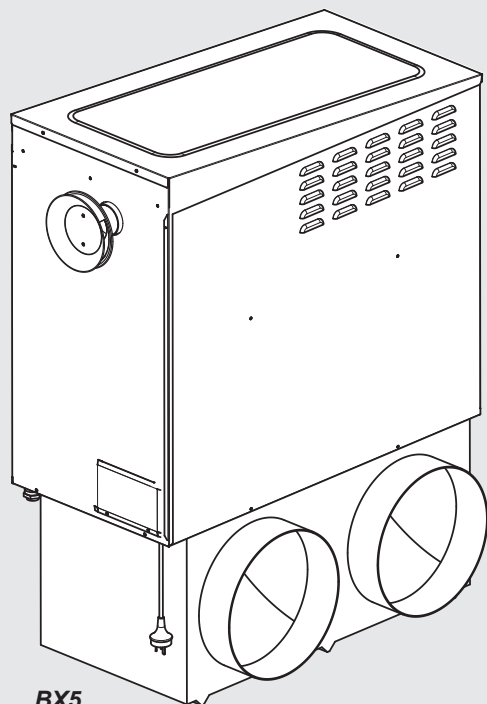


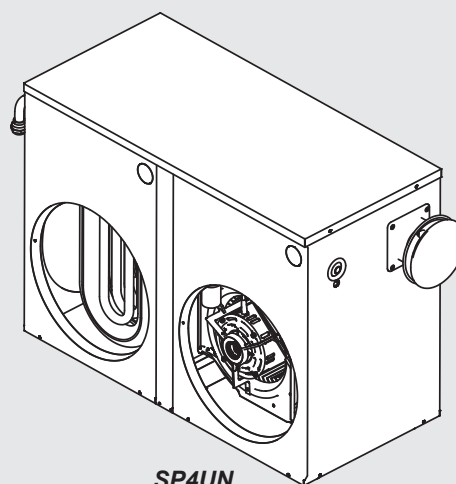
Models:

**BX5**

**SP4UN**



**BX5**



**SP4UN**

# StarPro Ducted Gas Heater

## Installation Manual

**brivis**  
Rinnai

This appliance must be installed in accordance with:

- Manufacturer's Installation Instructions
- Current AS/NZS 3000, AS/NZS 5601, AS/NZS 5141
- AS 4254, HB 276-2004
- Local Regulations and Municipal Building Codes including local OH&S requirements

This appliance must be installed, maintained and removed only by an Authorised Person.

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



**The Australian  
Gas Association**

All Rinnai gas products  
sold in Australia are  
A.G.A. certified.



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## WARNINGS AND IMPORTANT INFORMATION



### READ ALL INSTRUCTIONS BEFORE USING THE APPLIANCE.

Always comply with the following precautions to avoid dangerous situations and to ensure optimum performance.

Failure to carefully read and follow all instructions in this manual can result in equipment malfunction, property damage, personal injury and/or death.

**DANGER:** Indicates an imminently hazardous situation which, if not avoided, will result in personal injury or death.

**WARNINGS:** Indicates a potentially hazardous situation which, if not avoided, could result in personal injury or death.

**CAUTIONS:** Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury or damage to the appliance. It may also be used to alert against unsafe practices.



### REGULATORY / INSTALLATION

This appliance shall be installed in accordance with:

- Manufacturer's Installation Instructions.
- Current AS/NZS 5601, AS/NZS 5141 and AS/NZ 3000.
- AS 4254 - Ductwork for air-handling systems in buildings.
- HB 276-2004 – A Guide to Good Practice.
- Local Gas and Electricity Authorities.
- "SuperSizeGuide"
- Building Code of Australia (BCA) including local OH&S requirements
- Environment Authorities

This appliance must be installed, maintained and removed by an Authorised Person.

For continued safety of this appliance it must be installed and maintained in accordance with the manufacturers instructions.

This appliance is heavy, use 2 people or mechanical lifting device. Improper lifting may result in serious injury.

Take care when opening or unpacking this appliance. Failure to do so may result in serious injury or product failure.

**DO NOT** modify the electrical wiring of this appliance. If the control power wiring is damaged or deteriorated then it must be replaced by an authorised person. Failure to do so may result in electric shock, fire, serious injury or product failure.

**DO NOT** install the heater on an unstable or non level surface or where there may be a danger of it falling. It may result in death, serious injury, or product failure.

**DO NOT** install the outdoor unit where noise may cause nuisance.



### A NOTE ON ILLUSTRATIONS

The illustrations used in this manual are for explanatory purposes only and the shape of your unit may vary slightly from that which is shown in this manual.



The manufacturer cannot guarantee compatibility and support for anyone using 3rd party accessory/devices (device) on any of their appliances.

The suitability, compatibility or functional performance of any 3rd party device is entirely the responsibility of the device's supplier or installer.

Any 3rd party device, technical, installation, operation, performance or other enquiries need to be referred to the device's supplier or installer.

Any adverse effects of 3rd party devices on the operation, performance or reliability of this appliance is not covered by the manufacturer's product warranty.



#### **MANDATORY INSPECTION PRIOR TO INSTALLATION**

Immediately report any damage or discrepancies to the Supplier of the appliance. This appliance was inspected and tested at the time of manufacture and packaging, and released for transportation without known damage. Upon receipt, inspect the exterior for evidence of rough handling in shipment. Ensure that the appliance is labelled correctly for the gas and electrical supply, and/or other services it is intended to be connected to.

For safety and warranty purposes, appliances that may be damaged or incorrect must not be installed or operated under any circumstances. Installation of damaged or incorrect appliances may contravene local government regulations. Rinnai disclaims any liability or responsibility whatsoever in relation to the installation or operation of damaged or incorrect appliances.

# 1. SCOPE

This installation manual is intended to be used as a guideline for the installation of Gas Fired Central Heaters. It covers only the installation and commissioning of the heater and the allowable flueing configurations. Although recommended return air grilles and allowable duct outlet quantities are specified, it does not cover the actual ducting design required to suit the installation.

This installation manual is based on Australian codes. For all other applications, please refer to local codes and regulations.

These heaters must be installed and serviced only by qualified personnel. This manual applies to the following models:

5 Series	4 Series Heaters
External	Universal
BX520EN	SP415UN
BX526EN	SP421UN
	SP430UN
	SP435UN

## 1.1 SP4UN Heater Overview

SP4UN series heaters are non-condensing heaters.

Universal models may be used in both internal and external applications.

For more details refer to Technical Specifications section.

## 1.2 BX5 Heater Overview

The BX520 and BX526 ducted heaters are designed primarily to replace Buffalo 85 and Buffalo 120 heaters respectively. Their configuration allows for seamless changeover onto an existing base box, where applicable, with identical service connections, capacities and airflows commensurate with the original units. They also incorporate on-board controls providing greater flexibility for thermostat and zone control options.

### 1.3 Installer Due Diligence for Changeovers

Modern ducted gas heaters, even those that are physically 'like-for-like', typically have different technical specifications and control systems to existing, older models. Modern units usually have higher Star Ratings, which are accompanied by higher airflows. Higher efficiency heaters with modulating gas valves also operate differently to non-modulating units.

When doing a direct unit change over:

- Do a comprehensive inspection of the entire existing system to ensure it is 'fit for purpose' with the new heater
- Check existing items that are not being replaced; i.e. ensure the soundness and suitability of all fittings and controls for use with the new ducted gas heater (e.g. Duct sizes, Flue, Return Air grille size, Thermostat, Zoning etc.)
- Correctly commission the new ducted gas heater – where possible, align it with the performance characteristics of the original system – do not leave units at the factory default settings unless you are absolutely certain the settings are appropriate

Failure to observe best practice can lead to costly call backs for installers, unnecessary manufacturer warranty calls and a poor customer experience.

With our policy of continuous improvement, we reserve the right to change, or discontinue at any time, specifications or designs without notice.

#### Definitions

##### Shall

Indicates a mandatory requirement of this manual.

##### Should

Indicates a recommended requirement of this manual.

Any deviations from these instructions may, at the discretion of the manufacturer, void the warranty. As a result, the customer and/or installer may be charged a fee for non-product warranty related call outs. Also note that failure to comply with these instructions may preclude company service personnel from being able to service the unit.

#### Disclaimer



**This document is a guide only. Laws, regulations and industry standards can vary between States and Territories. Accordingly, this guide must be read in conjunction with, and subject to, all laws, regulations and industry standards applicable in the State or Territory in which the products are installed. You must ensure that the installation of the products will comply with those laws, regulations and standards, and that the products recommended to customers are fit for the purpose for which they are intended.**



## 2. GENERAL PRODUCT GUIDELINES

### 2.1 APPLICATION AND SIZING

These heaters are designed to provide a central source of heat for a ducted central heating system.

The heaters should not be installed downstream from an air washer, an evaporative cooler or refrigerative cooling system. Nor are they designed to be installed on a marine craft, houseboat, or any similar environment.

The heaters must be installed in accordance with these instructions and related regulations, codes, standards, and authorities. These include but may not be limited to:

- AS/NZS 3000 - Electrical Installations
- AS/NZS 5601 - Gas Installations
- AS 4254 - Ductwork for air-handling systems in buildings
- HB 276 - A Guide to Good Practice
- AS/NZS 5141 - Residential Climate Control Systems
- Local Gas and Electricity Authority Codes
- Product Sizing Guide
- Local Building Regulations
- Environment Authorities
- National Construction Code of Australia (NCC)



**The manufacturer assumes no responsibility for equipment installed in violation of any code, regulations and these installation instructions.**

It is recommended the Product Sizing Guide is followed in estimating heating requirements and for system design that will result in efficient installation and provide a higher level of comfort and economical operation.

