



Installation and Operating Instructions

Raypak Commercial Water Heaters

Part 1: Safety warning

Part 2: Models 507 NCO, 538 to 4224 NCO, NCM

Part 3: Warranty

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Section 1. Installation Instructions

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Date of Installation: _____ // _____ // _____

Model No. _____

Serial No. _____

Installed by: _____

Purchased from: _____

This Installation and Operating Instructions Manual is provided with the necessary information for the proper installation, operation and maintenance of your Raypak Heater. Please review and follow these procedures carefully. Keep this manual in a safe and accessible place for easy reference in the future.

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

WARNING

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 service agency.

WHAT TO DO IF YOU SMELL GAS?

DO NOT try to light any gas appliance

DO NOT touch any electrical switch.

Turn off the gas supply at the gas meter

Immediately, call your gas supplier or licensed gasfitter.

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

CAUTION

DO NOT Operate this appliance before reading this instruction booklet.

DO NOT Place articles on or against appliance.

DO NOT Store chemicals or flammable materials in the same room as this appliance.

DO NOT Store chemicals or flammable materials, on, or spray aerosols near this appliance.

DO NOT Operate with panels, covers or guards removed from appliance.

DO NOT Enclose this appliance (applies to external models only).

DANGER

Water temperatures above 45 Degrees Celsius can cause severe burns.

Children, disabled and elderly persons are at the highest risk of being scalded.

Feel water before bathing or showering and supervise where necessary.

Keep this manual in a safe and accessible place for easy reference in the future.

This Installation and Operating Instructions Manual is provided with the necessary information for the proper installation, operation and maintenance of your Raypak Heater.

Please review and follow these procedures carefully.

Model No. Serial No. Installation Date

Part No. 209130.5: Effective 08/01/2001 (Replaces: 01/10/2000)



CAUTION!

Ceramic Firetile Refractory is used in Raypak Heaters

Possible risks of irreversible effects

Harmful by inhalation

May be irritating to the skin, eyes and respiratory system.

WHEN HANDLING

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

AFTER HANDLING

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

FIRST FIRING OF HEATER

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

REMOVAL OF USED PRODUCT

- Wear an approved mask. Over-exposure to dust formed after service may cause respiratory disease since cristobalite, a form of crystalline silica may be formed above 900 degrees Celsius.
- Consult Occupational Health and Safety Authority for further information regarding removal of used ceramic fibre linings.

Raypak Commercial Water Heaters

Part 2: Models 507 NCO, 538 to 4224 NCO, NCM.



SECTION I - INSTALLATION INSTRUCTIONS

Before you commence the installation:

1. **Read these instructions in full!**
2. **Check that the heater you have been supplied is suitable for the type of installation and the gas that is available. The gas supply pressure must be between the minimum and maximum as shown on the heater data plate.**

These instructions are provided to ensure the correct installation and operation of your Raypak Hot Water Heater. Whilst all care has been taken to provide the correct information we also rely on your expertise and quality workmanship to provide the end user with a high class installation.

Should any questions arise regarding the specifications, installation, operation or servicing of this heater, we suggest that your local representative or Raypak Customer Service be consulted.

Raypak heaters utilise a finned copper tube heat exchanger resulting in a low water content and reduced "stand by" heat losses. Therefore a circulator pump of sufficient capacity to match the heater model must be installed in the system.

Raypak heaters are fitted with Australian Gas Association approved components and all heaters in this range are designed to comply with AS 3814/AG501.

Some models are designed for either indoor or outdoor installation subject to the appropriate indoor draft hood or outdoor stackless top being fitted. It is the responsibility of the installer to locate the heater in such a manner that correct operation is obtained.

Check that the correct top for your installation has been supplied.

RAYPAK will not be held responsible for any damages which are caused to the appliance due to its location and caused by means beyond the control of Raypak, EG High Winds, Downdraft, Incorrect installation etc.

WARNING:

This appliance must be installed to AS 3500.4 and may require a Backflow Prevention Device as part of the installation.

All electrical, gas piping, gas connection and flueing of the heater must only be undertaken by a properly authorised person. The installation must comply with local gas, AS

5601/AG601 and electrical codes and/or statutory body codes and regulations.

INSTALLATION PROCEDURES - INSPECTION OF EQUIPMENT

Check the heater and associated equipment for any damage and notify your local representative or Raypak for any further instructions.

DO NOT INSTALL OR START UP ANY RAYPAK SUPPLIED PRODUCT THAT HAS BEEN DAMAGED, WITHOUT FIRST CONSULTING RAYPAK AS ANY DAMAGE OR FAULTS CAUSED BY UNAUTHORISED START UP MAY NOT BE COVERED BY OUR WARRANTY.

HEATER LOCATION AND CLEARANCES

The heater and any Raypak supplied equipment should be located so that any possible water leaks will not cause damage to any adjacent areas or structures. When such locations cannot be avoided, it is recommended that a suitable drain pan, adequately drained, be installed under the heater.

This pan should be large enough for all of the equipment and must not restrict combustion airflow. Any damage caused by water leaks is the responsibility of the installer.

The heater must be mounted on a level non-combustible base such as a concrete slab, concrete plinth, steel plate etc. Raypak heaters and equipment must not be installed on carpeting.

Any gas or water piping, electrical conduits,

trees, fences, or other equipment, etc must not obstruct the front of the heater.

COMBUSTION / VENTILATION AIR

Indoor model heaters must only be installed in a protective enclosure or properly constructed plant room with adequate ventilation in accordance with AS 5601/AG 601 Gas Installation Code.

Ventilation shall be via 2 permanent openings directly to outside, one at an upper level and one at low level.

The minimum free area provided by each vent shall be as calculated by using the following formula, unless otherwise stated in AG 601.

$$A = 1.5 \times T$$

Where A = Minimum free ventilation area (cm²)
T = Total hourly input of all appliances (MJ/h)

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

Please take the heater location into account when locating the fresh air vents because any excessive draft will cause flame disturbance and probable pilot outage. In some cases where excessive draft effects the burner, the risk of major damage is high due to incomplete combustion.

Installations, which obtain air from a source other than directly from outside, must comply with AS 5601/AG601.

Warning: Air supply to the heater room must not be affected by mechanical exhaust vents located in other parts of the house or building, such as kitchen or bathroom fans, spa blowers, etc.

Mechanical exhaust vents may create a negative

HEATER CLEARANCES

Clearance from **non-combustible** materials:

	Models 507 to 1922	Models 2004 to 4224
Rear	150mm	350mm
Left Side	300mm	600mm
Front	750mm	1200mm
Right Side	300mm	600mm
Ceiling	1200mm	1200mm

Clearance from **combustible** materials:

Rear	600mm	600mm
Left Side	600mm	600mm
Front	750mm	1200mm
Right Side	600mm	600mm
Ceiling	1200mm	1200mm

pressure in the heater room that can become a hazard by asphyxiation, explosion or fire.

