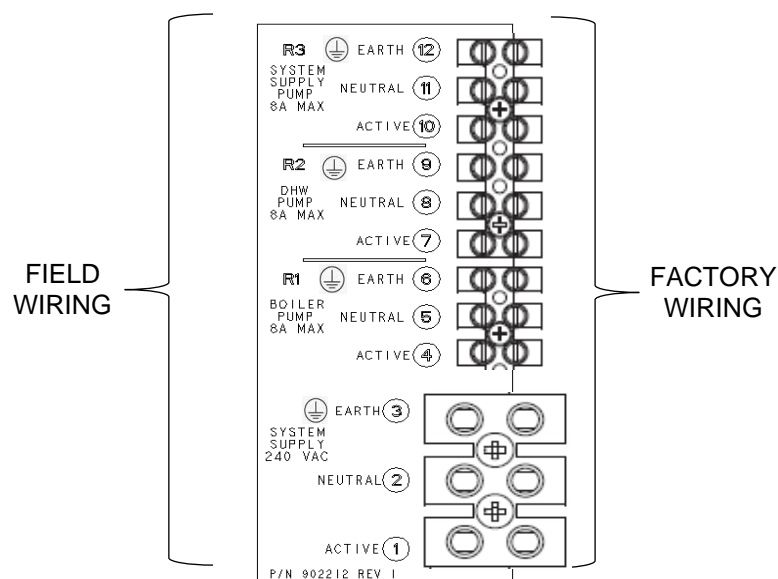


Fig 34: Mains Power and Pump Wiring Connections

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

If any of the original wire as supplied with the heater must be replaced, it must be replaced with 105°C wire or its equivalent.

EXTRA LOW VOLTAGE AND ANCILLARY CONNECTIONS

All extra low voltage wiring, including sensors, interlocks, enable/disable, and various options are wired into terminals 1–24 on the front wiring panel as noted in [Fig. 35](#) on page 68. Ensure power to the MVB is isolated and remove the front top panel to access the terminal strip.

WARNING: DO NOT CONNECT ANY SAFETY EXTRA LOW VOLTAGE (SELV) CIRCUIT(S) TO THIS WATER HEATER.

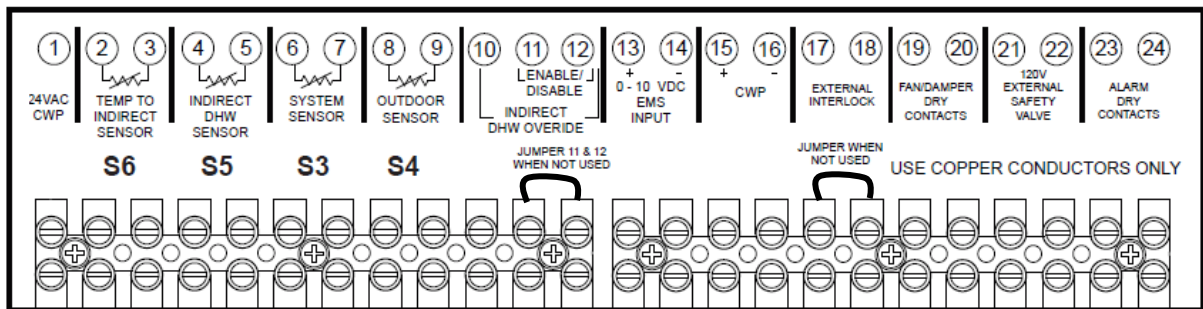


Fig 35: Extra Low Voltage Field Wiring Connections

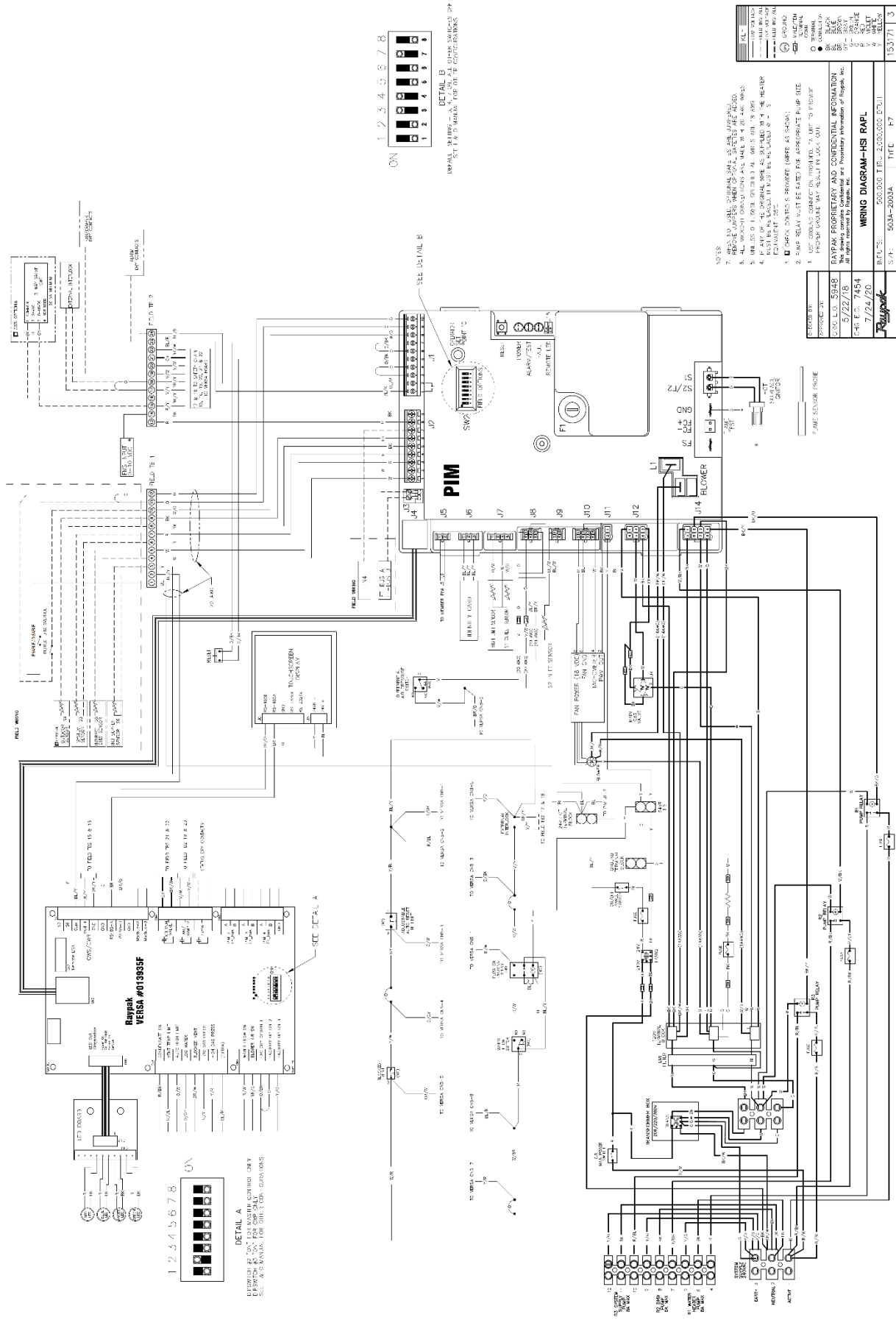


Fig 36: Wiring diagram – All MVB Models

PUMP AND SENSOR WIRING FOR VARIOUS APPLICATIONS / MODES

Domestic Hot Water Applications With Storage Tank up to 71°C

Refer to [Fig 37](#).

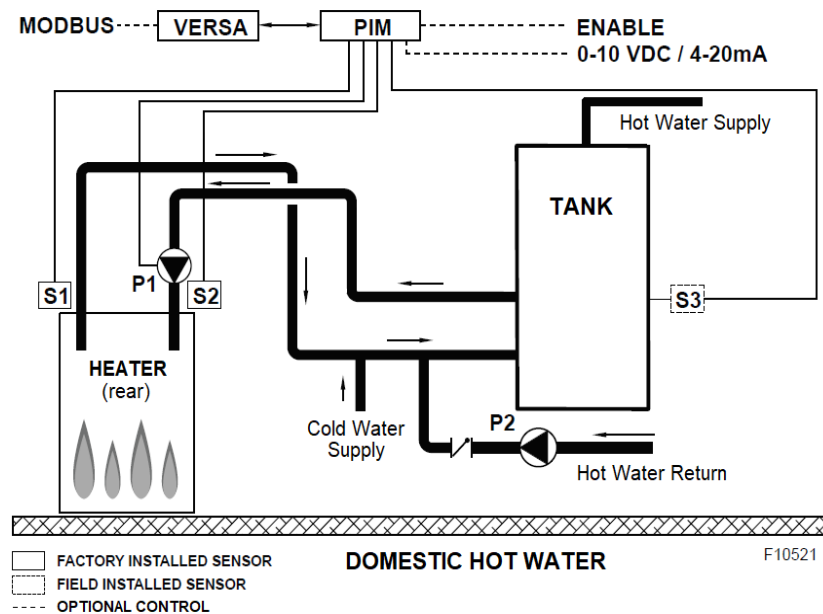


Fig 37: DHW Sensor and Pump Wiring up to 71°C

One 10m NTC sensor cable is supplied with each MVB.

Connect the sensor to terminals **6 and 7** marked '**System Sensor**' and fit the sensor into the sensor well of the storage tank, shown as 'S3'. For most applications this will be the lowest sensor location on the tank, but may vary depending on specific project design needs. Refer to [Fig 35](#).

Connect the primary pump shown as 'P1' to the terminals marked **R3 / 'Water Heater Pump'** located in the Mains Power and Pump electrical connections junction box at the back of the MVB. Refer to [Fig 34](#). Use an external contactor if 3 phase pump is used or the pump current exceeds 8A.

Domestic Hot Water Applications With Storage Tank Between 72°C and 82°C

Refer to [Fig 38](#).

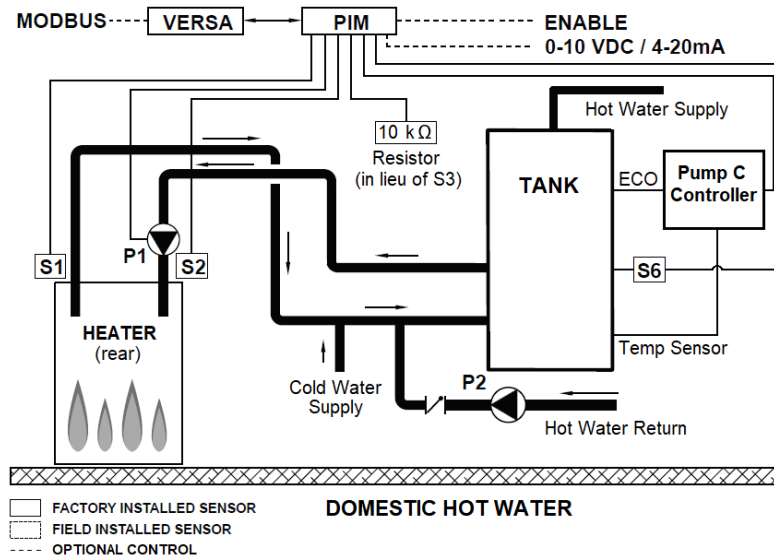


Fig 38: DHW Sensor and Pump Wiring Between 72°C and 82°C

One 10m NTC sensor cable is supplied with each MVB.

Connect the sensor to terminals **2 and 3** marked '**Temp to Indirect Sensor**' and fit the sensor into the sensor well of the storage tank, shown as 'S6', into the second lowest sensor port on the storage tank.

Connect a 10 kOhm resistor to the terminals **6 and 7** marked '**System Sensor**', shown as S3.

Fix the Pump C controller (P/No AQ0200127) to the storage tank nearest the master MVB. Fit the sensor into the lowest sensor port on the storage tank. Fit the capillary bulb ECO supplied with the Pump C controller into the highest sensor port on the storage tank.

Remove the jumper wire from terminals **17 and 18** marked '**External Interlock**' and connect double insulated 2 wire cable to the VFC Output terminals marked '**N/O and C**' in the Pump C controller.