For the hourly input and the gas type to be used, refer to the appliance data label located inside the service compartment or the Technical Specifications at the rear of this manual.



**All installations should only be carried out by a qualified tradesperson. Installations at altitudes above 1000m above sea level may require main burner injector upgrading. Please contact the Customer Service Centre for advice.**

### 2.2 INSPECTION

This appliance has been inspected and tested at the time of manufacture and packaging and released for transportation without known damage. Upon receipt, inspect the exterior for evidence of rough handling in shipment. Ensure that the appliance is labelled correctly for the gas to which it is intended to be connected. If a discrepancy or damage to the appliance is identified DO NOT install the appliance and report findings back to supplier.

### 2.3 UNPACKING THE HEATER

Some heaters are supplied on a pallet with a plastic sleeve. To unpack:

Cut and remove the external plastic packaging and dispose of thoughtfully.

Remove heater from pallet (if supplied).

Some heaters are supplied with a base box assembly wrapped with a removable plastic film to protect the surface.



**Always remove and dispose of the plastic film before mounting the heater onto the base box.**

### 2.4 UNLOADING OR LIFTING THE HEATER

When unloading or lifting the heater, ensure lifting equipment is in good operating condition and capable of lifting the total load. Be sure there is a clear area to place the heater down, which is within reach of the lifting equipment.



**Do not use the lifting handles provided to lift the heater above head height. If fitting the heater to elevated heights such as a roof, use suitable lifting equipment.**

## 2.5 SERVICE CONNECTION GUIDELINES

### 2.5.1 Gas Inlet Connection

- All piping must be in accordance with AS/NZS 5601 and any local gas regulations.
- The connection point for universal and external model heaters is a female G3/4 compression fitting to AS 3688. This is either located on the outer cabinet of the heater, or supplied loose within the heater.
- The connection point for internal model heaters is a male G3/4 compression fitting to AS 3688.
- A gas cock shall be fitted in the gas line adjacent to the heater and in a convenient location so it can be turned OFF quickly and easily.
- The gas supply shall in no way interfere with any servicing of the heater.



**The gas supply must be installed by a licensed gas fitter. The gas pipe and gas meter should be sized so the heater can maintain its required incoming gas pressure at maximum consumption with all other gas appliances operating at their maximum capacity at the same time as the heater.**

### 2.5.2 Electrical Power Supply

The heater is pre-wired with a 3-pin plug and lead, and shall be plugged into a standard 10 Amp 220-240V fixed switched socket outlet adjacent to the heater in a convenient location so it can be turned OFF quickly and easily.



**A qualified electrician must install the 220 to 240 volt wiring according to local regulations.**



**Switch OFF the power and unplug the heater before touching any wiring. If any electrical wiring is damaged, it must be replaced by the manufacturer, its service agents or an electrically qualified technician, in order to avoid a hazard.**

The electricity supply must be 220-240V at 50Hz, and supplied by an authorised power supplier. Generators should never be used to supply this system as their output may be incompatible with, or prone to damage electronic components of the heater.

## 3. HEATER DIMENSIONS AND CLEARANCES

### 3.1 HEATER DIMENSIONS – SP4UN

Diagram 1. SP4 Universal Heater Dimensions

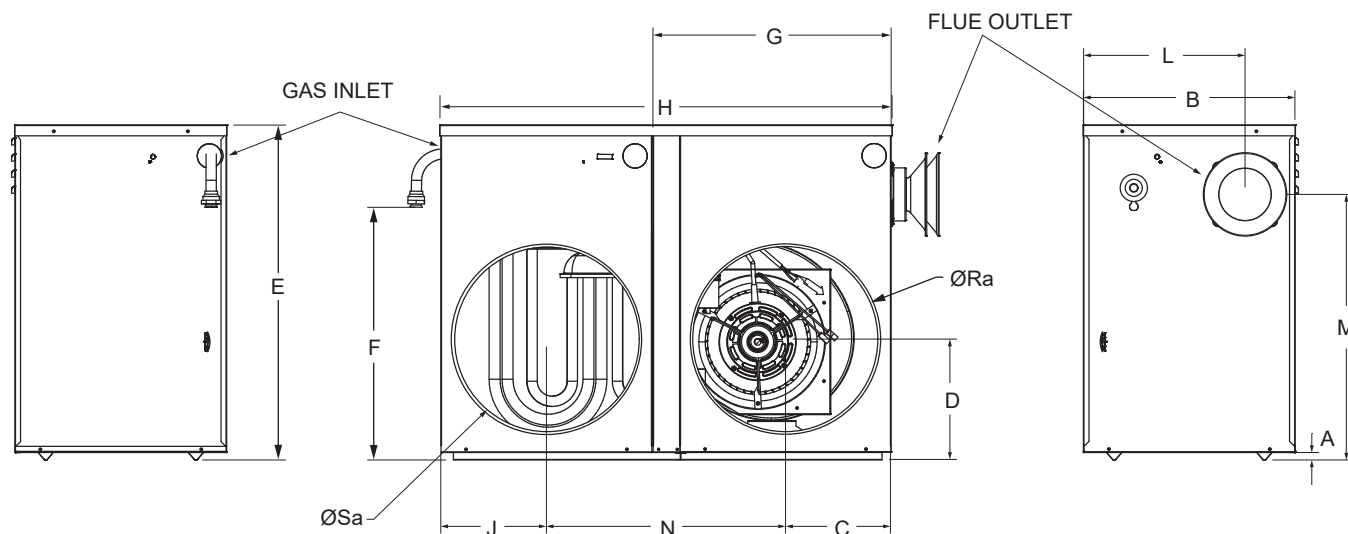


Table 1. SP4 Universal Heater Dimensions (mm)

Universal Model	A	B	C	D	E	F	G	H	J	L	M	N	øSa	øRa
SP415UN	14	397	197	235	625	471	448	845	197	95	495	447	300	300
SP421UN	14	397	197	235	625	471	448	845	197	95	495	447	300	300
SP430UN	14	549	197	235	644	491	497	923	237	250	515	487	350	350
SP435UN	14	549	197	235	644	491	497	923	237	250	515	487	400	400



SP4 Universal models are approved for internal or external applications.

### 3.2 HEATER DIMENSIONS – BX5

Diagram 2. BX5 Heater Dimensions

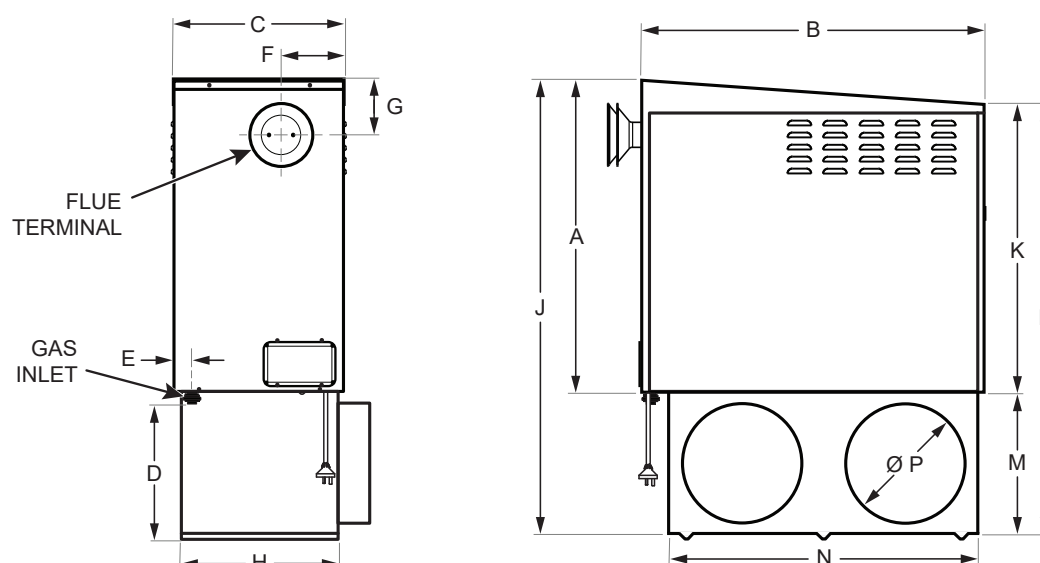


Table 2. BX5 Heater Dimensions (mm)

MODEL	A	B	C	D	E	F	G	H	J	K	L	M	N	P
BX520	775	852	420	341	41	156	135	391	1145	715	1085	370	771	300
BX526	866	1028	582	387	41	238	135	557	1280	805	1220	415	951	350

### 3.3 SERVICE CLEARANCES – INTERNAL

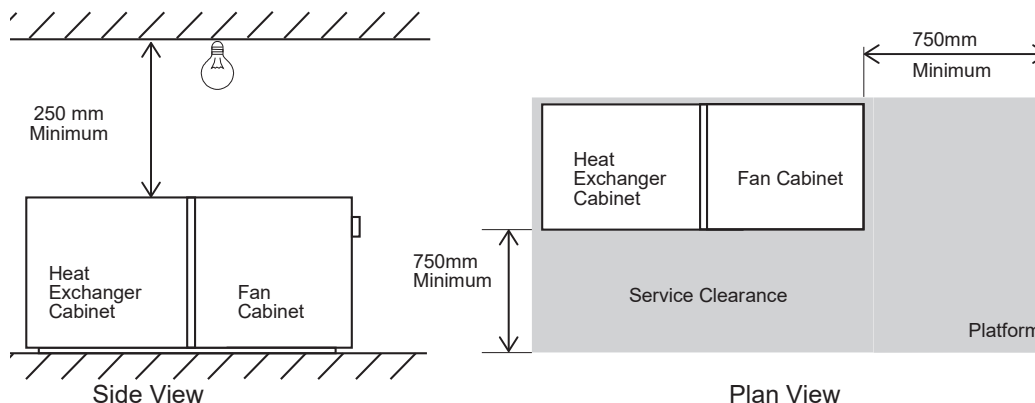
#### 3.3.1 Service Clearance Notes

All SP415UN and SP421UN models can be installed in accordance with 'Method 1', 'Method 2', 'Method 3' and 'Method 4' below. The SP430UN and SP435UN can be installed in accordance with 'Method 1' and 'Method 2' only.