Caution: Do not store chemicals or flammable materials in the same room or near this heater. Do not use aerosols near this heater whilst it is in operation.

FLUEING

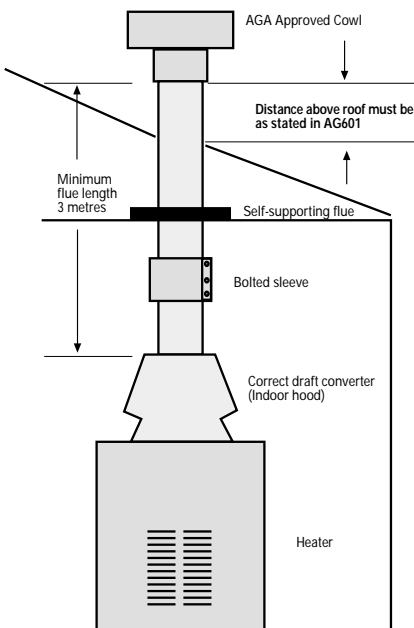
The correct Draft hood must be fixed to the top of the heater and connected to a properly constructed flue, vented to the outside using only approved fittings.

Reduction of the flue diameter or alteration to the draft hood voids all warranty.

Where flueing may be difficult, please contact Raypak for advice, we will have solutions, particularly where a fan assisted flue may be the answer.

The weight of the flue must not rest on the heater draft diverter, the flue must be self-supporting and be fitted with a disconnection section (bolted sleeve) to enable the heater top and draft diverter to be removed easily, for servicing.

Where practicable the flue should run vertically. Lateral (raised above horizontal) is acceptable but the run of a flue shall not exceed 50% of



total flue height and shall be designed to rise not less than 20 mm per 1 m run. The flue must be terminated with an approved cowl.

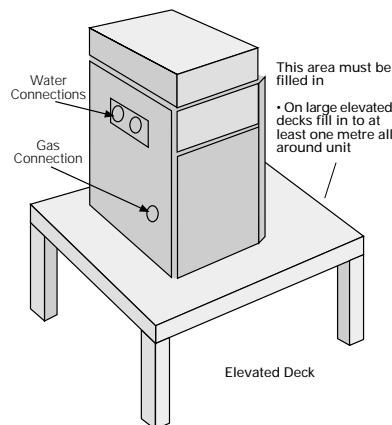
Raypak recommends a minimum length of

vertical flue of three (3) metres to ensure correct draft. Consult Raypak for advice if length is shorter.

OUTDOOR HEATERS

Must not be installed inside any roofed structure or under eaves, roof overhangs, or pool decks. It should also be at least 1500 mm, in any direction from any window or fresh air opening.

When installing the heater on a raised base, please make sure that the base material is solid and filled in. E.G. If steel mesh decking is

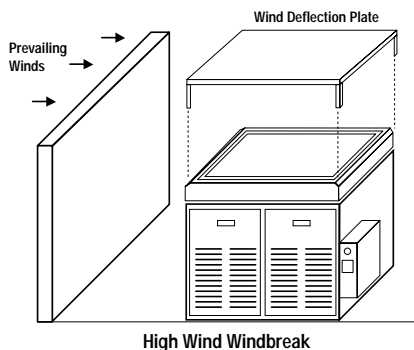


used, a suitable plate material must be used to fill in the perforations. This is very important, as any excessive drafts must not be able to enter the unit from directly underneath.

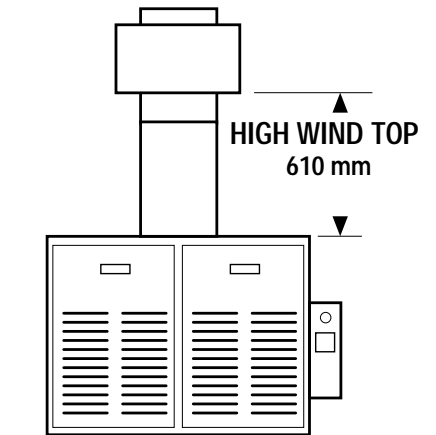
HIGH WIND CONDITIONS

On some rare occasions or in areas where high winds frequently occur, at ground level, it may be necessary to locate the heater a minimum of one (1) metre away from high vertical walls, or to install a wind break so that the heater is not in direct wind current.

High rise or multi storey installations can present problems with excessive winds and we



recommend that the common practice of surrounding the plant and equipment within an open top enclosure be adhered to. The installer would meet the costs for this enclosure, heater relocation and/or windbreak.



Should the installation of a windbreak still not remedy "Down draft", on models 538 to 1852, Raypak can supply a Wind Deflection Plate (at extra cost), to eliminate constant ignition failures or flame disturbance, the need for which would be determined by an approved Raypak Service Person.

In areas of "constant extreme winds" or where a Wind Deflection Plate is not appropriate, it may be necessary to replace the "standard" low profile outdoor hood with a HIGH WIND TOP (which would be at extra cost.) The HIGH WIND TOP serves the same function as the low profile outdoor hood and should be installed in accordance with the same clearance requirements.

There can be occasions where seasonal or unexpected climatic conditions will cause failures of the heaters to operate, Raypak cannot be held responsible for any of these types of faults that are beyond their control.

Why not consider installing a remote reset button and fail indicator to eliminate inconvenience for the end user in the instances of unavoidable failures? See the electrical section for more information.

GAS SUPPLY

The gas supply pipe must be sized to give sufficient pressure and volume for the correct operation of the heater. The gas line must be fitted with an isolation valve. Consult AS 5601/AG 601 for further details.

CAUTION:

The gas supply must be isolated from the heater during pressure testing of the gas fitting line. Dissipate test pressure and make sure that any internal debris is removed from the pipe before reconnecting to the heater.

Failure to follow this procedure may result in damage to the gas valve. (Damaged valves etc are not covered by our warranty.)

The heater and its gas connection must be thoroughly leak tested before placing in operation. Use soapy water and a manometer for leak test.

DANGER! Do not use an open flame to check for gas escapes.

PUMP SELECTION

In order to obtain the best possible hydraulics in your system, you must select the correct size water-circulating pump.

It should normally be installed so as to pump water into the heater and this is particularly important where the system water pressure is low.

Refer to Flow Rate and Pressure Drop chart and allow for the system head pressure when sizing the pump.

Where the water flow rate exceeds the maximum shown in the chart, a by pass valve must be installed to reduce the water flow through the heater. If the water flow rates are below the minimum shown, a supplementary pump may be required. (Please consult your local representative or Raypak for any assistance).

A pump run on timer is fitted to remove any residual heat from the heater and prevent any nuisance tripping of the high limit switch.