Refer to [Fig 35](#), [Fig 38](#) and [Fig 39](#).

Connect the primary pump shown as 'P1' to the terminals marked **R3 / 'Water Heater Pump'** located in the Mains Power and Pump electrical connections junction box at the back of the MVB. Refer to [Fig 34](#). Use an external contactor if 3 phase pump is used or the pump current exceeds 8A.

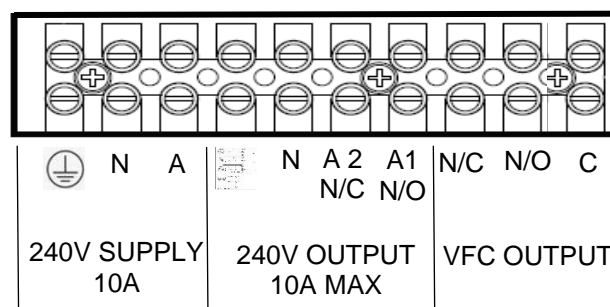


Fig 39: Pump C Controller Wiring

Hydronic Heating Applications

Mode 1 – Hydronic Heating Only

Refer to [Fig 40](#).

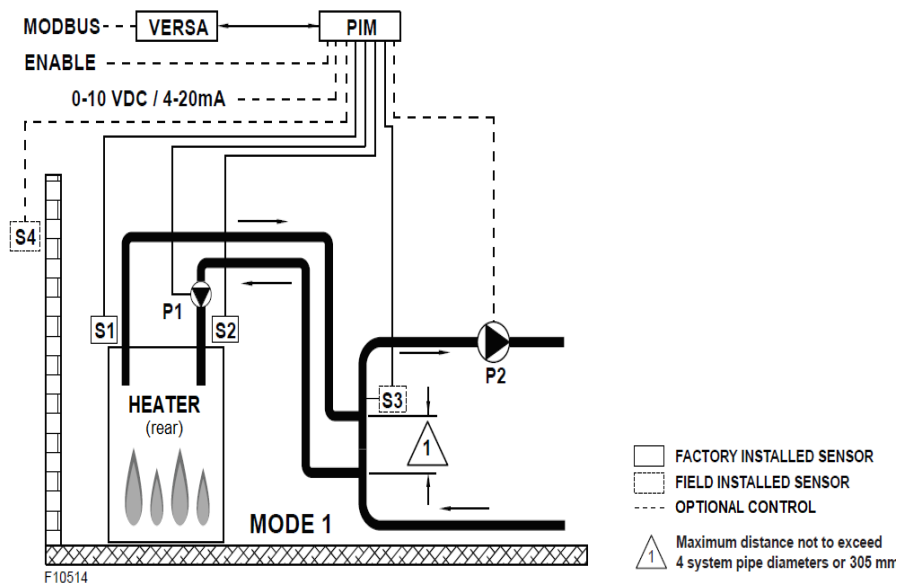


Fig 40: Mode 1 Sensor and Pump Wiring

One 10m NTC sensor cable is supplied with each MVB.

Connect the sensor to terminals **6 and 7** marked '**System Sensor**' and fit the sensor into a sensor well in the main heating flow and return piping downstream of where the water heater primary flow joins the main heating flow and return piping, shown as 'S3'. Refer to [Fig 35](#).

Refer to [Wiring the Outdoor Sensor](#) on page 76 if an outdoor sensor is used, shown as 'S4'.

Connect the water heater pump shown as 'P1' to the terminals marked **R1 / 'Water Heater Pump'** located in the Mains Power and Pump connections junction box at the back of the MVB. Refer to [Fig 34](#). Use an external contactor if 3 phase pump is used or the pump current exceeds 8A.

Optionally connect the system pump shown as 'P2' to the terminals marked **R3 / 'System Pump'** located in the Mains Power and Pump connections junction box at the back of the MVB. Refer to [Fig 34](#). Use an external contactor if 3 phase pump is used or the pump current exceeds 8A.

Mode 2 – Hydronic Heating with Indirect DHW on the System Loop

Refer to [Fig 41](#).

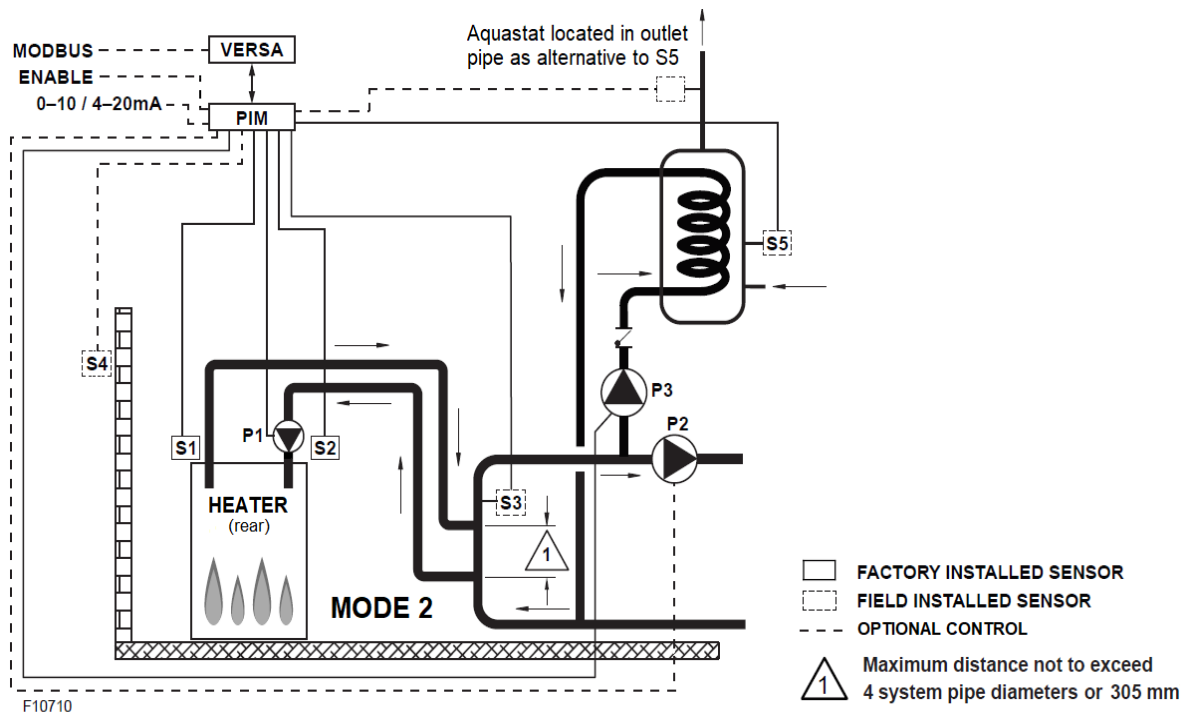


Fig 41: Mode 2 Sensor and Pump Wiring

One 10m NTC sensor cable is supplied with each MVB. If multiple sensors are required these can be ordered from Rheem.

Connect one sensor to terminals **6 and 7** marked '**System Sensor**' and fit the sensor into a sensor well in the main heating flow and return piping downstream of where the water heater primary flow joins the main heating flow and return piping, shown as 'S3'. Refer to [Fig 35](#).

Connect the other sensor to terminals **4 and 5** marked '**Indirect DHW Sensor**' and fit the sensor into the indirect DHW storage tank, shown as 'S5'. Refer to [Fig 35](#).

Refer to [Wiring the Outdoor Sensor](#) on page 76 if an outdoor sensor is used, shown as 'S4'.

Connect the water heater pump shown as 'P1' to the terminals marked **R1 / 'Water Heater Pump'** located in the Mains Power and Pump connections junction box at the back of the MVB. Refer to [Fig 34](#). Use an external contactor if 3 phase pump is used or the pump current exceeds 8A.

Connect the indirect DHW pump shown as 'P3' to the terminals marked **R2 / 'Indirect DHW Pump'** located in the Mains Power and Pump connections junction box at the back of the MVB. Refer to [Fig 34](#). Use an external contactor if 3 phase pump is used or the pump current exceeds 8A.

Optionally connect the system pump shown as 'P2' to the terminals marked **R3 / 'System Pump'** located in the Mains Power and Pump connections junction box at the back of the MVB. Refer to [Fig 34](#). Use an external contactor if 3 phase pump is used or the pump current exceeds 8A.

Mode 3 - Hydronic Heating with Indirect DHW on the Water Heater Loop

Refer to [Fig 42](#).

One 10m NTC sensor cable is supplied with each MVB. If multiple sensors are required these can be ordered from Rheem.

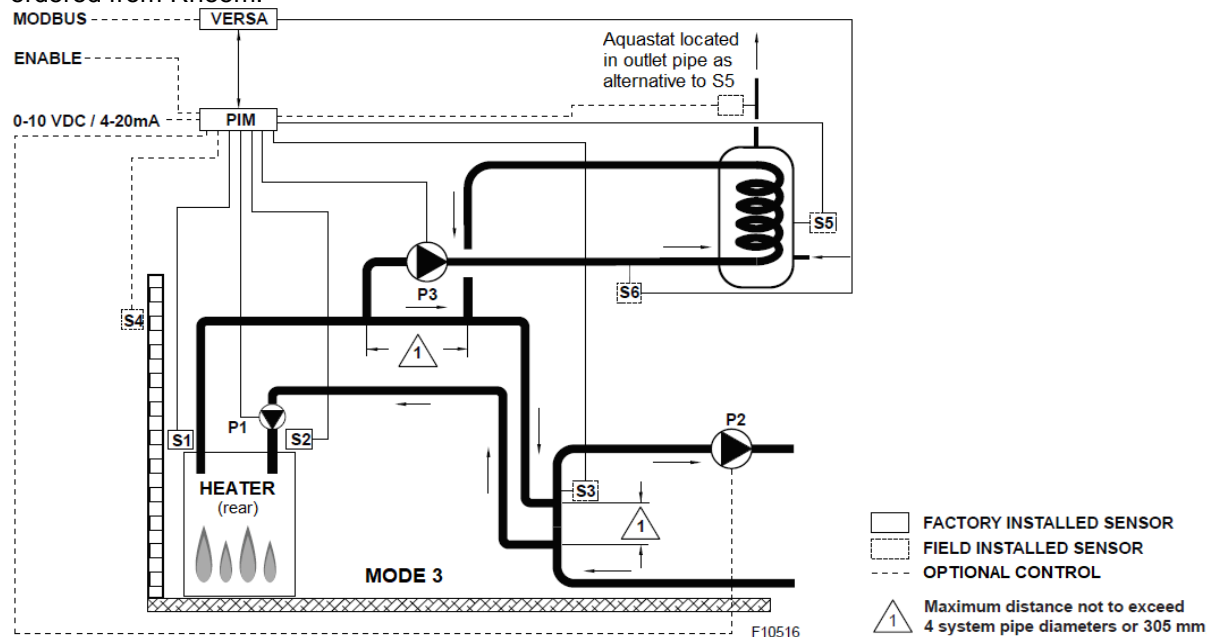


Fig 42: Mode 3 Sensor and Pump Wiring

Connect one sensor to terminals **6 and 7** marked '**System Sensor**' and fit the sensor into a sensor well in the main heating flow and return piping downstream of where the water heater primary flow joins the main heating flow and return piping, shown as 'S3'. Refer to [Fig 35](#).

Connect one sensor to terminals **4 and 5** marked '**Indirect DHW Sensor**' and fit the sensor into the indirect DHW storage tank, shown as 'S5'. Refer to [Fig 35](#).

Connect one sensor to terminals **2 and 3** marked '**Temp to Indirect Storage**' and fit the sensor into a sensor well on the primary flow line to the indirect DHW storage tank, shown as 'S6'. Refer to [Fig 35](#).

Refer to [Wiring the Outdoor Sensor](#) on page 76 if an outdoor sensor is used, shown as 'S4'.

Connect the water heater pump shown as 'P1' to the terminals marked **R1 / 'Water Heater Pump'** located in the Mains Power and Pump connections junction box at the back of the MVB. Refer to [Fig 34](#). Use an external contactor if 3 phase pump is used or the pump current exceeds 8A.