#### 3.3.2 Internal Clearances

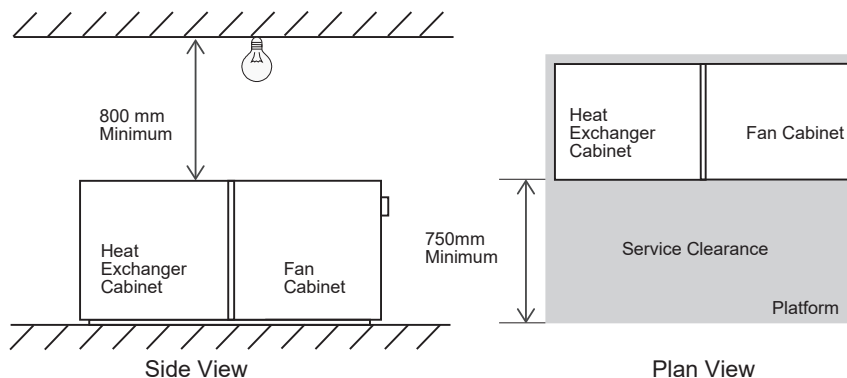
##### Method 1: In Ceiling and Under Floor

Diagram 3. Method 1 Clearances



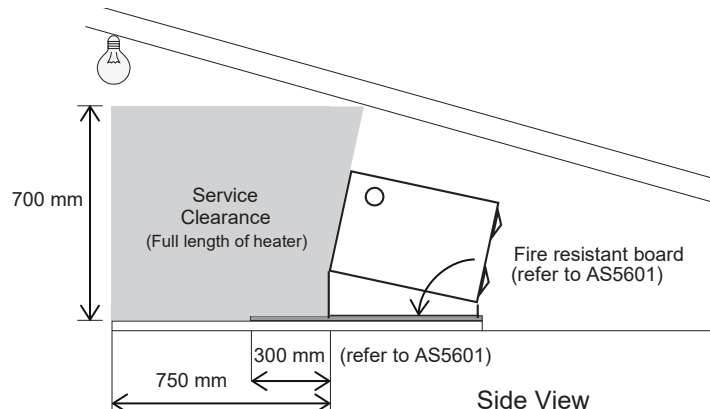
##### Method 2: In Ceiling and Under Floor

Diagram 4. Method 2 Clearances



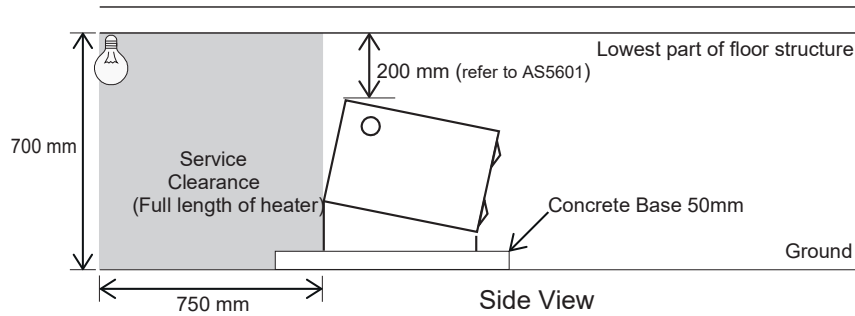
##### Method 3: Lay-down Option – In Ceiling

Diagram 5. Method 3 Clearances



## Method 4: Lay-down Option – Under Floor

Diagram 6. Method Clearances



Method 3 and Method 4 are not options for SP430UN and SP435UN models. These models may be installed to Method 1 or Method 2 only.

## 3.4 SERVICE CLEARANCES – EXTERNAL

### 3.4.1 Installation of Flashing

The flashing must be fitted to ensure the ductwork is adequately weather protected.



To allow the heater to be moved out from the wall such as for servicing, it is important to provide additional length in the ducting connected to the pops.

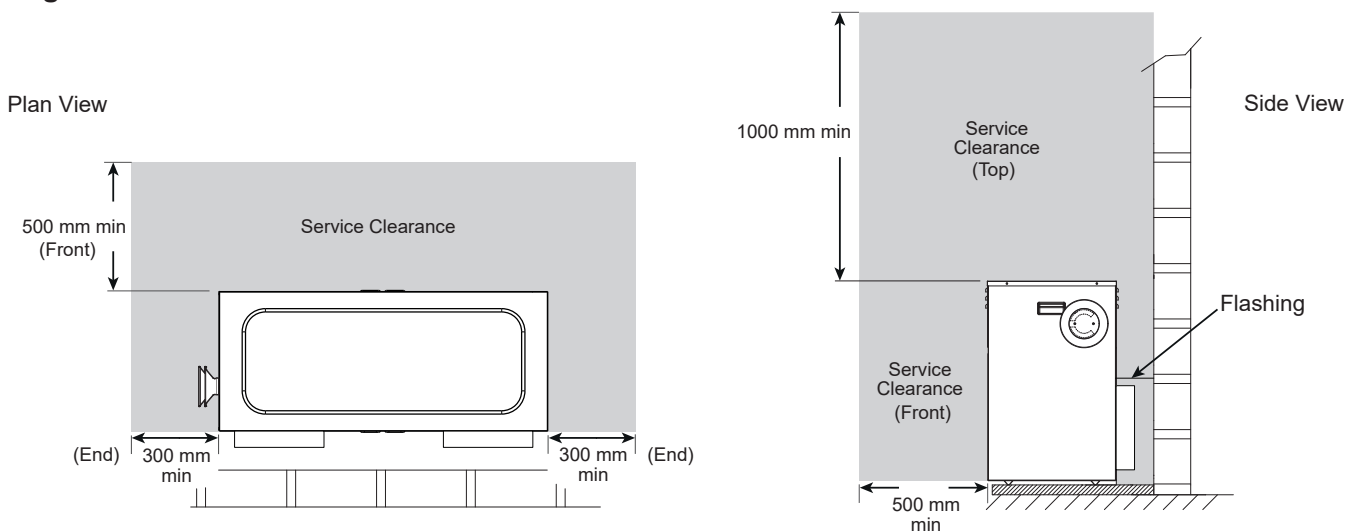
### 3.4.2 SP4UN External Clearances

**Front:** A minimum of 500mm must be provided at the side facing away from the house.

**End:** A minimum of 300mm must be provided at each end of the heater.

**Top:** A minimum of 1000mm must be provided above the heater roof. This clearance must be maintained for the entire surface area of the heater roof.

Diagram 7. External Clearances



### 3.4.3 BX5 Service Clearances

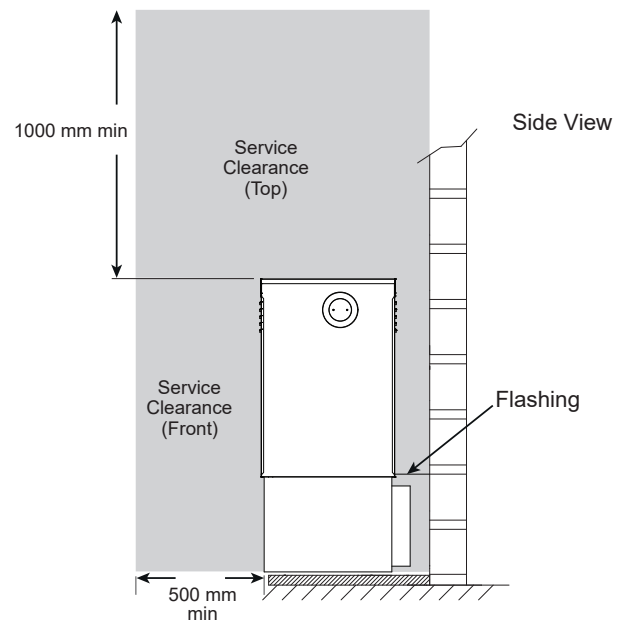
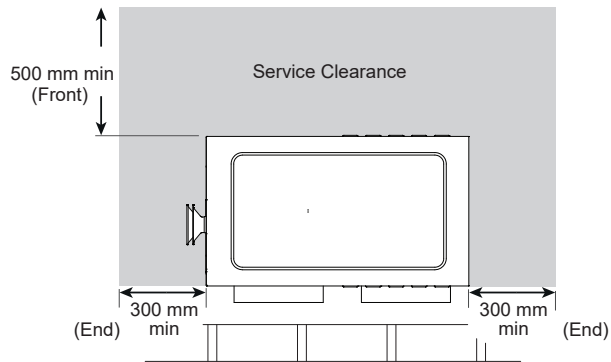
**Front:** A minimum of 500mm must be provided at the side facing away from the house.