WATER FLOW RATE AND PRESSURE DROP.				
Model	10 Deg C Rise		20 Deg C Rise	
	l/sec	kPa	l/sec	kPa
507	2.5	21	1.3	5
538	2.9	7	1.4	3
658	3.5	11	1.8	3
768	4.1	15	2.0	4
868	4.6	23	2.3	5
972	5.2	28	2.6	7
992	5.4	30	2.7	7
1142	6.1	44	3.0	10
1182	6.3*	45	3.2	11
1242	6.3*	47	3.3	13
1292	6.3*	47	3.4	13
1362	6.3*	49	3.6	16
1412	6.3*	49	3.8	21
1492	6.3*	52	3.9	21
1552	6.3*	52	4.1	22
1662	6.3*	55	4.4	27
1722	6.3*	55	4.6	30
1852	6.3*	58	4.9	36
1922	6.3*	58	5.1	39
2004	11.7	45	5.5	12
2214	11.7	45	5.9	12
2404	12.0*	48	6.5	18
2634	12.0*	48	7.0	18
2804	12.0*	50	7.9	21
3164	12.0*	50	8.4	21
3304	12.0*	54	9.2	30
3694	12.0*	54	9.9	30
3804	12.0*	57	10.5	42
4224	12.0*	57	11.3	42

* Where marked as maximum water flow, the temperature rise will be greater than 10 Deg. C.

If a system water temperature rise in excess of 20 Deg C is required, please contact Raypak for advice. Systems with multiple zones may require additional pump(s).

COLD WATER MAKE-UP/SUPPLY.

Heating heaters: We recommend that a cold water feed regulator (Pressure Reducing Valve) be installed and set at 50 kPa minimum pressure. Backflow prevention in accordance with A.S. 3500 may be required, please check with the local water supply authority for any local code requirements etc.

Alternatively a cold feed (header) tank may be used. The minimum recommended height above the heater is five (5) metres.

A minimum system water pressure of 70 kPa COLD is required. (Most systems operate at 100 kPa COLD.)

A suitably sized expansion vessel must be fitted to a closed heating system to prevent any unnecessary waste of water from the system and discharge of any inhibitors that may be present.

IMPORTANT: When installing a new heater to an old system, it is a Raypak requirement that the system and its equipment be inspected and if necessary, drained and flushed out with clean fresh water, before the new heater is connected.

Failure to do this may cause blockages and/or heater damage which is NOT COVERED BY WARRANTY and any damage caused would result in extra costs to repair etc.

IF THERE ARE ANY DOUBTS ABOUT THE SYSTEM, DRAIN AND FLUSH AS A PRECAUTION.

Domestic Hot Water heaters: These heaters are normally connected to a storage tank and the cold water supply must be fitted with a Pressure Limiting Valve, if the water supply pressure exceeds the pressure indicated on the storage tank.

As with Heating systems, the heater will operate at a minimum water pressure of 70 kPa (COLD) however, the design of any hot water system must be such that the water pressure is sufficient for the fixtures.

We recommend the installation of a cold water expansion valve (in accordance with AS 3500) to prevent unnecessary discharge of hot water from the tank pressure and temperature relief valve and subsequent waste of energy.

WATER QUALITY

The standard finned copper tube heat exchanger has proved to be very resilient and

capable of operating for many trouble free years on most reticulated water supplies.

Should your installation be in an area where "corrosive" or "hard" water is present, it would be advisable to contact Raypak before installation to ensure that the quality of the water is satisfactory.

DAMAGE CAUSED BY "CORROSIVE, HARD OR OTHERWISE POOR QUALITY WATER", IS NOT COVERED BY OUR WARRANTY.

PIPING.

Heating heaters: We recommend that all high points of the system be vented or fitted with automatic air vents.

The design of the system must be such that the heater is provided with adequate water flow and pressure at all times.

On radiator or heating systems where

ALL BY- PASS VALVES must be installed at the end of the system.

thermostatic or zone valves will vary the water flow, a suitable by-pass valve must be installed to control heater water flow.

Domestic Hot Water heaters: If the heater is supplied as part of a package, including the tank and pump, the installation must comply with the drawing provided. Failure to observe this requirement may result in an ineffective hot water capacity or damage.

For installation of the heater to an existing storage vessel we suggest that advice be sought to eliminate possible problems.

ELECTRICAL WIRING

The electrical power consumption of the heater is: **240 Volts AC, 50/60 Hz, of less than 1 Amp.**

A normal 10 or 15 Amp, single phase power circuit should be suitable.

Access to the electricals is achieved by removing the cover of the control panel. (See Location of Controls for different models.)

The heater must be properly earthed and Raypak highly recommends the installation of an RCD (Residual Current Device) for added electrical safety. If the site is "electrically noisy", a mains filter can be supplied at extra cost, to eliminate Microzone failures.

THE HEATER MUST NOT BE ABLE TO OPERATE WITHOUT THE CIRCULATING WATER PUMP RUNNING.

The heater (240 Volts) power supply must be "interlocked" via the auxiliary contacts of the pump contactor (relay) etc or alternatively the power supply for the pump and the heater must operate off the same circuit and isolation switch. (Parallel connection)

A Flow Switch is not regarded as an interlock and must not be used as one.

If a Microzone control is fitted and the pump control is used, this is recognised as being interlocked with the heater.

Any other form of interlocking must be approved by Raypak.

A pump run on timer is fitted so that at any time that the heater is no longer required, the heater shuts off and the pump continues for at least ten (10) minutes.

If a Microzone is installed and the pump control is used, this run on is included in the program.

A Raypak "Economaster" fitted as - standard on all other heaters.

For servicing purposes we suggest that the isolation switch be installed as near as practical to the heater.

If there is any control wiring etc which is not isolated by this switch then a suitable warning label must be affixed to the heater which will also direct the service person to the isolation switch for that particular wiring.

E.G. More than one isolation switch is required to turn off the power supply, Extra switch(es) on switchboard etc.

CAUTION: Do not locate cables in front of or underneath the burner, please consult Raypak for advice if unsure.

Where cables or conduit, trunking etc are to be mounted on the heater casing, please keep at

least 10mm air gap from the heater casing to eliminate possible overheating.

Do not locate cables etc where they will restrict access covers, doors etc.

Where the clearance from the right hand side of the heater (models 538 to 1922) is restrictive, please notify Raypak at the time of manufacture and we may be able to relocate the control panel for a minimal extra cost, if this is not possible then a field retrofit may be the best solution. (At extra cost)

If a Microzone or any other PLC device is installed as part of the heater control etc, please observe the requirements for suitably screened data cable when utilising the communication areas of these devices. Failure to do so will result in malfunctions and /or damage to the device, which will cause inconvenience to the user.

Failure of, or damage caused to the Microzone or any other heater component due to incorrect wiring is NOT covered by our warranty and any repairs will be at extra cost.

There are many variations to the types of controls available and also RUN & FAIL indication can be supplied. Advice on remote location of reset button and failure indication is available from your local representative or from Raypak.