Connect the indirect DHW pump shown as 'P3' to the terminals marked **R2 / 'Indirect DHW Pump'** located in the Mains Power and Pump connections junction box at the back of the MVB. Refer to [Fig 34](#). Use an external contactor if 3 phase pump is used or the pump current exceeds 8A.

Optionally connect the system pump shown as 'P2' to the terminals marked **R3 / 'System Pump'** located in the Mains Power and Pump connections junction box at the back of the MVB. Refer to [Fig 34](#). Use an external contactor if 3 phase pump is used or the pump current exceeds 8A.

NOTE: A Tank Aquastat (eg Pump C controller) can be used in lieu of the Indirect DHW Sensor (S5). See the Versa IC manual for additional details.

FIELD CONNECTED CONTROLLERS

It is strongly recommended that all individually-powered control modules and the heater should be supplied from the same power source.

WARNING: DO NOT CONNECT ANY SAFETY EXTRA LOW VOLTAGE (SELV) CIRCUIT(S) TO THIS WATER HEATER.

NOTE: Minimum 1mm, 105°C, stranded wire must be used for all extra low voltage external connections to the unit (less than 50 volts AC). Solid conductors should not be used because they can cause excessive tension on contact points. Install conduit as appropriate. All low voltage (120/240V) wires must be the same size as the ones on the unit or larger (105°C, stranded wire).

Check the Power Source

WARNING: Using a multi-meter, check the following voltages at the circuit breaker panel prior to connecting any equipment. Make sure proper polarity is followed and earth is proven.

Active to Earth = 216 VAC Minimum, 253 VAC MAX
Active to Neutral = 216 VAC Minimum, 253 VAC MAX
Neutral to Earth = <1 VAC Maximum

Making the Electrical Connections

Refer to [Fig. 35](#) on page 68.

1. Verify that circuit breaker is properly sized by referring to heater rating plate and pump current from [Table 19 and 20](#) on page 67. A dedicated circuit breaker should be provided.

NOTE: Current draw noted on rating plate does not include pump current.

2. Turn off all power to the heater. Verify that power has been turned off by testing with a multi-meter prior to working with any electrical connections or components.
3. Observe proper wire colours while making electrical connections. Many electronic controls are polarity sensitive. Components damaged by improper electrical installation are not covered by warranty.
4. Install heater controls, thermostats, or building management systems in accordance with the applicable manufacturers' instructions.
5. Conduit should not be used as the earth ground.

FIELD WIRING CONNECTION

CAUTION: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

Wiring the Enable/Disable

Remove the jumper wires and connect the Enable/Disable wires to terminals **11 and 12** marked 'Enable/Disable' shown in [Fig. 35](#) on page 68. Any dry contact closure, eg a remote thermostat, flue or mechanical air interlock across these terminals will enable the MVB unit to run. Caution should be used to ensure neither of the terminals becomes connected to earth.

CASCADE SYSTEM CONNECTIONS

Cascade Communication Bus

Up to four MVB water heaters can be connected in a cascade formation without any external controls.

Designate the primary water heater as the Master water heater / water heater 1 by leaving **dip switch 2** on the VERSA in the UP (ON) position. All other VERSA controls require **dip switch 2** to be toggled DOWN (OFF), designating them as Followers (Slaves). Refer to [Fig 44](#) on page 77.

For heater rotation to occur, the Master heater's VERSA control board **dip switch 6** must be set to the up (ON) position (default is down – OFF). Rotation is fixed at 48 hours difference between min run time and max run time i.e. at 48 hours difference, the lead heater becomes the heater with minimum run time once current CFH is satisfied.

Use standard 1mm wire to connect from the Master VERSA at terminals **A and B** marked 'PIM FT_Bus 2' etc, to each corresponding Follower at terminals **J3** marked 'FT_BUS' on the PIM™ by pressing down on the slots with a small screwdriver and then inserting the wires into the holes.

OBSERVE POLARITY between terminals A and B on the PIM and Versa. Refer to [Fig 44](#) and [Fig 45](#) on page 77. A total of 3 Followers can be connected to the VERSA on the Master.

It is recommended that the shortest length cable possible be used to reach between the water heaters. Do not run unprotected cables across the floor or where they will become wet or damaged. Do not run communication cables parallel with, or close to or against, low voltage (120/240 volt) wiring. The total maximum length of each set of communication bus cables should not exceed 60m.

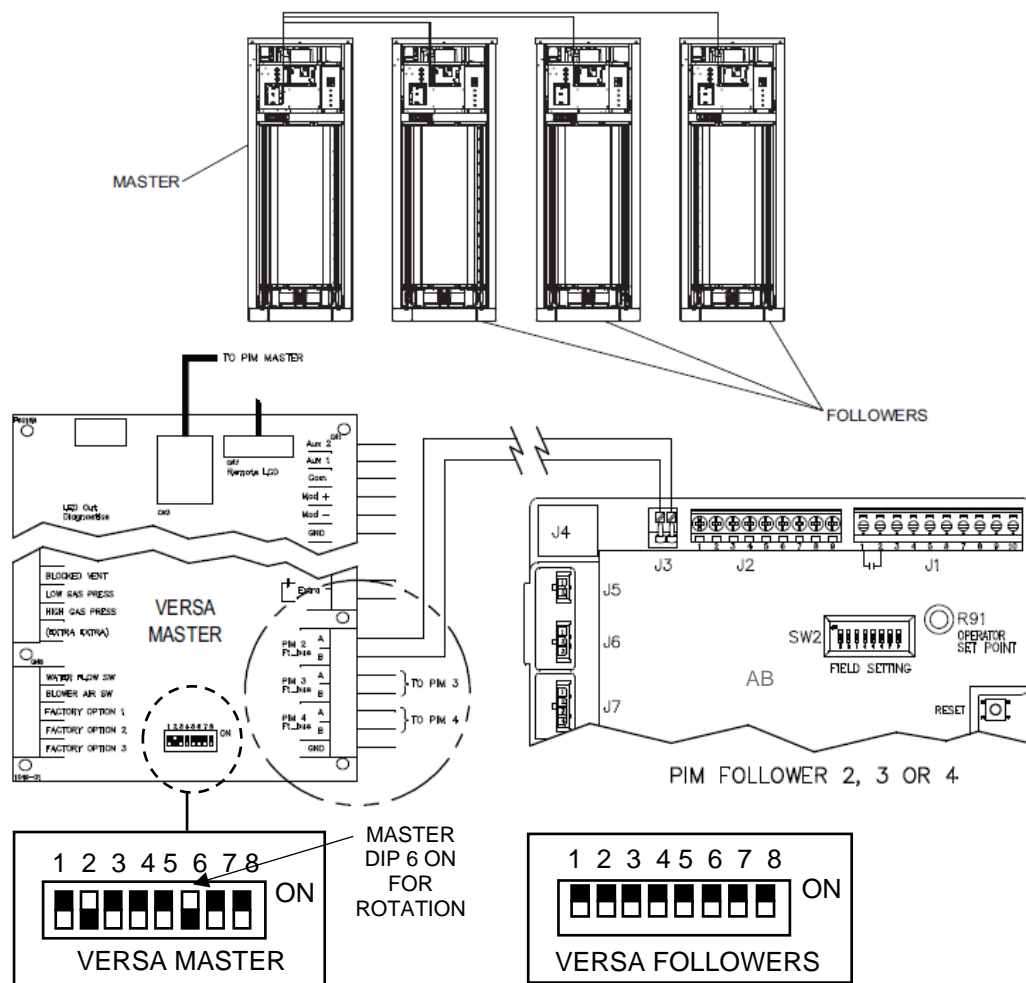


Fig 44: MVB Cascade System Wiring and VERSA DIP Switch Settings



Fig 45: PIM™ FT_BUS Wire Connection

Cascade Master/Follower Pump and Sensor Wiring

Follow sensor and pump connections for DHW or any of the 3 Modes in Hydronic applications as per the instructions shown in [Fig. 37 to 42](#) beginning on page 70 for the water heater designated as the MASTER and FOLLOWERS.

The System and DHW pump outputs and any sensor inputs are not used in the Cascade Follower configuration.

NOTE: where pump control is common across all heaters, eg IDHW, operation of the pump MUST be provided via a relay box (not supplied). Refer to diagrams in [Fig 27, 29 and 31](#) starting on page 57.

If used, connect the Enable/Disable wiring to terminals **11 and 12** marked '**Enable/Disable**' on the Master water heater (Refer to [Fig. 35](#) on page 68). This connection must be provided through dry contacts closure, which can come from a room thermostat or a remote relay. No power of any kind should be applied to either of these terminals.

ALARM CONNECTION

An alarm annunciator or light may be connected to the alarm contacts on the water heater at terminals **23 and 24** marked '**Alarm Dry Contacts**'. The Alarm Contacts are 3A rated dry contacts on a normally-open relay that close during fault or lockout conditions, and the maximum voltage across the contacts is 30 VAC or 30 VDC. Refer to [Fig. 35](#) on page 68.

In a cascade system, the alarm output of the Master water heater will be active if either the Master water heater or any of the Follower(s) have a lockout condition. The alarm output of the Follower water heaters will only energize if a lockout condition occurs on that specific water heater.

BMS COMMUNICATION

The MVB is equipped as standard with a communications port for connectivity to building automation via Modbus protocol. Refer to the VERSA IC manual for further information.

Other protocols such as Lonworks, Metasys and Bacnet may be used with the addition of interface cards. Refer to Rheem for further information.

LOCATION OF CONTROLS

WARNING: Installation, adjustment and service of heater controls, including timing of various operating functions, must be performed by Rheem Service. Failure to do so may result in control damage, heater malfunction, property damage, personal injury, or death.

WARNING: Turn off the power to the heater before installation, adjustment or service of any heater controls. Failure to do so may result in board damage, heater malfunction, property damage, personal injury, or death.

CAUTION: This appliance has provisions to be connected to more than one power supply source. To reduce the risk of electric shock, isolate all such sources before servicing.

Ignition Control Functions

When there is a call for heat, and all safeties are closed, then the combustion air blower starts to purge air from the combustion chamber. After the pre-purge, the igniter is energized. The ignition module will attempt to light only one time before lockout occurs. To reset the lock-out, press and release the **RESET** button located on the right of the control panel. **Turning off the power to the heater WILL NOT reset the ignition module.**

High Limit - PIM™

The PIM™ high limit utilizes a dual element sensor located in the outlet header (see [Fig. 47](#)). The set point is fixed depending on the type of heater supplied ('H' model or 'W' model). To reset a high limit lock-out, press and release the RESET button located on the right of the control panel.

High Limit— Adjustable Auto Reset

The adjustable auto reset high limit is located behind the touch screen swing out door on the left hand side and senses water in the outlet header. (see [Fig. 48](#)). The purpose of this high limit is to prevent undesirable conditions from affecting the water heater without causing nuisance tripping. Once conditions return to within specification, the high limit will automatically reset. Adjust the setting to approx. 10°C above desired outlet temperature.