**End:** A minimum of 300mm must be provided at each end of the heater.

**Top:** A minimum of 1000mm must be provided above the heater roof. This clearance must be maintained for the entire surface area of the heater roof.

**Diagram 8. BX5 Clearances**

Plan View



## 4. HEATER CONFIGURATION

### 4.1 HEATER DUCT POP INSTALLATION

On SP4UN series heaters, the duct connection pops need to be fastened to the heater cabinet as follows:

- Insert pops into the hole in the pop plate, ensuring the pop flange is placed over the prescribed wall of the cabinet, refer to Table 3.
- Spread pop flange to fit tightly into the hole in the cabinet (the notch side overlapping the other).
- Secure pops with the rivets supplied.

**Table 3. Pop Installation Matrix**

		Return Air		Supply Air	
		No. of Walls	Install Pop	No. of Walls	Install Pop
Universal Model Cabinet	SP4UN	2	Inner Wall	2	Inner Wall

### 4.2 DUCT CONNECTION CONFIGURATION OPTIONS

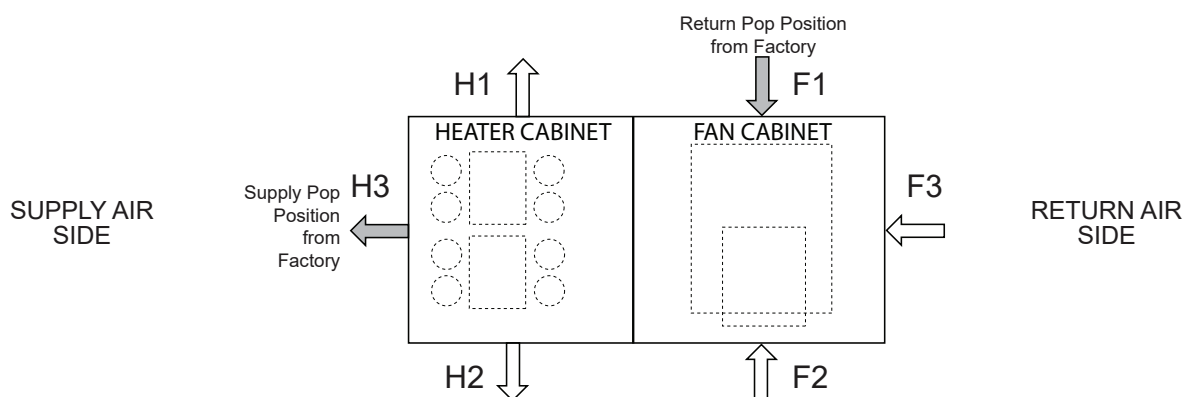
#### (Not applicable BX5 Models)

For SP4UN series heaters, the return air and supply air duct connections can be reconfigured. That is, the heater panels can be repositioned to move the duct outlet/inlet to the back or to the side of the unit to suit the specific installation.

#### Change Duct Connection Locations

Simplistically, the heater unit is made up of two cabinets: a heater cabinet (air heating components) and a fan cabinet, (supply air fan). Diagram 9 identifies three pop positions on the heater cabinet (H1, H2 and H3) and three pop positions on the fan cabinet (F1, F2 and F3).

**Diagram 9. Duct Connection Options**



**SP430UN and SP435UN:** The pops can be configured to support any combination of the following options:

- Return air pop: Can be positioned at F1 or F2 (Diagram 9).
- Supply air pop: Can be positioned at H1, H2 or H3.

**SP415UN and SP421UN:** The pops can be configured to support any combination of the following options:

- Return air pop: Can be positioned at F1, F2 or F3 (Diagram 9).
- Supply air pop: Can be positioned at H1, H2 or H3.

## Return Air Orientation

### 4.2.1 SP430UN and SP435UN Fan Cabinet: Swap F1 – F2

- a. Remove the lid.
- b. Remove F1 and F2 panels (Diagram 9).
- c. Remove the internal blanking panel (four screws behind insulation).
- d. Install the blanking panel in the required position.
- e. Install F1 and F2 panels in the required positions.
- f. Install the lid.

### 4.2.2 SP415UN, SP421UN Fan Cabinet: Swap F1/F2 – F3

(Not available for SP430UN and SP435UN)

- a. Remove the lid (Diagram 9).
- b. Remove the F3 handle and flue terminal, and then remove the panel.
- c. Remove the flue hole blanking plate from F1 or F2 as required, then remove the panel.
- d. Remove the internal blanking panel (four screws behind insulation).
- e. Install the blanking panel in the required position.
- f. Install the panels in the required positions.
- g. Install the flue terminal and flue hole blanking plate.
- h. Install the lid.



#### RETURN AIR CONNECTION AT THE END OF THE UNIT - REAR ENTRY (F3)

Connecting the return air duct to the end of the unit reduces the rated airflow by up to 30%. The total number of outlets normally permitted for a heating system shall be reduced by 2 (predominantly when a unit is laid down). Refer to the outlet register chart on "Table 6. Outlet Register Chart" on page 27

For ADD-ON cooling applications, **MAKE SURE** that the minimum recommended airflow is maintained. Refer to the ADD-ON installation manual for more information.

## Supply Air Orientation

### 4.2.3 SP4UN Heater Cabinet: Swap H1/H2 – H3

- a. Remove the lid (Diagram 9).
- b. Remove the H3 handle, and then remove the panel.
- c. Remove H1 or H2 panel as required.
- d. Remove the internal blanking panel (four screws behind insulation).
- e. Install the blanking panel in the required position.
- f. Install the external panels in the required positions.
- g. Install the lid.



Feed tube knockout opening will need to be removed prior to installing the feed tube. Grommet for feed tube provided.



### **4.3 SP4UN SERIES GAS FEED TUBE INSTALLATION**

SP4UN model heaters are supplied with a gas feed to be in the controls area beneath the lid. The gas feed shall be installed on to the heater gas valve and tested for leaks.

For SP4 Universal heaters install the gas feed tube as follows:

- a.** Change the pop (duct connection) locations as required. This ensures the pre-cut blanking plate is removed from the correct cabinet panel.
- b.** Remove the pre-cut blanking plate covering the hole in the upper corner of the end panel near the gas valve assembly.
- c.** Position the gas feed tube from the gas valve out through the hole.
- d.** Install the compression fitting to the valve assembly to connect the feed tube. Do not over-tighten the compression fitting.

## 5. HEATER POSITIONING

Install the heater in a position that allows adequate and safe access for service as per guidelines in this manual and applicable standards. The cost of any equipment and additional labour involved in accessing such heater installations will not be accepted by the manufacturer.



**Service clearance measurements must be complied with, to avoid impeding the serviceability of the heater.**

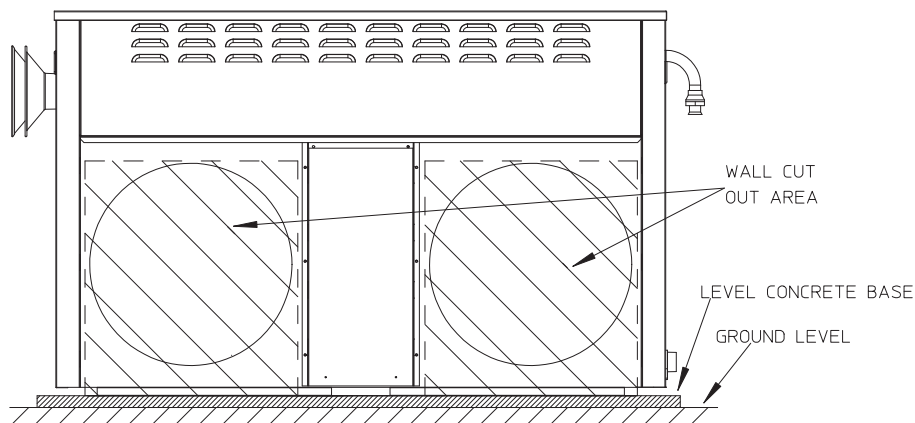
### 5.1 WALL CUT-OUT AREA

- 5.1.1 When installing the heater at ground level, create two holes to suit the pops, ensuring there is no impediment to the structural integrity of the dwelling. Create two holes all the way to ground level (refer to Diagram 10), or one hole to cover the distance of both pops.



**Refer to Table 1 to obtain the dimensions for the model of heater being installed.**

**Diagram 10. Wall Cut-out Area**



### 5.2 SPLITTING HEATER FOR ASSISTED LIFTING AND POSITIONING

#### (Not applicable BX5 Models)

The SP4UN series heaters can be split for ease of installation.

#### 5.2.1 SP4 Universal Heater

- Remove the lid (four screws).
- Disconnect the gas valve, overheat/pressure switch loom, igniter and flame sensor from the PCB.
- Disconnect the flue pipe.
- Remove the screws fastening the fan cabinet tabs to the heat exchanger cabinet. These are located at the top of the heat exchanger cabinet on the heater split line.
- Tilt the fan cabinet back and slide away from the heater cabinet.



**Protect the exposed looms and tabs from damage while the heater is split.  
Ensure when reassembling the heater that all items are correctly installed and connected.**

- f. To assemble the heater, follow the procedure in the reverse order ensuring that:
- the two locating brackets at the base of the cabinets are fully engaged, and
  - all switches, the gas valve and the flue pipe are correctly installed.

### 5.3 INTERNAL INSTALLATIONS

SP4UN series heaters that are installed in the roof or beneath the floor shall comply with the following guidelines and AS/NZS 5601.