WARNING:

COMMISSIONING MUST ONLY BE UNDERTAKEN BY A PROPERLY AUTHORISED AND IN SOME CASES APPROPRIATELY LICENSED PERSON WHO IS FAMILIAR WITH SAFE COMMISSIONING PROCEDURES. THE COMMISSIONING MAY REQUIRE INSPECTION BY THE GAS SUPPLY AUTHORITY, CHECK IF THIS IS APPLICABLE.

COMMISSIONING

1. Check that all necessary approvals and appropriate documents have been obtained.
2. Ensure that the heater is clean and the surrounding area is clear of all combustible and flammable materials.
3. Remove all liquids and chemicals from the plant room and check that combustion air openings are not obstructed. Chemicals must not be stored in the plant room - this is extremely dangerous and may damage the heater.
4. Fill the system with water and expel any air as required.
5. Purge all air from gas supply piping.

CAUTION: Liquid Propane Gas is heavier than air and sinks to the ground, exercise extreme care in lighting heater in confined areas.

6. Test ALL gas connections for leaks, using soapy water and a manometer.

(DO NOT USE A NAKED FLAME)

7. Conduct a visual inspection of the heater and equipment for any damage or installation problems and report as necessary.
8. Check that the correct power supply is available and the circulation pump is electrically interlocked with the heater.
9. Check that the ventilation to the plant room complies with Raypak requirements, AS 5601/AG601 and local authority regulations. If mechanical ventilation is provided, check its operation and any interlocks.
10. Check that the flue complies with the appropriate regulations and is fitted with an approved termination cowl.
11. Check that the gas supply is isolated and with the main gas valve isolation switch turned off, check the heater gas train and components for gas escapes.
12. Start the circulation pump and verify the flow switch operation (if fitted), then test the operation of the heater with no gas flow to confirm its operation up to the lockout status.
13. Open the gas supply valve, switch on the main valve isolation switch and reset the ignition control to fire the heater.
14. When the unit fires and reaches high fire, set the burner gas pressure to that shown on the data plate which is located on the front of the heater. Set the low fire if necessary also.
15. Verify that the high limit and any other safety devices are operating correctly and set low fire for safe, reliable ignition if required.
16. Check that the flue is operating correctly or if there is evidence of down draft etc report as necessary.
17. Check operation of any water pressure relief valves etc and set up the controls to desired settings.
18. Ensure that the customer is supplied with this manual and you have demonstrated the operation of the unit etc.

It is quite normal for the heater to produce some smoke and possible condensation for the first thirty (30) minutes of firing from new.

WARNING:

SHOULD OVERHEATING OCCUR OR THE GAS FAIL TO SHUT OFF, TURN OFF THE GAS ISOLATION VALVE ADJACENT TO THE HEATER AND THEN EXAMINE THE UNIT OR CALL FOR ASSISTANCE.

SECTION II - OPERATING INSTRUCTIONS

WHAT IF YOU CAN SMELL GAS?

SAFETY INSTRUCTIONS

- **DON'T TRY TO LIGHT ANY GAS APPLIANCE.**
- **DON'T TOUCH OR OPERATE ANY ELECTRICAL SWITCH.**
- **TURN OFF THE GAS SUPPLY AT THE GAS METER OR ISOLATION POINT.**
- **CALL YOUR GAS SUPPLIER OR QUALIFIED GASFITTER FROM A NEIGHBOUR'S TELEPHONE.**

Use only your hand to turn the pilot gas control knob. Never use any tools.

If the knob will not turn by hand do not try to repair it, call a qualified service technician.

Force or attempted repair may result in a fire or explosion.

Do not use this heater if any part has been under water.

Call a qualified service technician immediately to replace any part or control system that has been under water.

Always keep the heater clean and the surrounding area clear of all combustible and flammable materials.

Remove all dangerous liquids and chemicals from the plant room and check that the combustion air openings are not obstructed.

Chemicals must not be stored in plant room. This is extremely dangerous and also very damaging to the heater.

If you don't know what to do.

Ring for assistance.

LIGHTING PROCEDURE.

1. STOP read the safety information.
2. Turn heater ON/OFF power isolation switch to the "OFF" position.
3. Turn "OFF" any other electrical power to the heater. (If required)
4. Turn the gas supply valve, fitted next to the heater "OFF".
5. Wait 5 minutes to clear out any gas.

STOP!

If you smell gas, follow safety instructions.

If you do not smell any gas continue ...

6. This heater is equipped with an ignition device that automatically lights the burners.

Don't attempt to light the burner by hand.

7. Turn the gas supply valve to the "ON" position.

8. Turn on all electrical power to the heater. (If required)

9. Set the thermostat or temperature control to the desired temperature setting and turn the heater ON/OFF switch to the ON position.

10. The heater will go through its light up sequence.

If the heater fails and the "red" reset light illuminates, turn off the power supply, wait one (1) minute, turn the power supply back on and when the reset illuminates again, push the reset button, which will turn off the fail light and restart the light up sequence.

If heater still does not light, turn off gas and power supply and contact your qualified service technician.

TO TURN OFF THE HEATER

1. Turn the heater ON/OFF power isolation switch to the "OFF" position.

EMERGENCY SHUT-DOWN

1. Turn "OFF" the power supply to the heater.
2. Turn "OFF" the gas isolation valve fitted close to the heater or the main gas supply.

AFTER START-UP WARNING

Should overheating occur or the gas supply fail to shut off, turn off the gas isolation valve located adjacent to the heater turn off the power supply switch and call for assistance.

VISUAL INSPECTION FOR DANGER!

Keep the heater area free from chemicals, combustibles and flammable materials.

Do not obstruct the flow of ventilation air into the plant room.

Regularly clean the heater cabinet air louvres of any dust, lint and debris.

Failure to follow these safety precautions can cause fire, explosion, or asphyxiation.

With the heater turned on and heating, remove the door (if fitted) and make a visual check of the burners. The flame should be blue with a well-defined pattern.

A yellow or floating flame indicates restricted air openings, incorrect orifice size or possible excessive draft. Continual yellow flames indicate some restriction of the combustion air openings.

A bright orange, luminous flame is not normal and can cause sooting under prolonged operation.

Observe for any indication of soot. The presence of soot accumulation would indicate an abnormal operating condition.

Should any abnormalities occur, turn the heater off and contact your installer or service organisation.

WARNING: Operation of the heater when faulty will result in rapid and severe damage to the heater, which is not covered by our warranty.

SERVICE ASSISTANCE

Service must only be undertaken by properly authorised personnel.

It is a requirement of all Raypak and all gas authorities that the heater be serviced at least once per year, where it is used in a specific application, e.g. heating, it would be practical to perform the service at the commencement of the heating season, or at any time there may be an indication of a problem.