Fig 47: High Limit (Manual Reset)

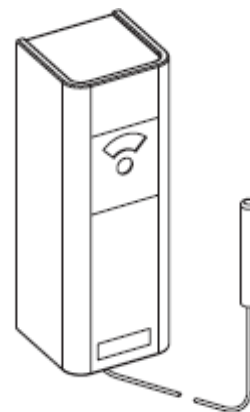


Fig. 48: Adjustable High Limit (Auto Reset)

Flow Switch

The flow switch is mounted in the outlet of the water header and is wired via a self-proving relay in accordance with AS 3814. It will prevent the heater from operating in the case of pump failure or low water flow. (see [Fig. 49](#))

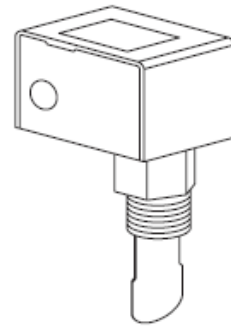


Fig 49: Flow Switch

Blocked Flue Switch

The blocked flue pressure switch (smaller of the two pressure switches) prevents the operation of the heater when too much of the flue is blocked. This switch is located on the right side of the heater near the right rear corner. (see [Fig. 50](#))

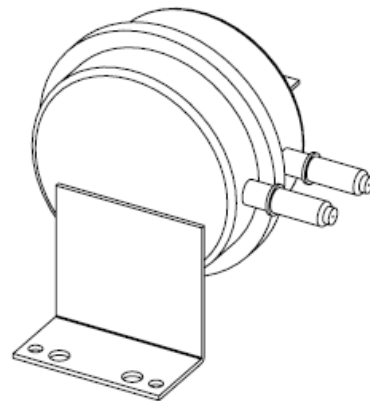


Fig. 50: Blocked Flue Switch

Air Pressure Switch

This heater is equipped with an air pressure switch (larger of the two pressure switches) to ensure the fan is operating before entering ignition mode in accordance with AS 3814. It operates during pre-purge, ignition sequences and all stages of normal burner operation. This switch is located on the right side of the heater near the right rear corner. (see [Fig. 51](#))

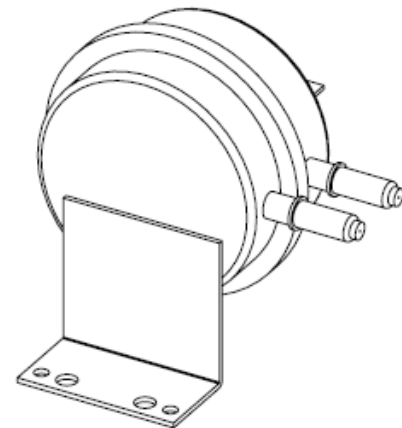


Fig. 51: Air Pressure Switch









USER INTERFACE AND ADJUSTMENTS

USER INTERFACE

The MVB features a touchscreen user interface as well as coloured LEDs to indicate water heater state.

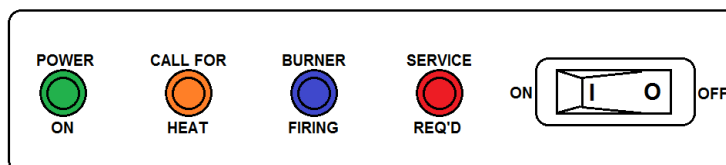
Touchscreen



-  MENU Button: Activates main menu screen (as depicted above).
-  VIEW Button: Used to view system and master/slave information.
-  ADJUST Button: Used to view or adjust operating and system parameters.
-  BOILER Button: Used to view master and slave operating information.
-  TOOLS Button: Used to perform miscellaneous functions e.g. user test, reset defaults.
-  DOCUMENT Button: Not currently used.
-  WIFI Button: Not currently used.
-  BACK Button: Tap to go back to the previously viewed screen.

Refer to 'Touchscreen Menu Overview' on page 85 for more information.

Indicating Light Panel



ON/OFF Switch: Turns on the 24 VAC control circuit power supply.

POWER ON LED (green): Illuminates when ON/OFF switch is ON and 24 VAC power is present.

CALL FOR HEAT LED (orange): Illuminates when a CFH is present.

BURNER FIRING LED (blue): Illuminates when the burner is firing.

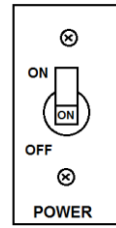
SERVICE REQ'D LED (red): Illuminates if a fault is detected

Power Circuit Breaker & Reset Button

The power circuit breaker and reset button are located behind the heater top front panel.

POWER Circuit Breaker: Turns ON the heater's internal 240 VAC power supply.

RESET Button: Non-illuminating red push button used to clear a lockout condition.



RESET



To Turn the Heater ON – Lighting Instructions

The following procedure assumes any external controlling devices are all in the ON position and that the 'POWER' circuit breaker located behind the heater upper front panel is also in the ON position.



If you smell gas do not attempt to turn ON the heater.

1. Switch ON the electrical supply at the electrical isolator located adjacent to the heater.
2. Turn ON the gas supply at the gas isolating valve located adjacent to the heater.
3. Switch the ON/OFF switch located on the indicating light panel to the ON position.
4. If not controlled by the heater, ensure system circulating pump P2 is operating.
5. Adjust the system setpoint to the desired water temperature setting (refer to ['Raising or Lowering the System Setpoint'](#) on page 83).
6. If an indirect DHW tank is also installed (H models operation mode 2 or 3 only), adjust the indirect DHW setpoint to the desired water temperature setting (refer to ['Raising or Lowering the Indirect DHW Setpoint'](#) on page 84).

The heater will automatically operate to heat the water to the desired setpoint temperature(s) provided there is correct water flow through the heater.

To Turn the Heater OFF

1. Switch the ON/OFF switch on the indicating light panel to the OFF position.
2. To isolate the power supply to the heater, switch OFF the heater's electrical supply at the electrical isolator located adjacent to the heater.
3. To isolate the gas supply to the heater, close the heater's gas isolating valve located adjacent to the heater.
4. To isolate the water supply to and from the heater, close the water isolating valves at the heater's water inlet and water outlet.

To Reset the Water Heater

If the water heater is in lockout, this could be an indicator of a dangerous situation. A lockout condition is indicated by the red 'Service Required' LED on the front of the water heater and also the red flashing LED on the PIM™ and the cause will be displayed on the touch screen interface. If this occurs, the ignition system can be reset as follows:

- Press and hold the reset button for approximately 1 second (the red LED light should extinguish).
- The water heater will attempt to re-light following the pre-purge operation.

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

Raising or Lowering the System Setpoint

- For W model heaters:
 - a) If *ADJUST > System Settings > System > Modbus Mode* parameter = OFF or Monitor, use this procedure to raise or lower the system setpoint.
 - b) If *ADJUST > System Settings > System > Modbus Mode* = Temp or Rate, the system setpoint can only be changed via the EMS or BMS system.
- For H model heaters:
 - a) If *ADJUST > Operation Settings > Target Mode* parameter = SETP, use this procedure to raise or lower the system setpoint.

Note: For H model heaters set to operation mode 3 in a DHW only application >71°C, the setpoint is changed via the Pump C Controller aquastat – refer to instructions supplied with the Pump C Controller.
 - b) If *ADJUST > Operation Settings > Target Mode* = EMS or MODB, the system setpoint can only be changed via the EMS or BMS system.
 - c) If *ADJUST > Operation Settings > Target Mode* parameter = RSET, the VERSA control board varies the system setpoint temperature based on the outdoor air temperature as detected by the optional outdoor air sensor S4.

To change the system setpoint if Modbus Mode parameter = OFF or Monitor (W model heaters), or if Target Mode parameter = SETP (H model heaters without an aquastat):

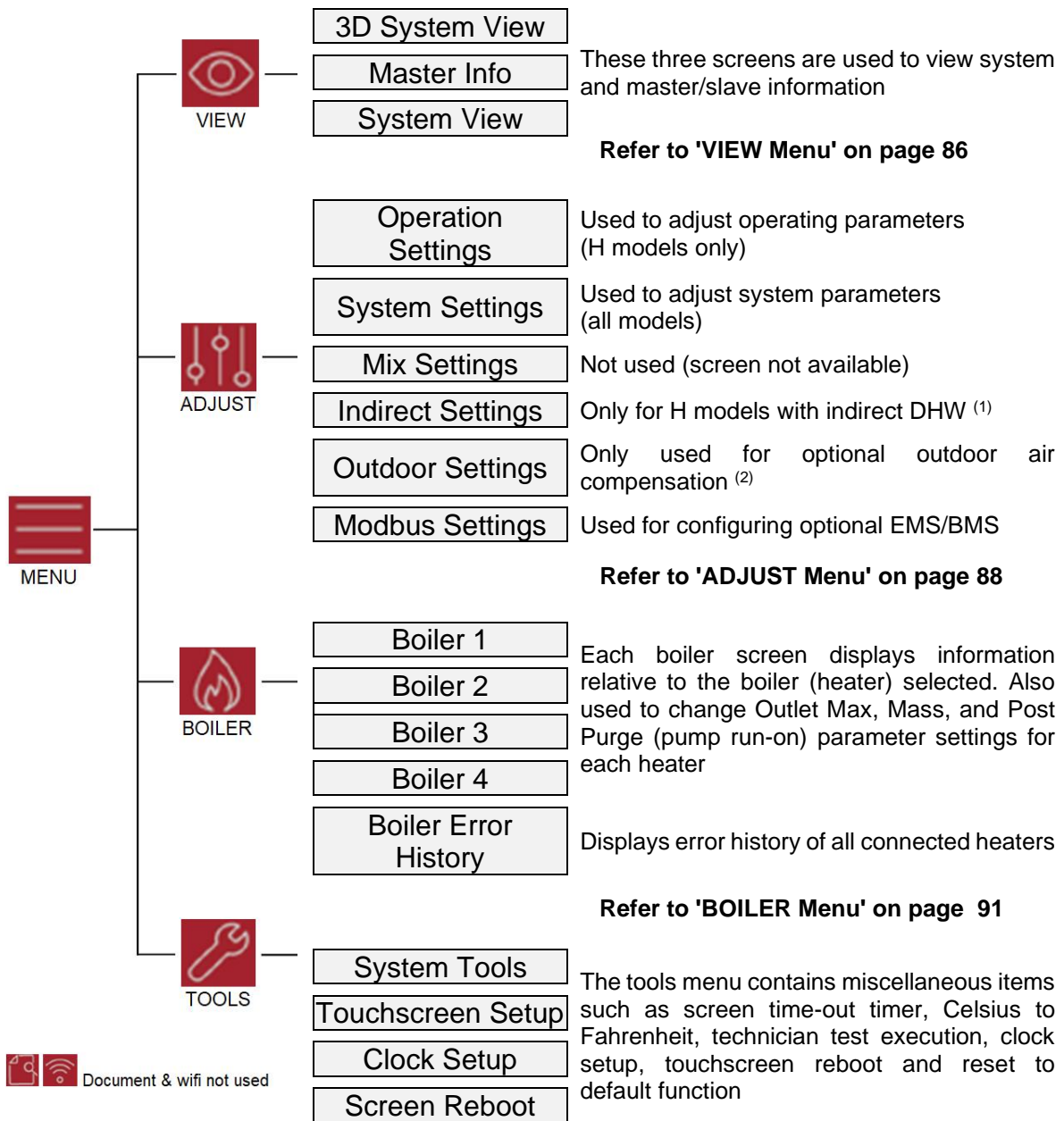
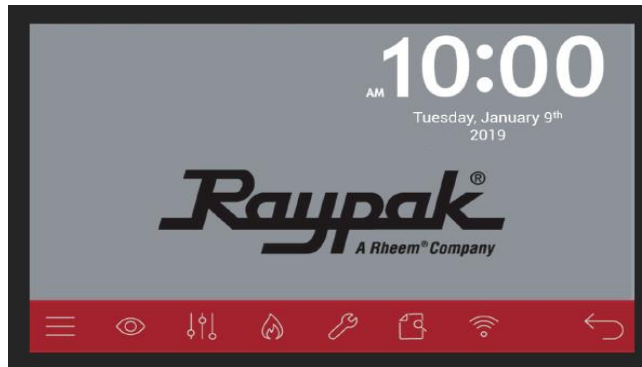
1. **Turn heater OFF and isolate power supply to heater by switching off electrical isolator located adjacent to heater.**
2. Remove front upper panel then remove six hex head screws retaining touchscreen surround panel and remove panel.
3. Switch VERSA DIP switch 1 to the ON (up) position.
4. Restore power supply and turn heater ON.
5. Reboot touchscreen *TOOLS > Screen Reboot > Screen Reboot*.
6. Tap the **MENU** button to enter the home screen.
7. Tap the **ADJUST** button to enter the adjust menu.
8. Tap the **System Settings** button to enter the system settings menu.
9. Tap the **System** button to enter the system screen.
10. Tap the Target Setpoint (Tank Setpoint for W models) up ▲ or down ▼ buttons to adjust the setpoint value to the desired temperature. The value will change and the green bar above the value will change to red.
11. Tap the Target Setpoint **SET** button. The red bar above the value will change to green at which time the new value is accepted.
12. **Turn heater OFF and isolate power supply to heater by switching off electrical isolator located adjacent to heater.**
13. Switch VERSA DIP switch 1 to the OFF (down) position.
14. Reassemble in reverse order of steps 2 ~ 1.
15. Reboot touchscreen *TOOLS > Screen Reboot > Screen Reboot*.