#### 5.3.1 Installation in the Roof Space

- The area under the heater must be capable of supporting the additional load, without causing deformation of any part of the building structure.
- The appliance must be accessible by means of fixed access, a normal ladder or steps.
- A passage of 600mm wide must be provided between the roof access opening and the heater.
- This passage must have a suitable walkway of at least 19mm thick particle board or equivalent.
- A permanent level platform must be provided beneath the heater and this platform area must extend 750mm out from the controls access panel side and fan motor access panel side/s for the entire length of the heater.
- The air gap created between the base of the heater and the platform by the heater's legs must be maintained.
- Permanent artificial lighting must be provided at the heater, with the switch located at the roof access opening.
- If a lay-down kit is used the supporting platform must be covered with a fire resistant material.

#### 5.3.2 Installation Beneath the Floor

- There must be a minimum clearance of 200mm between any part of the appliance and the lowest part of the floor structure. In addition to this, refer to Service Clearances 3.3 (internal) or (external).
- The heater must be located within 2m of the access opening, or with a minimum clearance of 1.2m between the lowest part of the floor structure and ground level, maintained from the access opening to the heater.
- All under floor installations must be on a level concrete base (50mm thick), and provision made to drain any condensate, seepage or ground water away from the heater.
- Permanent artificial lighting must be provided at the heater with the switch located at the access opening.
- Lateral (horizontal) flues may be installed in accordance with AS/NZS 5601, ensuring that the lateral flue section has a minimum rise of a 20mm per metre of lateral run.
- The flue must be terminated outside the building in accordance with AS/NZS 5601. For SP4UN series heaters, termination can be performed using a remote terminal. Refer to para 6.1.3.

#### 5.3.3 Ventilation Calculations

For installation of universal heaters in a room, enclosure, residential garage, or plant room with natural ventilation conditions, ensure adequate ventilation is available by utilising the following formulae:

#### Properties Approved for Construction prior to 31st March 2014

- a. Determine if the rating per cubic metre of the space is greater than 3MJ/hr.

Example:

$$\text{Unit rating (Ur)} = 120\text{MJ/hr}$$

$$\text{Room volume (Rv)} = 1\text{m} \times 1\text{m} \times 2.4\text{m} = 2.4\text{m}^3$$

$$\text{Ur/Rv} = 120/2.4 = 50 \text{ MJ/hr per m}^3$$

As the result is greater than 3 MJ/hr per cubic metre of the space, additional ventilation is required.

- b. Two permanent openings are required, each equivalent in area to the determined value A. The lower vent shall be located close to the floor or at burner level. The upper vent shall be located at or above the top of the unit. The two openings may be combined as long as the above conditions are met.

Determine free ventilation area using  $A = T \times F$ , where:

A = minimum free ventilation area,  $\text{mm}^2$

T = total gas consumption of all gas appliances, MJ/hr. e.g. SP421UN = 90MJ/hr

F = factor (detailed in the table below)

**Table 4. Ventilation F Factors**

Gas appliance location	Source of Ventilation	Factor F
Gas appliance in a room or enclosure	Directly to outside*	300
	Via an adjacent room	600
Gas appliance in a plant room	Directly to outside*	150
	Via an adjacent room	300
Gas appliance in a residential garage	Directly to outside*	300
* <b>Directly to outside</b> means through an external wall to outside, into a cavity vented to outside, into an underfloor space vented to outside, or into a roof space vented to outside.		

## Properties Approved for Construction after 31st March 2014

c. Determine if the rating per cubic metre of the space is greater than 0.4 MJ/hr.

Example:

Unit rating (Ur) = 120MJ/hr

Room volume (Rv) = 1m x 1m x 2.4m = 2.4m<sup>3</sup>

Ur/Rv = 120/2.4 = 50 MJ/hr per m<sup>3</sup>

As the result is greater than 0.4 MJ/hr per cubic metre of the space, additional ventilation is required.

Refer to AS/NZS 5601 for natural ventilation requirements.



**For New Zealand ventilation requirements and all other applications, e.g. Mechanical Ventilation, refer AS/NZS 5601.**

## 5.4 EXTERNAL INSTALLATIONS

SP4 Universal and BX5 models can be installed outside of the house. For an installation under a house floor, an SP4 Universal model should be chosen.

All heaters that are installed externally on the ground should be installed on a level concrete base or pad. If the heater is to be installed in an elevated position or on a roof, the installation shall comply with AS/NZS 5601. It must be secured to prevent movement and it must have adequate provision for service access.

### 5.4.1 SP4UN – Installation of Flashing

For installation details refer to the instructions supplied with associated flashing kit.



**To allow the heater to be moved out from the wall such as for servicing, it is important to provide additional length in the ducting connected to the pops.**

## 6. FLUE INSTRUCTIONS AND CLEARANCES

### 6.1 INTERNAL – SP SERIES

#### 6.1.1 General

- All flues shall be installed in accordance with AS/NZS 5601.
- Horizontal flues shall have a minimum rise of 20mm per 1m run.
- Horizontal flues terminating on a wall shall be at least 300mm above ground level.
- An external flue terminal clearance to an opening in a building shall be no less than 1000mm in the vertical direction and 300mm in the horizontal direction.
- Systems with both vertical and horizontal flue runs should be treated as all horizontal.
- One 45° bend is equivalent to one half 90° bend (i.e. two 45° bends = one 90° bend).
- Provide adequate support to flue sections (e.g. saddles / strapping).

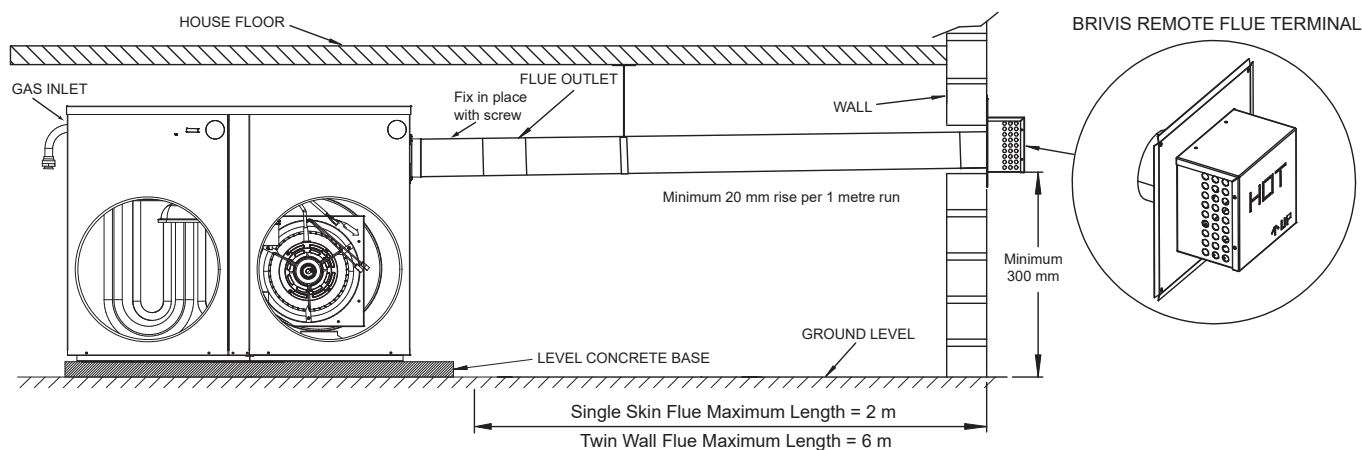
#### 6.1.2 SP4UN Models – 100mm Non-corrosive Metal Flue.

- Requires a 100mm round single or twin wall non-corrosive metal flue, suitably terminated.
- All flues shall have a bolted flue sleeve connection to allow for repairs and/or removal of the appliance.
- Twin Wall flue – maximum flue length of 6m.
- Single Wall flue – maximum flue length of 2m.
- Up to four 90° elbows are permitted with the same length requirements specified above.

#### 6.1.3 Remote Terminal (Part No. B018384) Internal Model Applications

In specific installations, for example under the floor, it is recommended that a remote terminal be used to terminate the flue on the outside wall of the building. Please refer to the instructions supplied with a remote flue terminal. Diagram 11 depicts a typical SP4UN underfloor configuration.

**Diagram 11. Typical Remote Terminal Configuration - SP4UN Models**



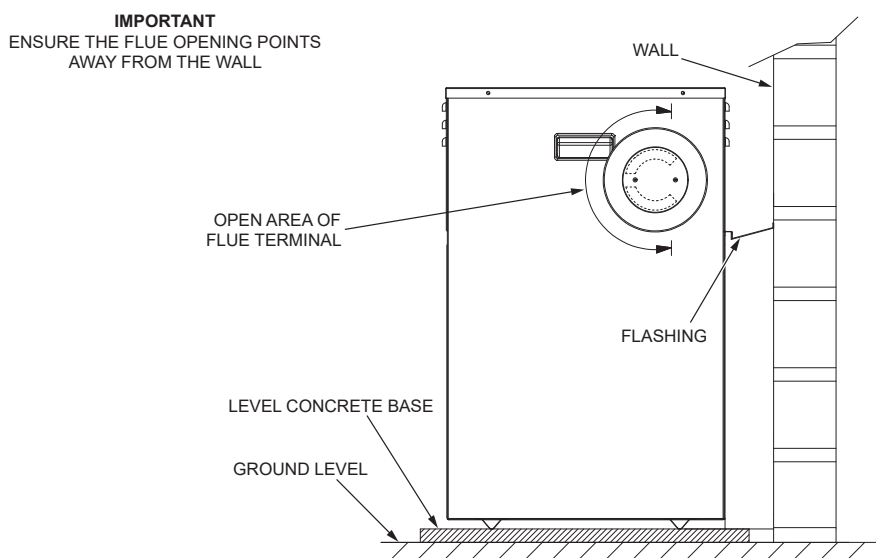
## 6.2 EXTERNAL FLUE TERMINAL CLEARANCES

### 6.2.1 Installation of Flue Terminal

The flue outlet socket can be found behind an installer instruction label. The flue terminal must be ordered separately when SP4UN is installed externally (Part No. B021385).