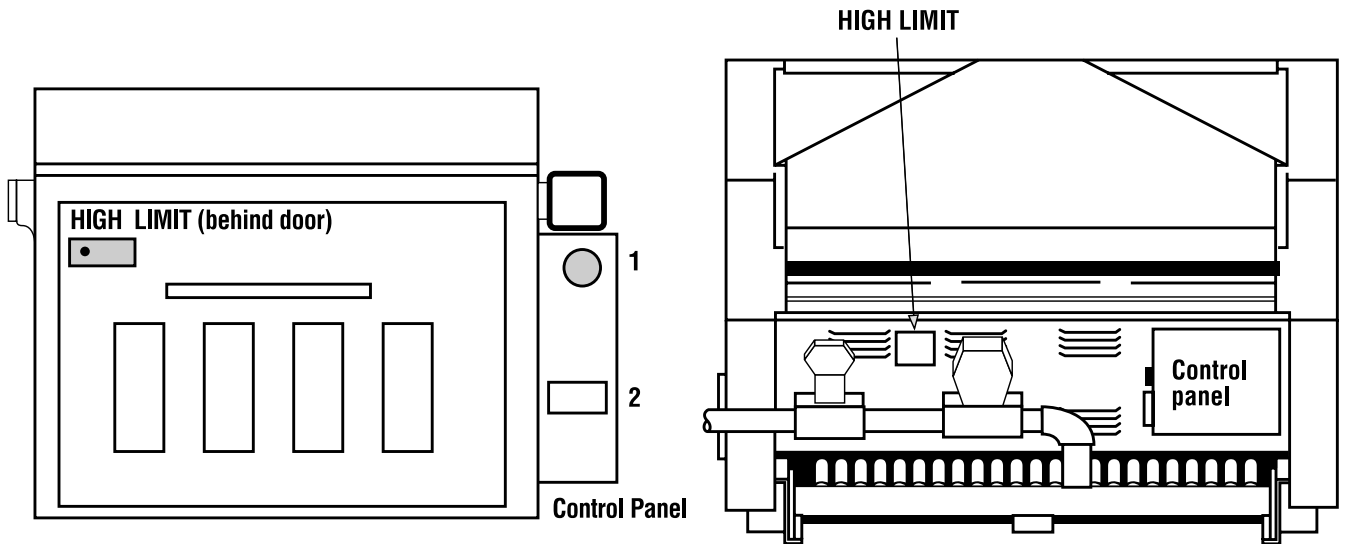
This service should include the cleaning of the gas burners, inspection of waterways, and checking of all controls for correct operation.

It is important and very often will save time if you state the model number, serial number and type of gas used. This information will be found on the heater data plate.

Your local Raypak distributor will arrange for your service or recommend a qualified service organisation or visit:

www.raypak.com.au

PART 2 - SECTION II - OPERATING INSTRUCTIONS
LOCATION OF CONTROLS



MODELS 538 TO 2004, 2404, 2804, 3304, 3804

MODELS 2214, 2634, 3164, 3694, 4224

1. Flame Fail Reset (Illuminates on FAIL) 2. Temperature Control (Digital Thermostat)

Please note: Model 507 is not shown above but the controls are in similar locations.

1. FLAME FAILURE RESET:

This is a combination reset button and indicator lamp. It indicates, when illuminated, that the ignition system has shutdown on its safety control. During normal operation the lamp is out and the button will not require any operation.

2. ALARM FAIL & MUTE BUTTON:

This is an optional extra, which will illuminate when the heater has generally failed to operate on its safety controls. The circuitry activates an audible alarm on fail, which can be silenced by pressing the reset button, the light will stay illuminated until the cause of failure has been reset.

3. FLOW SWITCH:

This is a safety device which will shut off the power to the heater internal controls in the event of low or no water flow.

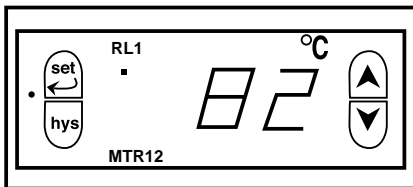
THERMOSTATS - ON/OFF CONTROLS

"00" heaters are fitted with an adjustable controlling thermostat with its temperature sensor usually located in the inlet side of the heater header, monitoring the system water temperature which will then determine whether there is a call for heat and if so start up the heater. This type of control is used where the system load is constant E.G. Hot water supplied from a water storage tank or in floor concrete slab heating.

The water temperature is controlled by setting the thermostat adjustment control.

NOTE: If your heater is supplied with a storage tank and a Tank thermostat, the heater thermostat should be set slightly higher than that of the Tank thermostat.

LAE ELECTRONIC THERMOSTATS



Raypak uses the MTR 11 series Thermostat that is programmed to operate in the heating mode.

The only adjustments that should normally be required are: -

Set point (set): - Which is the water temperature that you require.

Differential (hys): - Which is the difference between the thermostat turning OFF and then ON again when the temperature has fallen.

E.G. 10 Deg C would be ideal for a hot water control.

To Adjust the Set Point: -

Turn on the power supply to the heater.

Digital display will show the actual water temperature.

Press the "set" button, L1 will be displayed for 2 seconds.

Then the Set Point temperature will be displayed.

By pressing the "UP" or "DOWN" button, you can set the desired temperature.

To adjust the differential: -

Turn on the power supply to the heater/heater.

The Digital Display will show the actual water temperature.

Press the "hys" button, HY1 will be displayed for 2 seconds.

Then the value will be displayed. (It must be a negative value.)

Press the "UP" or "DOWN" button to set your desired differential, adjustable from - 1 to -25 which relates to 1 to 25 Deg. C.

Raypak may have programmed this thermostat to avoid any "nuisance" failures as: -

v SP- (Min Set Point):

0 Deg. C - the heater won't operate if the water temperature is below this setting.

^ SP- (Max Set Point)

95 Deg. C- the device turns off the heater if the temperature exceeds this setting.

rt1- (RL1 Rest Time)

0 min - there is no delay in relay operation.

PF1- (Probe Failure)

OFF - if the Probe (water sensor) fails, the relay will turn off the heater.

ADJ- (Probe Offset)

0 Deg. C - the relay operates on actual temperature of the sensor.

HY1- (Mode)

-25 - the negative value programs the device for heating.

FOR FURTHER INFORMATION ON PROGRAMMING ANY TYPE OF DIGITAL THERMOSTAT, PLEASE CONTACT YOUR LOCAL RAYPAK REPRESENTATIVE.



COMMISSIONING / PROGRAMMING PROCEDURE

SKP27 / SQS27 / RWF40

To Programme the RWF40 controller

1. Press "PGM" button for two seconds. Display shows "AL".
2. Press "PGM" button again for two seconds. Display shows "C111" and the current setting for C111.
3. Press the up (▲) button to change digit the right hand digit.
4. Press the down (▼) button to change digit position from right to left. The correct setting for C111 is 9000.
5. Press the "PMG" button to select the next parameter.
6. Follow steps 3, 4 & 5 until all parameters are set correctly. (Refer to table below)
7. When all parameters are set correctly press the "exit" button to lock in the programming.