Raising or Lowering the Indirect DHW Setpoint

This procedure only applies to H models set to operation mode 2 or 3 in hydronic installations with indirect DHW without an aquastat in the indirect DHW storage tank. If an aquastat is installed, the indirect DHW setpoint is changed at the aquastat.

1. **Turn heater OFF and isolate power supply to heater by switching off electrical isolator located adjacent to heater.**
2. Remove front upper panel then remove six hex head screws retaining touchscreen surround panel and remove panel.
3. Switch VERSA DIP switch 1 to the ON (up) position.
4. Restore power supply and turn heater ON.
5. Reboot touchscreen *TOOLS > Screen Reboot > Screen Reboot.*
6. Tap the **MENU** button to enter the home screen.
7. Tap the **ADJUST** button to enter the adjust menu.
8. Tap the **Indirect Settings** button to enter the indirect settings screen.
9. Tap the Ind DHW Setpoint up ▲ or down ▼ buttons to adjust the setpoint value to the desired temperature. The value will change and the green bar beside the value will change to red.
10. Tap the Ind DHW Setpoint **SET** button. The red bar beside the value will change to green at which time the new value is accepted.
11. **Turn heater OFF and isolate power supply to heater by switching off electrical isolator located adjacent to heater.**
12. Switch VERSA DIP switch 1 to the OFF (down) position.
13. Reassemble in reverse order of steps 2 ~ 1.
14. Reboot touchscreen *TOOLS > Screen Reboot > Screen Reboot.*

Touchscreen Menu Overview



⁽¹⁾ Screen only available if *ADJUST > Operation Settings > Operation Mode* parameter is set to 2 or 3.

⁽²⁾ Screen only available if *ADJUST > Operation Settings > Target Mode* parameter = RSET (H models only).

VIEW Menu

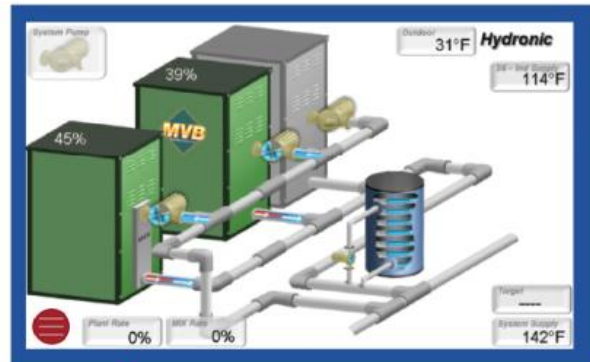


The VIEW menu is used to view system and master/slave information.

1. Tap the **MENU** button to enter the home screen.
2. Tap the **VIEW** button to enter the view menu.
 - Whilst in the view menu, tap the **3D System View** button to enter the 3D system view screen.
 - Whilst in the view menu, tap the **Master Info** button to enter the master info screen.
 - Whilst in the view menu, tap the **System View** button to enter the system view screen.



Home Screen



3D System View Screen



View Menu Screen

The 3D System View Screen depicts a graphic representation of how the pipe work arrangement should look, and gives a close representation of the installation, however the actual installation may differ from depiction.

The System View Screen focuses on data from a system perspective.

The Master Info Screen focuses on data from a local perspective.



System View Screen



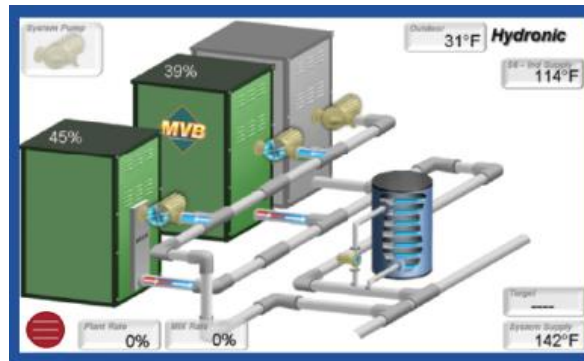
Master Info Screen

Refer to the following two pages for VIEW menu tables/items.

VIEW Menu Tables

1. VIEW > 3D System View

3D System View Screen (view only)



ITEM	DISPLAYS	NOTES
Plant Rate	% firing rate of installation	May differ from firing rate if > 1 heater is connected
Inlet Temp	S2 inlet water temp in °C	-
Outlet Temp	S1 outlet water temp in °C	-
Outdoor	tN4 or outdoor air sensor S4 temp in °C	Only avail Target Mode para = RSET
S6 – Ind Supply	Indirect flow line water temp in °C	Only avail if Operation Mode para = 3
DHW Supply	Domestic hot water tank S5 water temp in °C	Only avail if Operation Mode para = 2 or 3
Tank	Domestic hot water tank S3 water temp in °C	Only avail if heater is a W model
Target	Current target water temp ⁽²⁾	Displays ' _ ' if there is no target temperature
System Supply	Current S3 system supply water temp in °C	Only avail if heater is a H model

2. VIEW > Master Info

The master info screen displays the same information as the 3D system view screen plus the additional items listed in the following table.

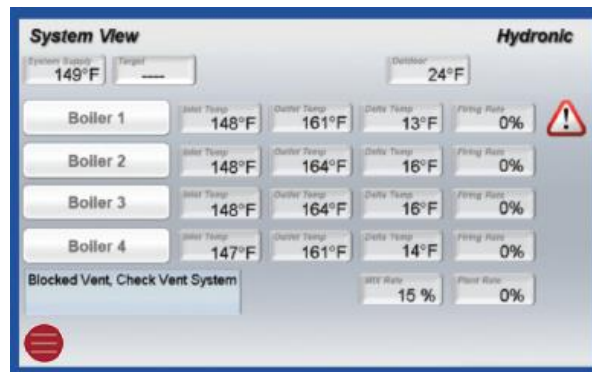
Master Info Screen (view only)



ITEM	DISPLAYS	NOTES
Delta Temp	Outlet water temp S1 minus inlet water temp S2 in °C	Temperature rise across the heat exchanger
Ignition Status	Idle (no CFH), Prepurge, IgnTry1 (trial for ignition), Burn (burner on), Postpurge, HardLock (hard lockout), SoftLock (soft lockout)	SoftLock = A soft lockout has occurred that interrupted the heating cycle. The CFH will resume after fault correction & expiry of 16 min
Firing Rate	% firing rate of burner	% modulation level determined by PIM
Outdoor Hi / Lo	Highest/Lowest recorded temp for sensor S4	Only avail Target Mode para = RSET
Inlet Hi / Lo	Highest/Lowest recorded temp for sensor S2	-
Outlet Hi / Lo	Highest/Lowest recorded temp for sensor S1	-
System Hi / Lo	Highest/Lowest recorded temp for sensor S3	-
Indirect Hi / Lo	Highest/Lowest recorded temp for sensor S5	Only avail if Operation Mode para = 2 or 3
Pump run times	System, boiler and DHW pump total run times	DHW pump for Operation Modes 2 and 3 only

3. VIEW > System View

System View Screen (view only)



ITEM	DISPLAYS	NOTES
Tank	Domestic hot water tank water temp in °C	Only avail if heater is a W type
System Supply	Current system supply water temp in °C	Only avail if heater is a H model
Target	Current target water temp ⁽²⁾	Displays '___' if there is no target temperature
S6 – Ind Supply	Indirect flow line water temp in °C	Only avail if Operation Mode para = 3
Outdoor	tN4 or outdoor air sensor S4 temp in °C	Only avail Target Mode para = RSET
DHW Supply	Domestic hot water tank water temp in °C	Only avail if Operation Mode para = 2 or 3
Plant Rate	% firing rate of installation	May differ from firing rate if > 1 heater is connected

The system view screen also displays the following information for each connected boiler (heater).

ITEM	DISPLAYS	NOTES
Inlet Temp	Inlet water temp in °C	-
Outlet Temp	Outlet water temp in °C	-
Delta Temp	Outlet water temp minus inlet water temp in °C	Temperature rise across the heat exchanger
Firing Rate	% firing rate of individual burner	% modulation level determined by PIM

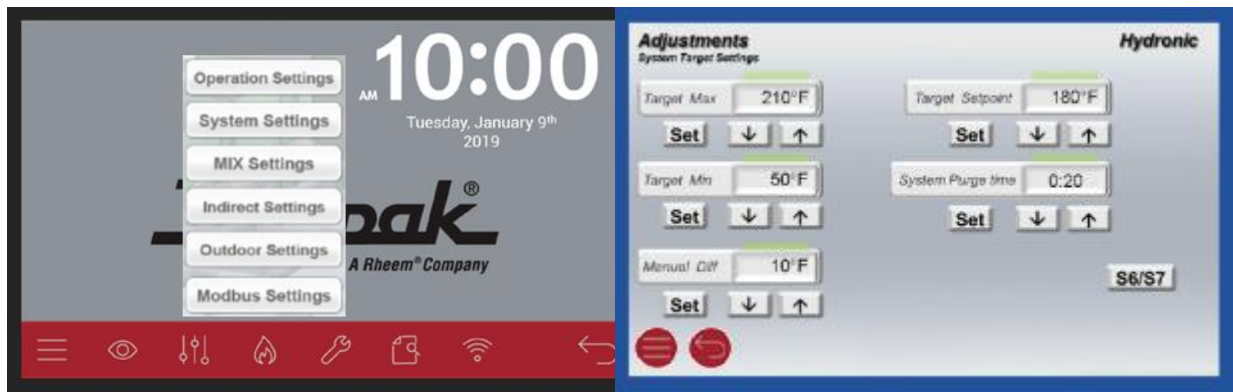
ADJUST Menu



The ADJUST menu has most of the adjustable parameters that determine heater and system operation (four others are found in Boiler 1 screen – Outlet Max, Mass, Post Purge and MOD min %). Each adjustable parameter has a small bar on top of or beside the parameters value; a green bar indicates a confirmed (saved) value, whilst a red bar means that the value displayed is different from the actual saved value.

Note: If changing a parameter value and the SET button is not tapped within 5 seconds, the value will revert to the previously saved value and the bar will change back to green.

- ADJUST menu parameters can only be adjusted/changed when VERSA control board DIP switch 1 is set to ON (up). **Always isolate power before changing DIP switch settings.**
- Some parameters may or may not be available depending on PIM and VERSA control board DIP switch settings.



Adjust Menu

System Settings Screen (Example)

Operation Settings	Used to adjust operating parameters (H models only)
System Settings	Used to adjust system parameters (all models)
MIX Settings	Not used (screen not available)
Indirect Settings	Only for H models with indirect DHW ⁽¹⁾
Outdoor Settings	Only for H Models using optional outdoor air compensation ⁽²⁾
Modbus Settings	Used for configuring optional EMS/BMS (all models)

⁽¹⁾ Screen only available if *ADJUST > Operation Settings > Operation Mode* parameter is set to 2 or 3.

⁽²⁾ Screen only available if *ADJUST > Operation Settings > Target Mode* parameter = RSET.

ADJUST menu parameter settings vary according to heater type, operation mode and installation requirements and are detailed in the '[Applications and Modes](#)' section on page 52 along with their relative mode plumbing diagrams as follows:

Heater Type/Operation Mode	Page
DHW ADJUST Menu Settings – W Models (65°C Max)	53
DHW ADJUST Menu Settings – H Models High Temp (82°C Max)	55
Mode 1 – ADJUST Menu Settings For Hydronic Systems without DHW	57
Mode 2 – ADJUST Menu Settings For Hydronic Systems with Indirect DHW on hydronic loop	60
Mode 3 – ADJUST Menu Settings For Hydronic Systems with Indirect DHW on heater loop	64

Refer to the following for ADJUST menu procedures.

Viewing ADJUST Menu Parameters

ADJUST menu parameters can only be adjusted/changed when VERSA control board DIP switch 1 is set to ON (up). If DIP switch 1 is set to OFF (down), ADJUST menu parameters can be viewed but cannot be adjusted/changed. DIP switch 1 OFF is the default setting.