Remove the label and insert the flue terminal firmly into the flue outlet socket in the correct orientation to ensure the flue gases are expelled away from the house (refer to Diagram 12).

**Diagram 12. Flue Terminal Installation**



**The flue terminal must be ordered separately when an SP4UN model is installed externally (Part No. B021385).**

**The flue terminal must always be installed before starting the heater.**

Heaters that are installed outside the house should be positioned so that, when measured from the edges of the flue, the following minimum clearances exist, which are in accordance with AS/NZS 5601:

#### 75mm

- Out from the wall against which it is mounted.
- From a drain or soil pipe.

#### 300mm

- From a flue terminal, cowl or combustion air intake.
- Below eaves, balconies or other projections.
- From the ground, above a balcony or other surface.
- To a return wall or external corner.
- Measured horizontally, from an opening window, door, non-mechanical air inlet or any other opening into the building (except sub floor ventilation) or 1500mm in direction of discharge.

#### 500mm

- From an electricity meter or fuse box (prohibited area extends to ground level).

#### 1000mm

- Measured vertically, from an opening window, door, non-mechanical air inlet or any other opening into the building (except sub floor ventilation).
- From a gas meter.
- From a mechanical air inlet, including a spa blower, measured both vertically and horizontally.
- A flue terminal of this type shall not be located under a roofed area, unless the roofed area is fully open on at least two sides, and a free flow of air at the appliance is achieved.

## 7. THERMISTOR INSTALLATION

### 7.1 SP4UN SERIES THERMISTOR INSTALLATION

All SP4UN series heaters are supplied with a remote thermistor assembly. The thermistor must be installed in the supply air duct, between 1m to 3m away from the heater, but never beyond the first Branch Take Off (BTO) fitting.



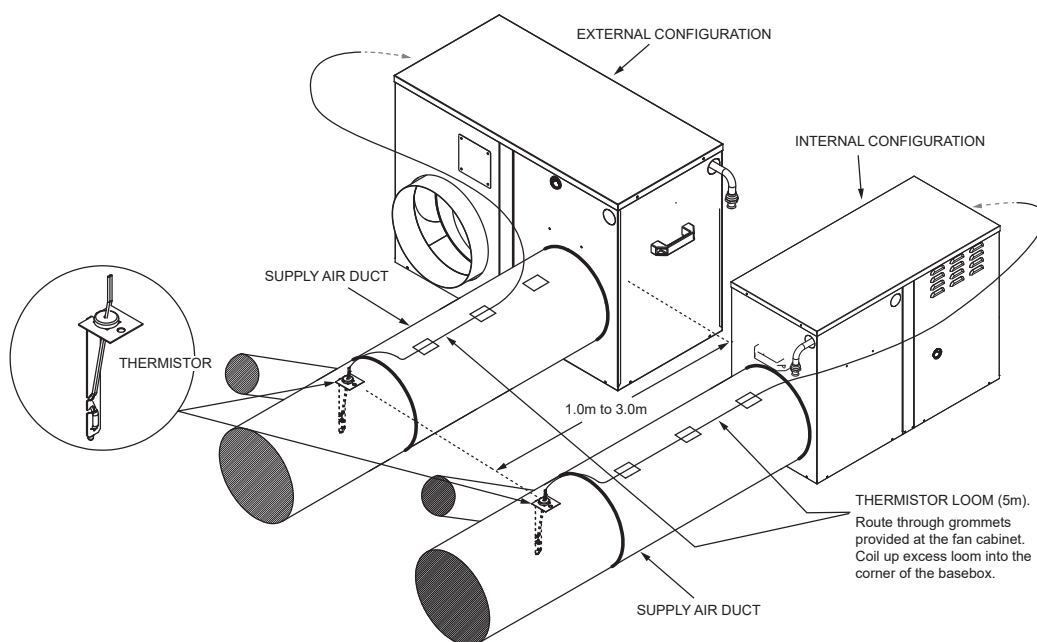
**Where an Add-On air conditioning indoor evaporator coil is installed, the thermistor must be located in the discharge air pop of the indoor coil.**

These installation practices promote more accurate supply air temperature control and optimise heater performance.

- Ensure that there is at least 1 metre of appropriately sized ducting installed between the heater and the first BTO fitting (or evaporator coil).
- Drill a 20mm diameter hole through the top of the inlet end of the first BTO fitting (refer to Diagram 13) or through the top of the evaporator coil discharge pop.
- Carefully insert the thermistor assembly (probe end first) into this hole and secure using the self drilling screw provided. Seal any remaining openings with duct tape.
- Ensure that the thermistor lead is secured to timbers or duct outer casing to prevent damage.

If the first BTO fitting is installed more than 3m away from the heater, an additional duct joiner (installer supplied) will be required so that the thermistor assembly can be fitted correctly. Install the joiner between 1m and 3m away from the heater, ensuring the thermistor can reach this joint. After making this modification, follow the steps per normal practice.

**Diagram 13. SP4UN Thermistor Position**



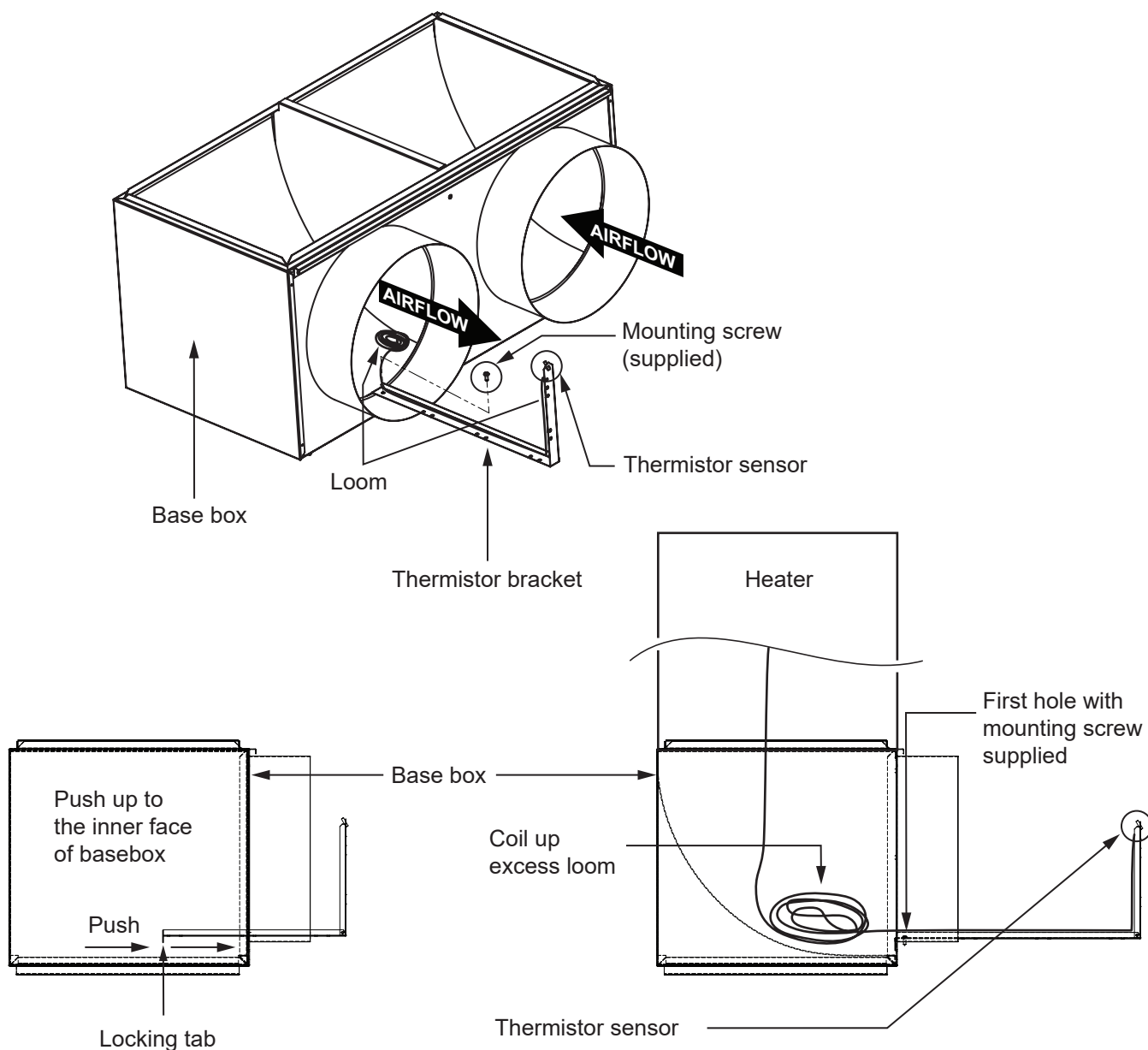
**Do not place thermistor at the base of the duct as this may impact appliance performance.**

### 7.2 BX5 THERMISTOR INSTALLATION

The thermistor is located on a bracket within the heat exchanger tubes and must be positioned correctly prior to the installing unit onto a base box. Install a thermistor as follows:

- a. Remove all packaging from the heater and basebox where applicable.
- b. Remove the thermistor bracket secured to the heat exchanger
- c. Position the thermistor bracket on the discharge pop lip and secure the arm with supplied mounting screw (located in plastic bag containing manuals). See "Diagram 14. BX5 Thermistor Mounting Location" on page 24
- d. Position heater onto basebox and coil up excess loom into the corner of the basebox. Ensure thermistor loom is not pinched between heater and basebox.