LOW GAS RATE ADJUSTMENT

1. Press the "Exit" button on the RWF40 controller for five seconds to enter the manual mode. The red LED adjacent to the hand symbol will illuminate.
2. Drive the SQS27 motor to the low fire position by pressing the ▼ button until the motor cam stops turning. (approx. 2 revolutions)
3. Refit the SQS27 drive motor to the SKP27 actuator. (refer to figure 2) Adjust the low fire rate to 0.12kPa by turning the small screw in the centre of the motor drive. (refer to figure 3)

4. Press the "Exit" button for five seconds to re-enter auto mode. The LED adjacent to the hand symbol will extinguish.

HIGH GAS RATE ADJUSTMENT

1. Fit manometer to burner test point.
2. Remove SQS27 motor drive from SKP27 actuator.
3. Turn on electrical power to unit.
4. With the main burner on, set the full fire gas pressure to 0.92kPa by adjusting the regulator screw on the SKP27. (refer to figure 1)

PARAMETER	SETTING	PARAMETER	SETTING	PARAMETER	SETTING
C111	9000	OFF 2	0	HyS1	-3
C112	0000	OFF 3	0	HyS2	0
C113	0000	DF	1	HyS3	4
SCL	0	AL	0	q	0
SCH	100	HySt	0	H	0
SCL2	0	Pb. 1	20	P	0
SCH2	0	dt	15	SP1	78
SPL	0	rt	60	SP2	0
SPH	95	db	3	Dsp	0
OFF 1	0	tt	30		

LOW GAS RATE ADJUSTMENT

1. Fit manometer to burner test point.
2. Remove SQS27 motor drive from SKP27 actuator.
3. Turn on electrical power to unit.
4. With the main burner on, set the low fire gas pressure to 0.12kPa by adjusting the outer regulator screw on the SKP27. (refer to figure 1)

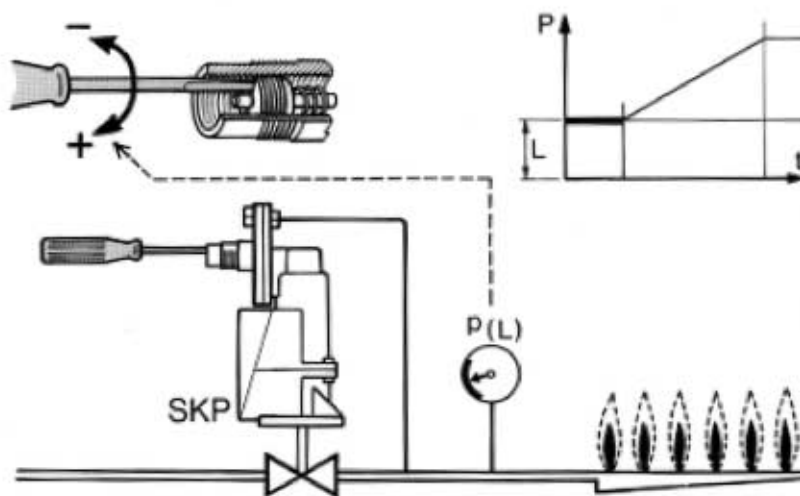


FIGURE 1

HIGH GAS RATE ADJUSTMENT

1. Press the "Exit" button on the RWF40 controller for five seconds to enter the manual mode. The red LED adjacent to the hand symbol will illuminate.
2. Drive the SQS27 motor to the high fire position by pressing the ▲ button until the motor cam stops turning. (approx. 2 revolutions)
3. Refit the SQS27 drive motor to the SKP27 actuator. (refer to figure 2)

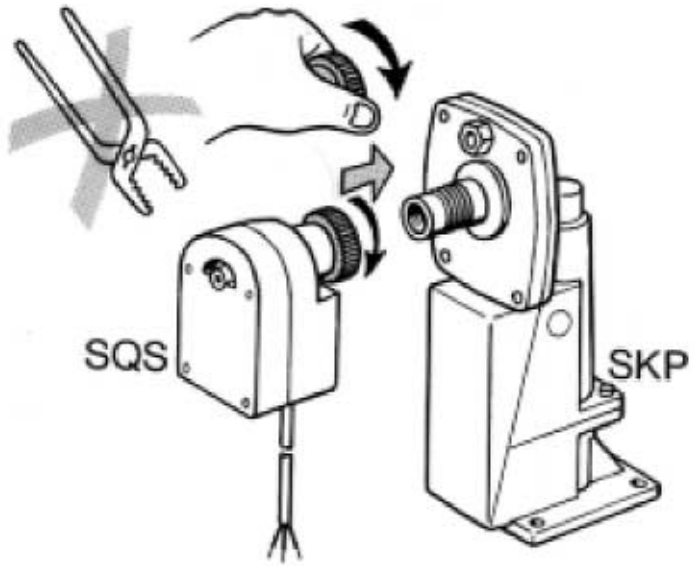


FIGURE 2

4. Adjust the low fire rate to 0.92kPa by turning the small screw in the centre of the motor drive. (refer to figure 3)
5. Press the "Exit" button for five seconds to re-enter auto mode. The red LED adjacent to the hand symbol will extinguish.

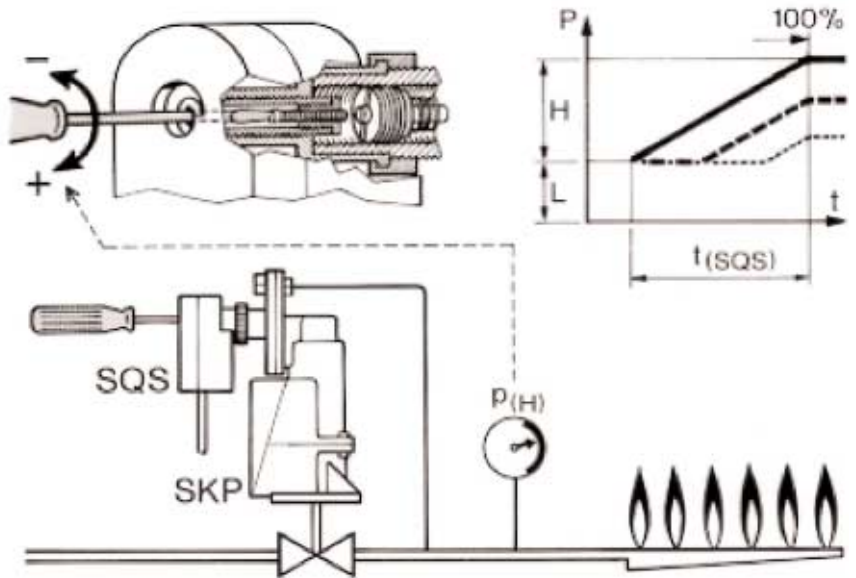


FIGURE 3

MODULATION BY AMBIENT AIR
COMPENSATION AND
AMBIENT AIR HEATER OFF

Commissioned By:

Date:



QAC22 / QAC32 MOUNTING
AND INSTALLATION

Mounting height:

- Preferably in the middle of the house or building or heating zone, but at least 2.5 m above the ground.