This procedure details how to view ADJUST menu parameters only. To adjust ADJUST menu parameter settings, refer to 'Adjusting ADJUST Menu Parameters' on page 90.

1. Tap the **MENU** button to enter the home screen.
2. Tap the **ADJUST** button to enter the adjust menu.
3. Tap the relevant **Settings** button to enter its settings screen.
4. If the selected settings button has a secondary menu, tap the relevant button to enter the secondary settings screen. Skip this step if a secondary menu is not present.
5. Perform steps 1 ~ 4 for each settings screen.

Adjusting ADJUST Menu Parameters

ADJUST menu parameters can only be adjusted/changed when VERSA control board DIP switch 1 is set to ON (up). If DIP switch 1 is set to OFF (down), ADJUST menu parameters can be viewed but cannot be adjusted/changed. DIP switch 1 OFF is the default setting.

1. **Turn heater OFF and isolate power supply to heater by switching off electrical isolator located adjacent to heater.**
2. Remove front upper panel then remove six hex head screws retaining touchscreen surround panel and remove panel.
3. Switch VERSA DIP switch 1 to the ON (up) position.
4. Restore power supply and turn heater ON.
5. Reboot touchscreen *TOOLS > Screen Reboot > Screen Reboot*.
6. Tap the **MENU** button to enter the home screen.
7. Tap the **ADJUST** button to enter the adjust menu.
8. Tap the relevant **Settings** button to enter its settings screen.
9. If the selected settings button has a secondary menu, tap the relevant button to enter the secondary settings screen. Skip this step if a secondary menu is not present.
10. Tap the parameters up ▲ or down ▼ buttons (or ON/OFF button or selection button) to adjust the parameter. The value will change and the green bar above or beside the value will change to red (if green bar is present – not all parameters have green bar).
11. Tap the parameters **SET** button. The red bar above or beside the value will change to green and the new value is accepted. Skip this step if a SET button is not present.
12. Perform steps 10 and 11 for all parameters in the currently entered settings screen.
13. Perform steps 6 ~ 12 for each settings screen until all parameters have been set.
14. **Turn heater OFF and isolate power supply to heater by switching off electrical isolator located adjacent to heater.**
15. Switch VERSA DIP switch 1 to the OFF (down) position.
16. Reassemble in reverse order of steps 2 ~ 1.
17. Reboot touchscreen *TOOLS > Screen Reboot > Screen Reboot*.
18. Validate correct operation.

Operation Settings	Used to adjust operating parameters (H models only)
System Settings	Used to adjust system parameters (all models)
MIX Settings	Not used (screen not available)
Indirect Settings	Only for H models with indirect DHW ⁽¹⁾
Outdoor Settings	Only for H Models using optional outdoor air compensation ⁽²⁾
Modbus Settings	Used for configuring optional EMS/BMS (all models)

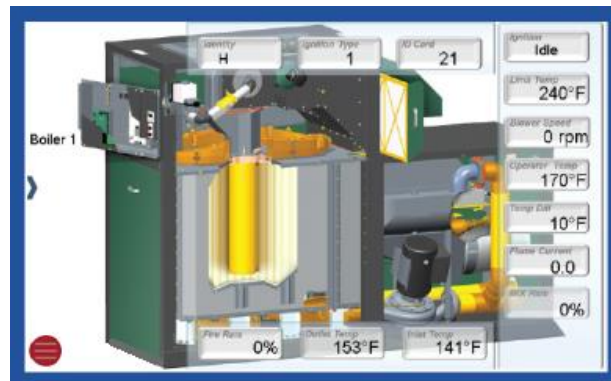
Refer to the following for BOILER Menu tables/items.

BOILER Menu Tables

The BOILER screen has two main pages which can be entered as follows:

1. **BOILER** > *Boiler X* (where 'X' is the heater number i.e. 1, 2, 3 or 4).

PAGE 1 – Expanded Boiler Screen (View only)



ITEM	DISPLAYS	NOTES
Identity	Water heater type i.e. H, WH	-
Ignition Type	Ignition type HSI	Hot surface ignition
ID Card	ID card identification number	-
Governor	PID	PID burner modulation control
Fire Rate	% firing rate of burner	Current PIM modulation level
Outlet Temp	Outlet water temp in °C	-
Inlet Temp	Outlet water temp in °C	-
Ignition	Idle (no CFH), Prepurge, IgnTry1 (trial for ignition), Burn (burner on), Postpurge, HardLock (hard lockout), SoftLock (soft lockout)	SoftLock = A soft lockout has occurred that interrupted the heating cycle. The CFH will resume after fault correction & expiry of 16 min
Limit Temp	Manual reset high limit fixed setting in °C	Non-adjustable – Set by ID card
Blower Speed	Blower speed in rpm	-
Operator Temp	PIM 'Operator Setpoint' dial setting in °C	-
Temp Diff	PIM hydronic fixed auto split differential in °C	Displays split value i.e. diff above and diff below setpoint e.g. for diff of 12 will display 6
Flame Current	Flame current in µA	-
EMS VDC	EMS input voltage in VDC	Only if an EMS/BMS system is connected

Whilst in expanded boiler screen (shown above), tap on arrow on left side of screen.

PAGE 2 – Boiler Controls Screen. Items can only be adjusted if VERSA control board DIP switch 1 is ON (up)



ITEM	DISPLAYS	NOTES
Boiler	ON/OFF	Enables/disables heater operation
Outlet Max	°C	Defines max outlet temperature offset above target setpoint
Mass	1 or 2	Sets thermal mass recovery (1 = Fast response 2 = Standard response)
Post Purge	AUTO (3 min), OFF, 0.20 ~ 10 min	Sets heater pump P1 run-on time period
System View	Tap to navigate to system view home page	-
3D System View	Tap to navigate to 3D system view home page	-
Extra	MOD min %	Set during commissioning DO NOT ALTER

2. BOILER > Boiler Error History

Boiler Error History Screen. Items can only be deleted if VERSA control board DIP switch 1 is ON (up)

Error Code	Boiler 1	Description
0	No Error	
0	No Error	
0	No Error	
0	No Error	
0	No Error	
0	No Error	
0	No Error	
0	No Error	
0	No Error	
0	No Error	
0	No Error	
0	No Error	
0	No Error	
0	No Error	
0	No Error	
0	No Error	

ITEM	DISPLAYS	NOTES
Error Code	Error code / Time / Month / Day	Listed in reverse chronological order i.e. most recent fault is on top of page
Boiler X Description	Error code description	Where X = heater 1, 2, 3 or 4
Del Button	Del	Tap to delete oldest occurring fault i.e. fault on bottom of list

TOOLS Menu



VERSA DIPsw: 01000000
PIM DIPsw: 10110010

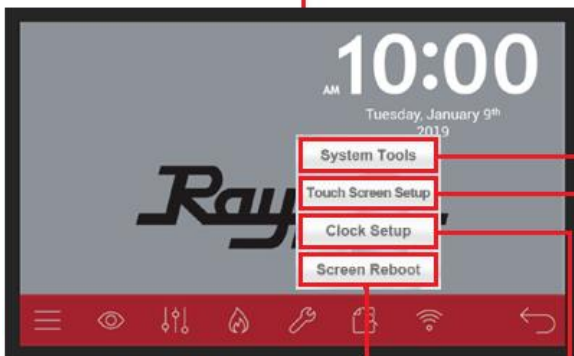
DIP Switches Pop-up Box



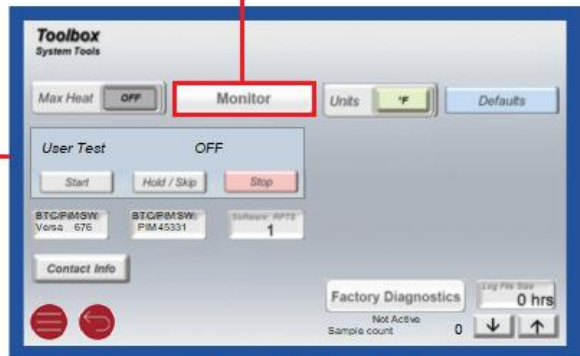
Home Screen



Monitor Screen



Tools Menu Screen

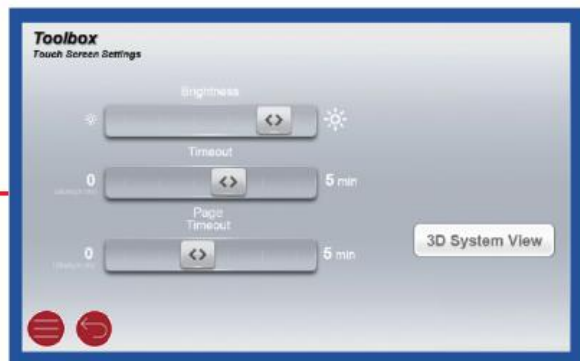


System Tools Screen

Press button again to confirm.
To cancel tap anywhere else on this screen.

Screen Reboot

Screen Reboot Pop-up Boxes



Touch Screen Setup Screen

The TOOLS menu contains miscellaneous items such as screen time-out timer, Celsius to Fahrenheit, technician test execution, clock setup, touchscreen reboot and reset to default function (*Defaults* button).

PIM and VERSA control board DIP switch settings can also be viewed without having to remove heater panels/covers (0 = ON, 1 = OFF).

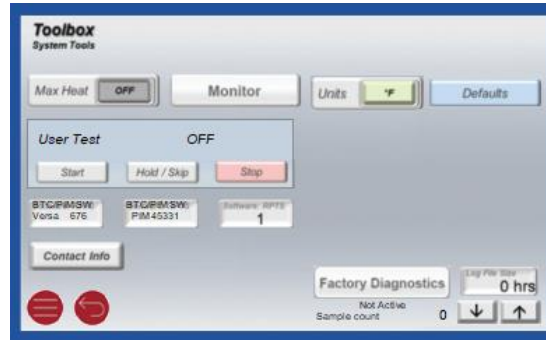


Clock Setup Screen

TOOLS Menu Tables

1. *TOOLS > System Tools*

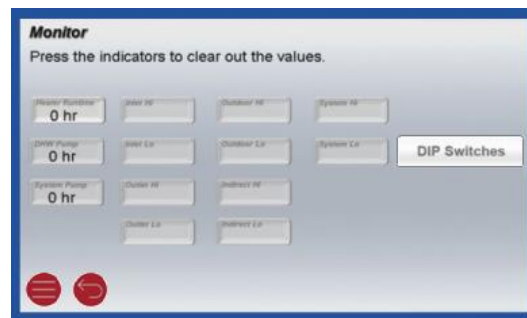
PAGE 1 – System Tools Screen. Items can only be altered if VERSA control board DIP switch 1 is ON (up)



ITEM	DISPLAYS	NOTES
Max Heat	OFF/ON	Sets target temp to Target Max para value whenever any CFH is present. In addition, DHW priority and WWSD are disabled. Setting times out after 24 hours or if user set to OFF
Monitor	Tap to enter hi/lo recorded temp values screen	Refer to step 2 below for Monitor screen
Units	Used to change temp units	Set to °C or °F
Defaults	Used to load factory defaults	Refer to Rheem for resetting all parameter settings to default factory settings
User Test	Used to perform a user (technician) test	Refer to Rheem for 'User Test Mode'
BTC/PIM SW	Versa & PIM Software information	-
Software RPTS	Software information	-
Contact Info	Used to enter contact details	Tap then use keyboard to type contact details after entering password RAYPAKREP
Factory Diagnostics	Tap to enable performance files to be recorded to SD card located on rear top left corner of touchscreen	
Log File Size	Used to adjust 'Factory Diagnostics' log file size	

Whilst in system tools screen (shown above), tap on Monitor button.