Diagram 14. BX5 Thermistor Mounting Location



The thermistor bracket is affixed with supplied mounting screw at the discharge pop.

- The loom can be installed either left or right handed, to be confirmed by installer.
- Remove bracket from heat exchanger and install as shown above.
- Be careful not to pinch the loom



## 8. DUCTING AND OUTLETS

### 8.1 DUCT DESIGN AND SIZING

Good duct design and sizing are essential to every Central Heating system. Use the Product Sizing Guide and technical data within this manual for the best results and follow these guidelines:

- Ductwork should be well insulated and airtight and have a minimum insulation rating of R1.0 (R1.5 in some areas). Ensure that ducting complies with the Building Code of Australia.
- The ducting should be well fastened to pops, BTOs, outlet boots and neck adapters adequately with duct tape, in accordance with AS 4254, HB 276 and AS5141.
- It should also be properly sized, and curves and bends should be smooth enough to ensure that the air flows through efficiently, quietly and with minimal resistance.
- The registers and diffusers should be large enough and of good design. They should minimise noise, while providing the correct distribution pattern.
- The positive return air system should be fitted with a grille large enough to accept the full air capacity of the system at low noise levels.
- If the system uses high level outlets (e.g. ceiling diffusers), then the return air inlet should be at a low level. Ceiling systems with a high level return air may result in reduced performance.
- For SP4UN heaters, access to the ductwork must be provided for general maintenance and service to the supply air thermistor sensor.



**It is important that the ducting should be well insulated. It is mandatory under building codes to install insulated, fire rated duct.**

### 8.2 RETURN AIR GRILLE

If a filter is fitted to the return air grille, make sure it is easily accessible for regular cleaning.

Table 5 gives the minimum recommended return air grille sizes for each model heater.

**Table 5. Minimum Recommended Return Air Grille Selection**

Model	Without Filter		With Filter	
	Grille Size (m <sup>2</sup> )	Example Size (mm)	Grille Size (m <sup>2</sup> )	Example Size (mm)
SP415UN, SP421UN, BX520	0.26	(400x650)	0.39	(400x1000)
SP435UN, BX526	0.36	(400x900)	0.54	(400x1350)
SP430UN	0.31	(400x800)	0.47	(400x1200)



**Sizes are based on maximum airflow for typical 'egg-crate' grilles. For all other types, refer to the manufacturer's specifications.**

Example:

If a grille has a free ventilation opening of 500mm x 800mm, the grille size is 0.5m x 0.8m = 0.4m<sup>2</sup>

With a filter, this grille suits the SP415UN, SP421UN and BX520 heaters, which require at least 0.39m<sup>2</sup>.

### 8.3 RETURN AIR POP CONFIGURATION CHANGES

Some heater models offer an alternative for the return air pop from the side position to the end of the cabinet (for example, to accommodate a lay-down kit). Connecting the return air pop to the end of the unit reduces the rated air flow by up to 30%.



#### **RETURN AIR CONNECTION AT THE END OF THE UNIT - REAR ENTRY (F3)**

Connecting the return air duct to the end of the unit reduces the rated airflow by up to 30%.

**For ADD-ON cooling applications, MAKE SURE that the minimum recommended airflow is maintained. Refer to the ADD-ON installation manual for more information.**

## 8.4 OUTLET CHART INFORMATION

The outlet chart (Table 6) provides recommendations based on the Product Sizing Guide or a system designed using accepted design principles. The calculations use the typical size of registers and diffusers used on domestic heating systems (300mm x 100mm floor registers and 150mm round ceiling diffusers) with 150mm ductwork.

For all systems, the minimum number of outlets, the outlet grille and the damper in the duct must all remain fully open if the heater is to operate properly without overheating. Additionally, to ensure that the air velocity through each ceiling outlet is sufficient, the maximum number of fully open ceiling outlets should not be exceeded (although the system will operate efficiently with more ceiling outlets fully open if properly balanced).

There is not a limit/maximum number of floor outlets, so Table 6 lists the *typical* number for each heater model.

'Half' figures, such as 1.5, indicate one outlet fully open and another outlet half open (for example, in a bathroom). Refer to Section 12.2.

The outlet chart is divided into four columns as follows:

- A. The maximum number of outlets that should remain fully open for a ceiling outlet system.
- B. The typical number of outlets for a floor outlet system.
- C. The minimum number of outlets that should remain fully open for floor/ceiling systems where the system does not have zone dampers installed or, where there are zone dampers but these zones are not operated from a networker thermostat (e.g. wall switches).
- D. (Adaptive Zoning Only) The minimum number of outlets that should be fully open for floor/ceiling systems with:
  - zone dampers installed,
  - zone control via a networker thermostat using on-board zone relays or a Network 516 module, and
  - adaptive zoning active (hence minimum outlet number is reduced).



NOTE

- Refer to Column D only when the networker has been configured for adaptive zoning. Otherwise, refer to Column C.
- For ZonePlus configurations, refer to the ZonePlus Installation Manual.
- Airflow figures are based on a total static pressure of 125Pa for 30 and 35 models and 50Pa for other models.

**Table 6. Outlet Register Chart**

System Model	Airflow Rate (L/s)	A Maximum No. Ceiling Outlets	B Typical No. Floor Outlets	C Minimum No. Floor/Ceiling Outlets	D (Adaptive Zoning) Minimum No. Floor/Ceiling Outlets
<b>SP4 Heaters – Universal</b>					
SP415UN	620	10	12	6	2
SP421UN	621	10	12	6	2
SP430UN	918	16	23	7	2
SP435UN	1004	17	23	7	3
<b>BX5 Heaters – External</b>					
BX520EN (300mm)**	605	10	12	5	2
BX520EN (350mm)**	667	12	13	6	2
BX526EN (350mm)**	944	16	23	7	2
BX526EN (400mm)**	1011	17	23	7	3

\*\* Model and base-box duct size



For SP4UN installations, the normal return air pop configuration is side entry, but can be changed to the end of the fan cabinet if necessary. Connecting the return air duct to the end of the unit reduces the rated airflow by up to 30%.

## 9. THERMOSTAT INSTALLATION

### 9.1 SP4UN AND BX5 SERIES THERMOSTAT POSITIONING GUIDELINES

A thermostat is positioned inside the house and wired to the control module in the heater unit. The thermostat monitors the temperature in the house and switches the system on and off in order to maintain a set temperature, therefore, the thermostat must be installed in the correct position.

Various thermostats are available for controlling the heating systems; these are explained below.

It is important that the thermostat is placed in a position that will provide the most accurate reading of the temperature, for example, in the area most often used for family living.



- Do not install the wiring with the power turned on, as the fuse may blow, which would not be covered under warranty.
- Use only thermostats of the same brand as the heater unit, as any failure relating to a non-matching thermostat will not be covered under warranty.

#### Internal Wall

The temperature difference on an external wall can also affect the thermostat accuracy, so the thermostat should always be mounted on an internal wall. Keep the hole in the wall for the wiring as small as possible to prevent draughts from within the wall cavity affecting the temperature.

#### Height

The thermostat should be positioned approximately 1500mm above floor level.

#### Avoid Hot Spots

Keep the thermostat away from warm air outlets, such as radiation from the sun, fireplaces, radio and television sets, and nearby warm pipes and ducts.

#### Avoid Cold Spots

Keep the thermostat away from draughts, such as from doorways, stairwells, windows and return air inlets.

#### Avoid Dead Spots

Keep the thermostat away from areas of less than normal air circulation, such as behind doors, in alcoves or in corners.

#### Interference From Other Electrical Connections

Ensure the thermostat and control wiring are kept away from other electrical components, including electrical wiring, data and antenna cables, and also the spark igniter loom within the heater cabinet.

#### Use the right cable

Ensure the cable is 0.75mm<sup>2</sup> in cross-section and less than 100m in length.

### 9.2 PROGRAMMABLE AND MANUAL THERMOSTAT INSTALLATION

Programmable and manual thermostats can be connected directly to SP4UN and BX5 series heaters.

#### 9.2.1 Connect a Programmable Thermostat

- Run the wiring from the heater to the thermostat.
- Remove the backing plate from the thermostat.
- Draw the wires out from the wall cavity through the centre opening of the backing plate.
- Mount the backing plate on the wall (before connecting the wires).
- Connect heater terminals R and W to the respective R and W terminals on the thermostat (refer to Diagram 15 for an SP4UN Series heater or Diagram 16 for BX5).
- Fan only operation: Connect heater terminal G to terminal G on the thermostat.
- Insert the batteries correctly and mount the thermostat onto the backing plate.
- Refer to the installation guide and operating manual supplied with the programmable thermostat.