The sensor must not be fitted at the following locations:

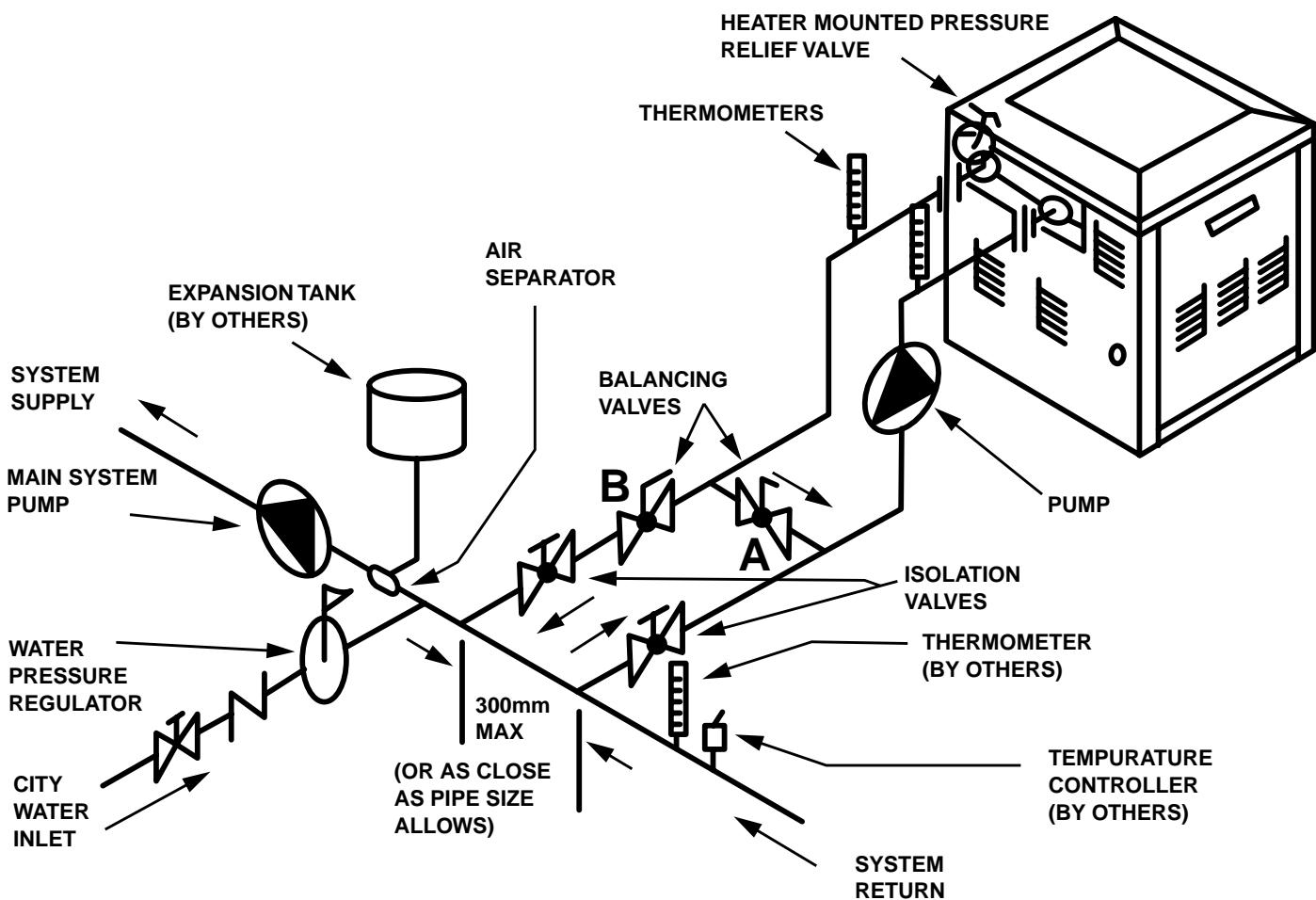
- Above windows, doors, air extracts or other heat sources.
- Below balconies or the eave of the roof.

To prevent measuring errors due to air circulation, the cable conduit at the sensor should be sealed. The sensor should not be painted over.

Mounting instructions are printed on the packing.

PROCESS DATA		
PARAMETER	FACTORY SETTING	COM. SETTING
SP1	78	
SP2	0	
Dsp	0	
tA	-	
SPE	-	
PARAMETER LEVEL		
PARAMETER	FACTORY SETTING	COM. SETTING
AL	24	
HySt	2	
Pb.1	20	
dt	15	
rt	60	
db	3	
tt	30	
H y S 1	-3	
H y S 2	0	
H y S 3	4	
q	0	
H	4	
P	0	
CONFIGURATION LEVEL		
PARAMETER	FACTORY SETTING	COM. SETTING
C111	9030	
C112	C010	
C113	0000	
SCL	0	
SCH	100	
SCL2	0	
SCH2	0	
SPL	55	
SPH	85	
OFF1	0	
OFF2	0	
OFF3	0	
DF1	1	

*COM. - abv. Commissioned Setting



CLOSED LOOP WATER SOURCE HEAT PUMP

Installation and set up procedure for this application.

1. Only use a heater with on/off controls.
2. The bypass MUST be the same as the inlet and outlet pipes.
3. Select the pipe size between the heater and the system loop main, equal to the inlet / outlet header connections of the heater (as a minimum)
4. Install the correct heater pump (this pump must give a temperature rise between 10°C - 15°C).
5. Check that both isolation valves are open.
6. Adjust balancing valve **A** half open and balancing valve **B** is fully open.

7. Fire the heater and adjust the 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 41°C.

8. If the heater inlet temperature remains less than 10°C higher than the system loop return temperature and valve A is fully open, leave A fully open and throttle valve B until the heater inlet temperature rises to be 10°C higher than the system loop return temperature.

9. Main loop and heater temperatures should be checked regularly throughout the season to prevent heater condensation. If the balancing

valves are adjusted at the coldest loop temperature (typically 10°C) and the heater temperature to 41°C then the entire heating season should have a proper 41°C operation. The heater inlet temperature can be higher than 41°C without heater damage, but operating at less than 41°C inlet can cause damage from condensation.



RECOMMENDED SERVICE PROCEDURES

It is a Raypak requirement that all Raypak supplied equipment is serviced at least annually.

In some installations, due to the appliance location and/or workload it may be necessary to perform a service every six months.

RECOMMENDED SERVICE PROCEDURE FOR ANNUAL SERVICE.