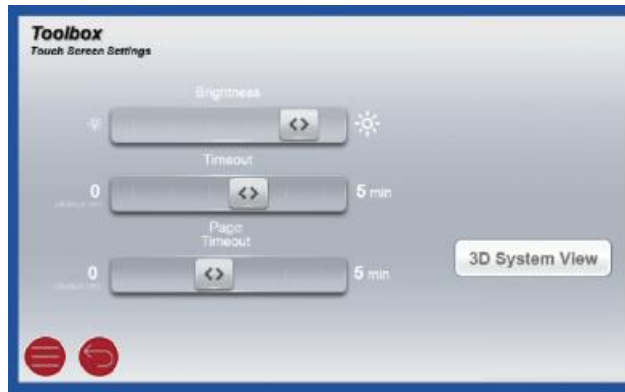
PAGE 2 – Monitor Screen. Items can only be adjusted/used if VERSA control board DIP switch 1 is ON (up)



ITEM	DISPLAYS	NOTES
Heater Runtime	Heater runtime in hours	Tap value to reset (clear) value
DHW Pump	DHW pump P3 runtime in hours	
System Pump	System Pump P2 runtime in hours	
Inlet Hi / Lo	Highest/Lowest recorded temp for sensor S2	
Outlet Hi / Lo	Highest/Lowest recorded temp for sensor S1	
Outdoor Hi / Lo	Highest/Lowest recorded temp for sensor S4	
Indirect Hi / Lo	Highest/Lowest recorded temp for sensor S5	
System Hi / Lo	Highest/Lowest recorded temp for sensor S3	
DIP Switches	VERSA control board & PIM DIP switch settings	Tap to view positions: 0 = OFF, 1 = ON

2. TOOLS > Touch Screen Setup

Touch Screen Setup Screen. Items can only be adjusted/used if VERSA control board DIP switch 1 is ON (up)



ITEM	DISPLAYS	NOTES
Brightness	Adjusts screen brightness	Tap and move slide bar to desired setting
Timeout	Adjusts screen timeout i.e. time till blank screen from last button press	Tap and move slide bar to desired setting
Page Timeout	Adjusts page timeout	Tap and move slide bar to desired setting
3D System View	Tap to navigate to 3D system view home page	-

4. TOOLS > Clock Setup

Clock Setup Screen. Items can only be adjusted/used if VERSA control board DIP switch 1 is ON (up)



ITEM	FUNCTION	NOTES
→	Moves flashing adjustment (item) location	Tap to change flashing item location
-	Decreases flashing item	Tap to decrease flashing item
+	Increases flashing item	Tap to increase flashing item
Save	Saves all items displayed	Tap to save all items displayed
Cancel	Cancels all items changes prior to saving	Tap to cancel all items entered prior to saving

Freeze Protection

To enable freeze protection, dip switch position 7 (on the PIM™) must be turned on (UP position). This is the default position.

If the water temperature drops below 7 °C on the Outlet or Inlet sensors, the water heater pump is enabled. The pump is turned off when both the Inlet and Outlet temperatures rise above 10 °C

If either the Outlet or Inlet temperature drops below 3 °C, the VERSA starts the burner at the minimum firing rate. The burner cycle will terminate when both the Inlet and Outlet temperatures rise above 6 °C.

Outdoor Reset Concept

The Temperature controller can change the System Set Point based on outdoor temperature (Outdoor Reset). The temperature controller varies the temperature of the circulating heating water in response to changes in the outdoor temperature. The heating water temperature is controlled through the modulation and/or sequencing of the cascade.

The Temperature controller can also control the System Circulating Pump with an adjustable Outdoor Cut-off. When the outdoor temperature is above the Outdoor Cut-off, the pump is turned off and no heating water is circulated through the system. When the outdoor temperature drops below the Outdoor Cut-off, the system pump relay is activated and the heating water circulates through the system. The temperature of the heating water is controlled by the Reset Ratio, Water Offset, and changes with the outdoor temperature.

Reset Ratio/Outdoor Reset

When a building is being heated, heat escapes through the walls, doors, and windows to the colder outside air. The colder the outside temperature, the more heat escapes. If heat can be input into the building at the same rate that it is lost out of the building, then the building temperatures will remain constant. The Reset Ratio is an adjustment that lets you achieve this equilibrium between heat input and heat loss.

The starting point for most systems is the 1.00 (OD):1.00 (SYS) (Outdoor Temperature: Heating Water Temperature) ratio. This means that for every degree the outdoor temperature drops, the temperature of the heating water will increase one degree. With the VERSA, both ends of the slope are adjustable. It is factory set at 21°C water temperature (Boil START), at 21°C outdoor air (OUT START), and 82°C water temperature (Boil DESIGN) at -12°C outdoor air (OUT DESIGN).

Each building has different heat loss characteristics. A very well insulated building will not lose much heat to the outside air, and may need a Reset Ratio of 2.00 (OD):1.00 (SYS) (Outdoor: Water). This means the outdoor temperature would have to drop 2 degrees to increase the water temperature 1 degree. On the other hand, a poorly insulated building may need a Reset Ratio of 1.00 (OD):2.00 (SYS). This means that for each degree the outdoor temperature dropped the water temperature will increase 2 degrees. The VERSA control Reset Ratio allows for full customization to match any buildings heat loss characteristics.

A heating curve that relies not only on Outdoor temperature but also on the type of radiation will improve heat comfort. The user can fine tune these adjustments based on the specific building need.

Reset Ratio

The control uses the four following settings to determine the reset ratio:

Water Heater Start (Boil START)

The Boil START temperature is the theoretical water heater supply water temperature that the heating system requires when the outdoor air temperature equals the OUT START temperature setting. The Boil START is typically set to the desired building temperature.

Outdoor Start (OUT START)

The OUT START temperature is the outdoor air temperature at which the control provides the Boil START water temperature to the system. The OUT START is typically set to the desired building temperature.

Outdoor Design (OUT DESIGN)

The OUT DESIGN is the outdoor air temperature that is the typical coldest annual temperature where the building is located. This temperature is used when completing heat loss calculations for the building.

Water Heater Design (Boil DESIGN)

The Boil DESIGN temperature is the water temperature required to heat the water heater zones when the outdoor air is as cold as the OUT DESIGN temperature.

Warm Weather Shut Down (WWSD)

When the outdoor air temperature rises above the WWSD setting, the control turns on the WWSD segment in the display. When the control is in Warm Weather Shut Down, the Dem 1 segment is displayed if there is a heat demand. However, the control does not operate the water heater to satisfy this demand. The control continues to respond to DHW demands (if in Mode 2 or 3 - indirect DHW)

Reset Ratio

The controller uses the following four settings to calculate the Reset Ratio (RR):

$$\text{RESET RATIO} = \frac{(\text{OUTDOOR START} - \text{OUTDOOR DESIGN})}{(\text{BOILER DESIGN} - \text{BOILER START})}$$

For example, when using the default values, the RR is:

$$\text{RR} = (21 - (-12)) / (82 - 21) = 0.55$$

Therefore, the RR is 0.55:1 (Outdoor: Water).

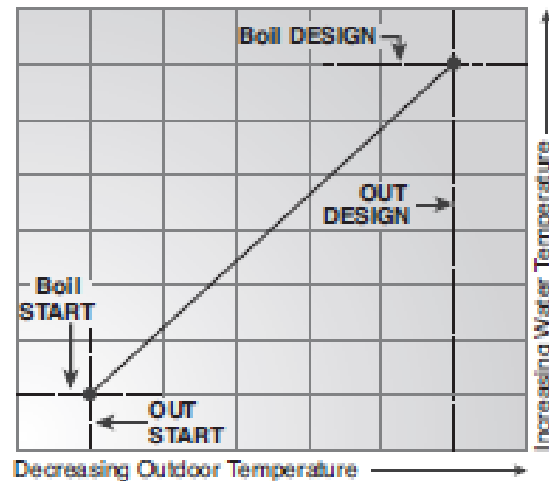


Fig X: Reset Ratio

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 - Lighting Instructions

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 99)

1. Open the gas isolation valve fully at the inlet to the water heater.
2. 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.

3. Before operation, make sure you have read all of the safety information in this manual.
4. Remove upper front panel.
5. Set the thermostat to the lowest setting.
6. Turn off all electrical power to the appliance.
7. This appliance is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
8. Turn on main manual gas valve field installed near gas inlet connection on back of heater.

9. Wait 5 minutes to clear out any gas. Then smell for gas, especially near the floor. If you then smell gas, STOP! Follow the steps in the safety information on the front cover of this manual. If you do not smell gas, go to next step.
10. Turn on all electrical power to the appliance.
11. Set thermostat to desired setting. The appliance will operate. The igniter will glow after the pre-purge time delay (15 seconds). After igniter reaches temperature (30 seconds) the main valve should open. System will try for ignition one time. If flame is not sensed, lockout will commence.
12. If the appliance will not operate, follow the instructions "To Turn Off Gas To Appliance" on page **100**, and call your service technician or gas supplier.
13. Replace upper front panel.
14. If heater fails to start, verify the following:
 - a. There are no loose connections or that the service switch is off.
 - b. Auto reset high limit is not tripped.
 - c. Enable/Disable circuit is closed.
 - d. Gas is on at the meter and the heater.
 - e. Incoming dynamic gas pressure to the gas valve is NOT less than that required per Table 14.

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 TURN OFF GAS TO APPLIANCE

1. Shut off manual gas valve field installed near gas inlet connection on back of heater.
2. Remove upper front panel.
3. Adjust set point to lowest setting.
4. Turn off all electrical power to the appliance if service is to be performed.
5. Replace access panel.

COMMISSIONING

COMMISSIONING THE WATER HEATER

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

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.

The MVB **MUST** be commissioned by Rheem Service only. Contact Rheem Service on 131 031 to arrange for commissioning.

However, it is recommended the following actions be undertaken prior to commissioning to avoid additional charges if commissioning cannot take place because the system is not ready.

Pre Start-up

TO FILL THE WATER HEATER

Mechanical/Process Heating Applications

A 60 PSI (415 kPa) pressure relief valve is fitted to 'H' model water heaters.

- If a header tank is fitted, ensure it is filled with water.
- Open the isolation valve on the inlet and outlet of the water heater.
- Bleed air from the system at all high points to ensure that the entire system is filled with water.
- Manually open air vent on the expansion tank until water appears, then close vent.
- Check the pipe work for leaks at operating pressure.

Water Heating Applications

A 150 PSI (1000 kPa) pressure relief valve is fitted to 'W' model water heaters and is required to be fitted to 'H' models used in high temperature DHW applications. The storage tank may be fitted with a temperature and pressure relief valve equal to, or lower than, this valve pressure. An expansion control valve may also have been installed. The maximum supply pressure should be 20% below the lowest relief valve pressure setting in the system.

Fill system with water. Purge all air from system before heater operation by opening all water discharge outlets throughout the building.

- 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) and the water heater.
- 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 at operating pressure.

CAUTION: An air vent valve should be installed at the highest point in the system for proper operation. If water piping is located higher than the water heater header, an air vent valve should be located at the highest point in the installed system.

Flue System Inspection

Check all flue pipe connections, flue pipe material, clearances and flue terminations are installed per these instructions, AS/NZS 5601.1 and are clear of all debris or blockage.

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. Refer to the rating plate on the back of the heater.
3. Ensure the correct water heater has been installed. Models ending with suffix 'H' are suitable for low pressure mechanical heating or process heating applications, including applications with an indirect DHW application. 'H' models may also be used for DHW applications above 71°C. Models ending with suffix 'W' are suitable for DHW applications up to 71°C.
4. Ensure the correct pressure relief valve has been supplied. 60 PSI (415 kPa) pressure relief valve is suitable for low pressure mechanical heating or process heating applications only on 'H' model water heaters. 150 PSI (1000 kPa) pressure relief valve is suitable for mains pressure DHW application on 'W' model water heaters and 'H' models being used in high temperature DHW applications.
5. Ensure correct water supply pressure (refer to ["Connections-Plumbing"](#) on page 26).
6. Ensure the correct power supply is available and the water heater and circulation pump are correctly wired (refer to ["Connections - Electrical"](#) on page 66).
7. Ensure the pump/s are installed in the correct orientation, the flow direction is correct and, for three phase pumps, the phase rotation is correct. Ensure the correct speed setting has been selected. Refer to ["Checking or Adjusting Pump Speed Setting – Magna 1"](#) on page 31.
8. Ensure the position of the water heater complies with the installation requirements of this manual, AS/NZS 5601.1 and local authority requirements.
9. Ensure the ventilation to the plant room complies with the requirements of this manual, AS/NZS 5601.1 and local authority regulations. Mechanical ventilation, if provided, must be interlocked with the water heater as required by AS/NZS 5601.1.
10. Ensure the flue complies with the installation requirements of this manual, AS/NZS 561.1 and local authority requirement.
11. Ensure adequate clearance has been left for servicing the water heater (refer to ["Clearances"](#) on page 22).
12. 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.
13. Ensure swimming pool chemicals, household cleaners, etc., are not stored near the water heater.
14. 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.
15. Ensure the combustion air openings are not obstructed.
16. Ensure the system is filled with water and any air has been expelled.
17. Purge all air from gas supply piping.
18. Test ALL gas connections for leaks using soapy water. **DO NOT USE A NAKED FLAME.**

19.Ensure supply gas pressure is correct. Refer to [Table 14](#) on page 29.