- Isolate gas, electricity and water as required.
- Remove access covers and door(s) as required.
- Disconnect and remove Burner Tray.
- Dismantle and clean pilot assembly(ies), including injector(s).
- Clean and re-align electrode(s) and/or flame rod(s) and /or thermocouple(s).
- Clean main burner injectors and burner bars as required.
- Inspect, repair if minor and clean combustion chamber.
- Report on any major combustion chamber damage.
- Inspect external area of heat exchanger, clean fins and repair if minor.
- Check water seal area and report any damage.
- Operate Pressure Relief Valve (if Fitted)

manually to check that the drain is clear and the valve reseals.

- Refit Burner Tray and reconnect gas train etc.
- Perform gas soundness tests to the gas train. (Any failures must be reported and repaired before recommissioning appliance.)
- Check all air vents and louvres, clean as required.
- Restore gas, electricity and water as required.
- Recommission unit, check and prove the operation of all safety devices.
- Check and monitor the operation of the appliance for at least ten (10) minutes.
- Refit access covers and doors as required.
- Clear and remove any dust and debris from the appliance and its immediate area.

RECOMMENDED SERVICE PROCEDURE FOR SIX MONTHLY SERVICE.

- Isolate gas, electricity and water as required.
- Remove access covers and doors as required.
- Restore the gas, electricity and water as required.
- Visually inspect main burner and pilot, check operation if needed.
- If necessary, remove Burner Tray and service as required. (Refer to Annual Service).

- Check over the appliance thoroughly and report any damage immediately.
- Check the heat exchanger and water seal areas and report any damage, if necessary.
- Check air vents and louvres, clean as required.
- Check operation of ignition system and all safety devices.
- Check operation and calibration of all temperature control devices.
- Check operation of appliance for at least ten (10) minutes.
- Refit access covers and doors as required.
- Clear and remove any dust and debris from the appliance and its immediate area.

ANY REPAIRS, SERVICE AND/OR COMMISSIONING OF GAS APPLIANCES MUST ONLY BE PERFORMED BY A SUITABLY LICENSED PERSON.

PART 3 - WARRANTY

RAYPAK WARRANTY FOR COMMERCIAL WATER HEATERS

Raypak Australia Pty Ltd* will:

- a) repair or, if necessary, replace any Raypak water heater; or
- b) replace any component (or, if necessary, arrange the installation of a new water heater), which falls within the Warranty Periods specified below, in accordance with and subject to the following table and terms and conditions.

Component and Heat Exchanger Warranty (From Date of Installation)

Period	12 Months
Installation	All Installations
Model	B0507 - B4224
Warranty	New component, tube bundle or heat exchanger (at Raypaks sole discretion) free of charge, including labour**

Heat Exchanger Warranty (From Date of Installation)

Period	Years 2 - 5
Installation	All Installations
Model	B0507 - B4224
Warranty	New tube bundle or heat exchanger (at Raypaks sole discretion) free of charge, with installation and labour costs being the responsibility of the owner.

Notes:

* Rheem Australia Pty Ltd provides warranty service on behalf of Raypak Australia Pty Ltd.

**Refer to item 5 of warranty conditions.

Raypak Australia Pty Ltd reserves the right to transfer fully functional components from the defective water heater to the replacement water heater if required.

WARRANTY CONDITIONS

1. This warranty is applicable only to water heaters manufactured from 1st August 2002.
2. The water heater must be correctly commissioned by an authorised and licensed person and certified by the relevant State Gas Authority.
3. The water heater must be installed in accordance with the Raypak installation instructions, supplied with the water heater,

and in accordance with all relevant statutory and local requirements of the State in which the water heater is to be installed.

4. Where a failed component or water heater is replaced under Warranty, the balance of the original warranty period will remain effective. The replaced part of the water heater does not carry a new warranty.
5. Where the water heater is installed outside the boundaries of a metropolitan area as defined by Rheem Australia Pty Ltd or further than 25 km from a regional Rheem branch office or a Rheem Accredited Service Agent, the costs of transport, insurance and travelling between the nearest Rheem Australia Pty Ltd Accredited Service Agent's premises and the installed site shall be the owner's responsibility.
6. The warranty only applies to the water heater and original or genuine (company) component replacement parts and therefore does not cover any plumbing or electrical parts supplied by the installer and not an integral part of the water heater, eg. pressure limiting valve, stop cock, non-return valve, electrical switches, pumps, or fuse.
7. The water heater must be sized to supply the hot water demand in accordance with the guidelines in Raypak Water Heater literature.

WARRANTY EXCLUSIONS

1. REPAIR AND REPLACEMENT WORK WILL BE CARRIED OUT AS SET OUT IN THE RAYPAK WATER HEATER WARRANTY ABOVE, BUT THE FOLLOWING EXCLUSIONS MAY CAUSE THE WATER HEATER WARRANTY TO BECOME VOID, AND MAY INCUR A SERVICE CHARGE AND/OR COST OF PARTS.

- a) Accidental damage to the water heater or any component, including: acts of God, failure due to misuse; incorrect installation; attempts to repair the water heater other than by a Rheem Accredited Service Agent or Rheem Service.
- b) Where it is found there is nothing wrong with the water heater, where the complaint is related to excessive discharge from the pressure relief valve due to high water pressure; where there is no flow of water due to faulty plumbing; where water leaks are related to plumbing and not the water heater components; where there is a failure of gas, electricity or water supplies; where the supply of gas, electricity or water does not comply with relevant codes or acts.

- c) Where the water heater or water heater component failed directly as a result of; excessive water pressure, temperature and/or thermal input; incorrect flow rate through the heat exchanger; corrosive atmosphere.
- d) Where the water heater is located in a position that does not comply with the Raypak installation instructions or relevant statutory requirements, causing the need for major dismantling or removal of cupboards, doors or walls, or use of special equipment to bring the water heater to floor level, or to a serviceable position.
- e) Repairs to the water heater due to corrosion or scale formation in the waterways when the water heater has been connected to a harmful water supply as outlined in the Operating and Installation Instructions

2. SUBJECT TO ANY STATUTORY PROVISIONS TO THE CONTRARY, THIS WARRANTY EXCLUDES ANY AND ALL CLAIMS FOR DAMAGE TO FURNITURE, WALLS, FOUNDATIONS OR ANY OTHER CONSEQUENTIAL LOSS EITHER DIRECTLY OR INDIRECTLY DUE TO LEAKAGE FROM THE WATER HEATER.

In addition to this warranty, the Trade Practices Act 1974 and similar laws in each state and territory provide the owner under certain circumstances with certain minimum statutory rights in relation to your Raypak water heater. This warranty must be read subject to that legislation and nothing in this warranty has the effect of excluding, restricting or modifying those rights.

FOR SERVICE TELEPHONE

Raypak Australia Pty Ltd

A.B.N. 65 078 743 414

131 031 AUSTRALIA

0800 657 335 NEW ZEALAND

or refer to local Yellow Pages

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



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