20.BEFORE OPERATING, smell all around the appliance area for gas. Be sure to smell near the floor because some gases are heavier than air and will settle on the floor.

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.
- IF YOU CANNOT REACH YOUR GAS SUPPLIER, CALL 000.
- USE ONLY YOUR HAND TO TURN THE GAS CONTROL VALVE HANDLE. NEVER USE TOOLS. IF THE HANDLE WILL NOT TURN BY HAND, DO NOT TRY TO REPAIR IT; CALL A QUALIFIED SERVICE TECHNICIAN. FORCED OR ATTEMPTED REPAIR MAY RESULT IN A FIRE OR EXPLOSION.
- DO NOT USE THIS APPLIANCE IF ANY PART HAS BEEN UNDER WATER, IMMEDIATELY CALL A QUALIFIED SERVICE TECHNICIAN TO INSPECT THE APPLIANCE AND TO REPLACE ANY PART OF THE CONTROL SYSTEM AND ANY GAS CONTROL WHICH HAS BEEN UNDER WATER.
- CHECK AROUND UNIT FOR DEBRIS AND REMOVE COMBUSTIBLE PRODUCTS, I.E. PETROL, ETC.

21.If the installation is for a closed loop water source heat pump, perform the [“Closed Loop Water Source Heat Pump Commissioning Procedure”](#) on page 103.

22.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 Fig 52for 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 after the water heater has been running for some time 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.

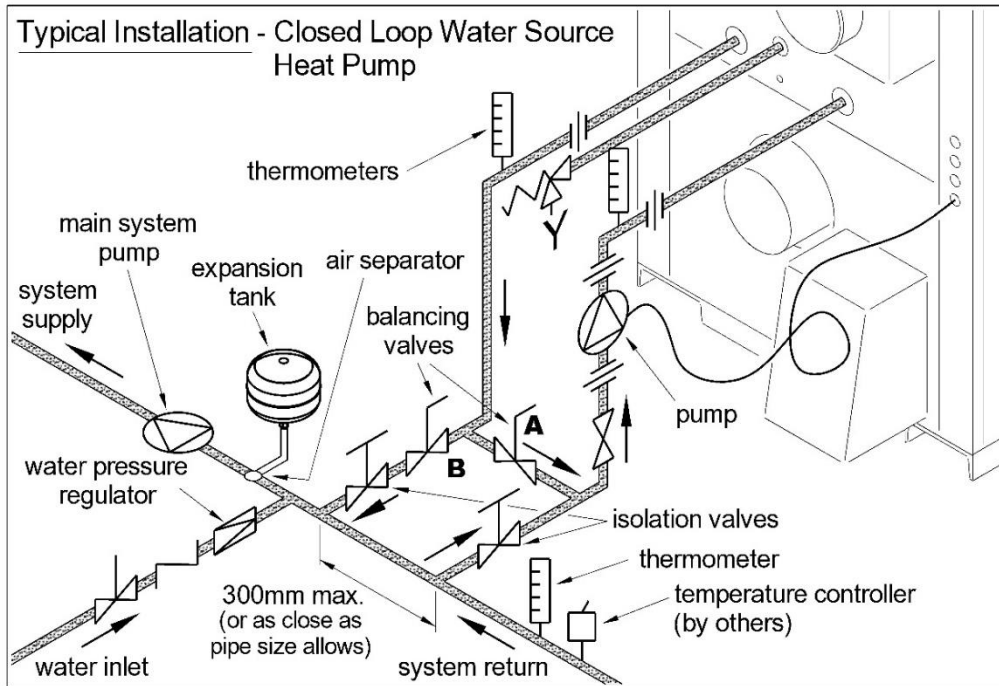


Fig 52: Closed Loop Water Sourced Heat Pump

SERVICE PROCEDURES

ONLY AN AUTHORISED PERSON MAY REPAIR OR SERVICE A GAS APPLIANCE

Regular servicing must be performed to ensure maximum operating efficiency.

The daily and monthly maintenance as outlined below may be performed by onsite maintenance staff however all other servicing **MUST** be performed by a suitably qualified tradesperson.

Daily

1. Check that the area where the heater is installed is free from combustible materials, chemicals and flammable vapours and liquids.
2. Check for and remove any obstruction to the flow of combustion or ventilation air to heater.

Monthly

1. Check for presence of water leaks around pumps, relief valves, and other fittings. If any leaks are detected, arrange for immediate repair.
2. Visually inspect burner flame through burner viewing window. It should be light blue at full input.
3. Visually inspect flue system for proper function, deterioration or leakage.
4. Visually inspect for proper operation of the condensate drain in the flueing. If leaks are observed, arrange for immediate repair.
5. Check air vents for leakage.

The following **MUST** be carried out by a suitable qualified tradesperson

For peak performance it is suggested that the heater be serviced 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 only once a year, conduct both the 'Six Monthly Service Procedure' and the 'Annual Service Procedure'. If servicing is performed at six monthly intervals, rotate between the 'Annual Service Procedure' and 'Six Monthly Service Procedure'.

Six Monthly Service

1. Clean the cabinet of any dust, lint and debris.
2. Ensure plants, shrubs or any other material are not obstructing the flue terminal or air intake / duct (if an air intake duct installed) and check flue system and air intake / duct system to ensure they are functional and not leaking.
3. Inspect flue system condensate drain(s) to ensure it is not blocked and that condensate is being directed to the appropriate area or drain.
4. Check for signs of excessive corrosion on the outside and inside of the heater.
5. Check for signs of leaking at pipe fittings and in/out header and header components.
6. Operate the pressure relief valve (PRV) manually to check that the drain is clear and the valve reseals.
7. Check gas train for missing test point screws or damaged gaskets, and check air pressure hoses to ensure they are correctly connected without kinks and that the test point cap is fitted.
8. Check the inlet gas pressure.
9. Check blower vacuum pressure and replace air filter if necessary (refer to ["Air Intake Filter Replacement"](#) on page 106).
10. Check the manifold gas pressure.
11. Check to ensure the burner flame burns with a small light blue flame (at full fire) by looking through the burner viewing window located on the bottom front of the heater (remove round black plug). Remove and clean the burner if there is a tendency for yellowing of the flame (Propane and ULPG models may exhibit a slightly yellow flame). The presence of soot accumulation indicates an abnormal operating condition.
12. With the burner operating, close gas isolation valve and test operation of heater with no gas flow to confirm its operation up to lockout stage. **Note:** When the gas is isolated, the burner should

- immediately extinguish and the heater should hard lockout at which time the PIM burner control should provide 3 flash indication and the touchscreen should provide 'Ignition Error' fault indication.
13. Open the gas isolation valve then press and release the heater's red 'RESET' button. The heater should relight after the pre-purge period.
 14. Test operation of the auto reset high limit switch as follows:
 - a) With the burner operating, disconnect one wire from the auto reset high limit switch (spade terminals are provided externally of and adjacent to the high limit switch); the burner must extinguish and the touchscreen should provide 'Auto High Limit, Auto Limit Error' fault indication.
 - b) Reconnect the wire then press and release the heater's red 'RESET' button. The heater should relight after the pre-purge period.
 15. Check operation of the blocked flue pressure switch as follows:
 - a) Disconnect one wire from the rear of the blocked flue pressure switch; the burner must extinguish and the touchscreen should provide 'Blocked Vent' fault indication.
 - b) Reconnect the wire then press and release the heater's red 'RESET' button. The heater should relight after the pre-purge period.
 16. Conduct a combustion analysis test.
 17. Warn customer of the danger of storing chemicals and/or using flammable materials or aerosol spray packs near the heater. Aerosols and harsh chemicals can also cause premature failure of heater components.

Annual Service

1. Conduct the Six Monthly Service Procedure detailed above PLUS;
2. Remove and check hot surface igniter. Check for cracks or damage, check resistance (refer to Service Manual TM080) and replace if necessary.
3. Remove and clean flame sensor. Check for cracks or damage and replace if necessary.
4. Remove and clean burner using compressed air (refer to component replacement procedure 41 in Service Manual TM080).

Five Year Service

1. Conduct the Annual Service Procedure detailed above PLUS;
2. Replace Temperature & Pressure relief valve.



DO NOT return the heater to service if any test procedure fails, if any test/check result is outside specifications indicated or if an unsafe condition exists.

Air Intake Filter Replacement

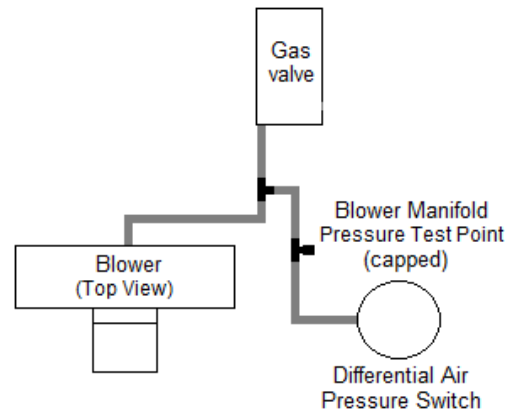
A dirty or blocked air intake filter will cause a decrease in blower vacuum pressure. The blower vacuum pressure is measured at the blower manifold pressure test point and should be:

- 1.02 kPa ± 0.05 kPa for NG models and
- 1.07 kPa ± 0.05 kPa for P models.

A lower vacuum pressure reading can indicate a blocked air filter which must be checked and replaced if blocked

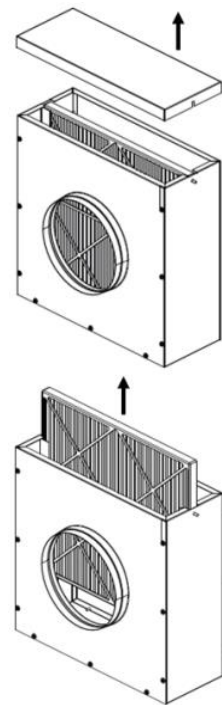
Perform the following procedure to check the blower vacuum pressure:

1. **Turn heater off and wait for blower to stop operating.**
2. Remove screw retaining right side upper access panel, push panel up, pull bottom of panel away from heater to disengage bottom retaining arms and lift panel out from heater.
3. Remove black cap from blower manifold pressure test point and attach manometer hose to test point.
4. Turn heater on **and ensure blower speed is 100% (full fire).**
5. Take manometer reading.
6. **Turn heater off and wait for blower to stop operating.**
7. Remove manometer hose and replace black cap on test point.
8. Replace side panel.



Perform the following procedure to replace the air filter:

1. **Turn heater off and wait for blower to stop operating.**
2. Remove two hex head screws retaining air filter box cover and remove cover.
3. Slide air filter out of air filter box.
4. Use a vacuum cleaner to remove any dust or foreign matter from inside air filter box.
5. Reassemble in reverse order of above using replacement air filter.



Note: The air filter must be replaced. Do not attempt to clean and reuse the air filter.

NOTE: Use Rheem replacement filters:

- 012553F (300mm X 300mm) for models 910500, 910750 and 911000
- 012552F (400mm X400mm) for models 911250, 911500, 911750 and 912000
- Inspect 6 monthly
- Replace when tracking pressure exceeds the following, at 100% fan speed:

Models	Tracking Pressure (kPa)
910500, 910750, 911250, 911500	-0.125
911000, 911750, 912000	-0.175

Table 20: MVB Filter Replacement Tracking Pressure

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