Diagram 15. SP4UN Series Programmable Thermostat

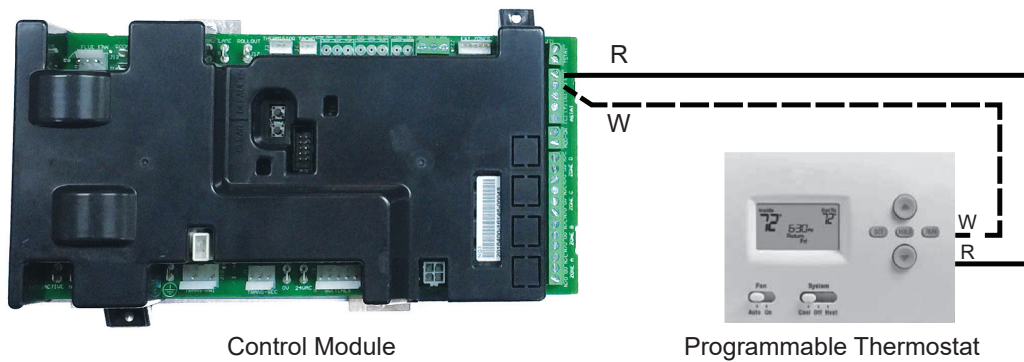
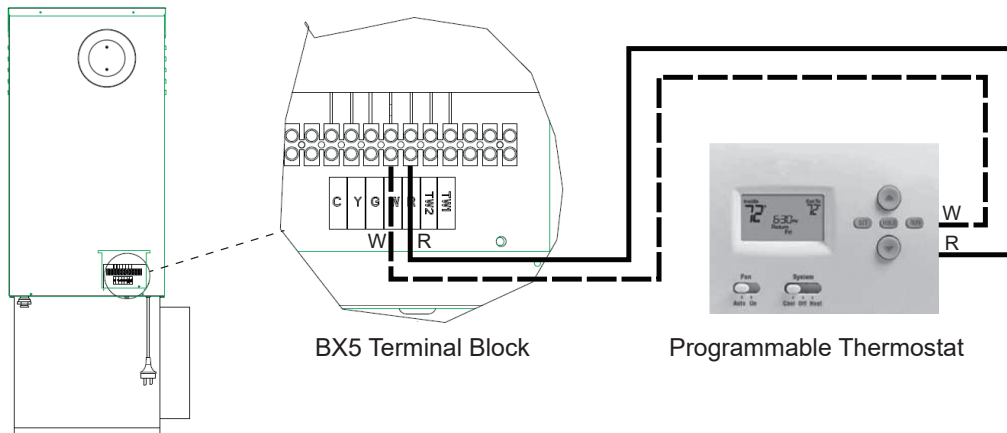


Diagram 16. BX5 Programmable Thermostat



### 9.2.2 Connect a Manual Thermostat

Connect a manual thermostat as follows:

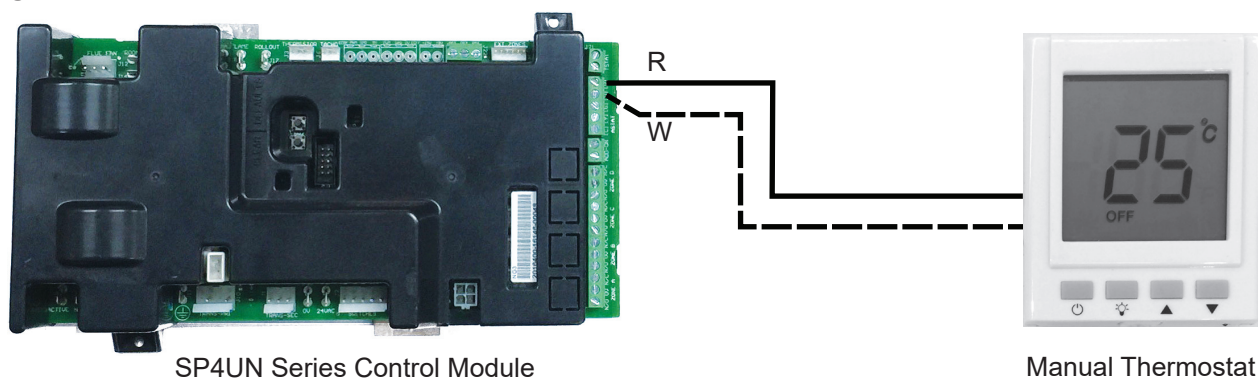
- Select a suitable location for the thermostat (refer to Section 9).
- Run the wiring from the heater to the thermostat.
- Remove the thermostat front cover and connect the wires to thermostat terminals A and B.
- Ensure the thermostat batteries are correctly installed and mount the thermostat level on the wall (refer to, and follow, the installation guide supplied with the thermostat).



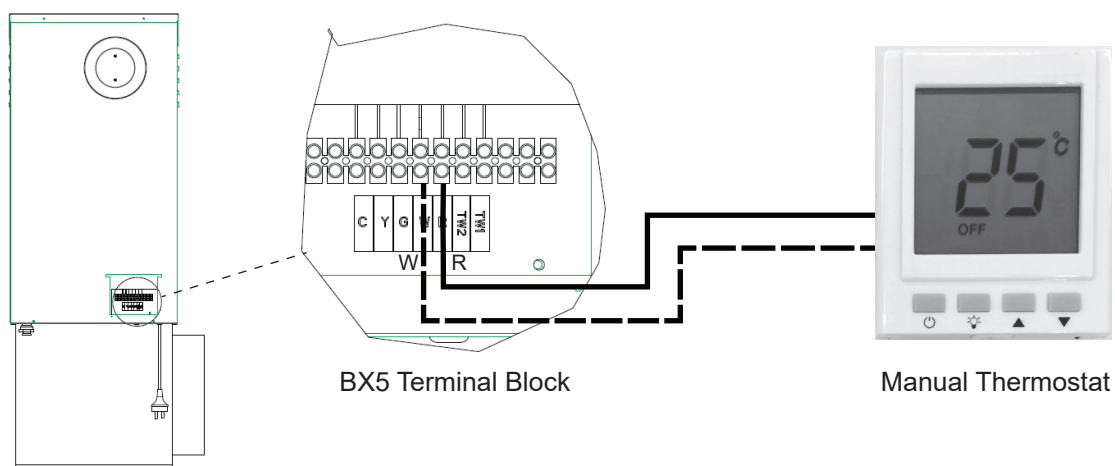
**Use only alkaline batteries as other types of battery can cause unpredictable operation as the batteries become depleted.**

- Install the thermostat front cover.
- Connect the wiring to the heater at terminals R and W (refer to Diagram 17 for an SP4UN Series heater or Diagram 18 for BX5).
- For fan-only operation, wire a switch in circuit between heater terminals R and G.

**Diagram 17. SP4UN Series Manual Thermostat**



**Diagram 18. BX5 Manual Thermostat**



# 10.NETWORKER INSTALLATION: SINGLE AND MULTIPLE CONNECTIONS

## 10.1 NETWORKER INSTALLATION

Networkers can be wired directly to SP4UN and BX5 series heaters.

The networker backing plate has four terminal points for the connection of control wires. When making the connections, use only the two top terminals marked TW1 and TW2 or the two bottom terminals also marked TW1 and TW2. Never use a combination of terminals when connecting to a single appliance. For example, a networker operating a cooler and a heater would have the two bottom terminals connected to the heater and the two top terminals connected to the cooler.



Always ensure that the TW1 and TW2 polarity is correct at both ends of all connections: TW1 to TW1 and TW2 to TW2.

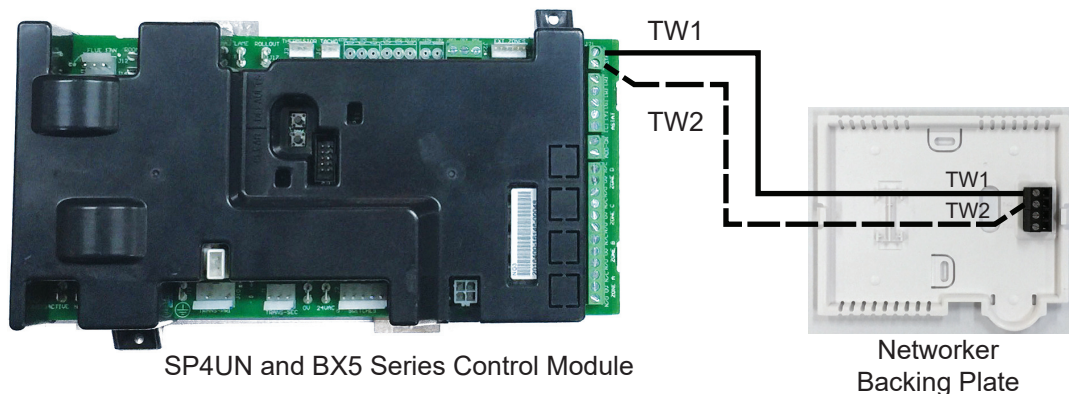
## 10.2 CONNECT A NETWORKER TO SP4UN OR BX5 SERIES HEATERS

- Run a twin wire cable from the heater to the networker (for example, figure-eight cable, 0.75mm<sup>2</sup>).
- Remove the backing plate from the networker by unclipping it at the sides.
- Draw the wires from the wall cavity and feed them through the opening in the backing plate.
- Connect the cable to the terminal connections on the backing plate before mounting it on the wall and reassembling the networker.
- Connect the other end of the cable to the terminals marked TW1 and TW2 in the heater's electronic control module, refer to Diagram 19.



To connect multiple heaters, refer to Section 10.

Diagram 19. SP4UN Series Networker Connections

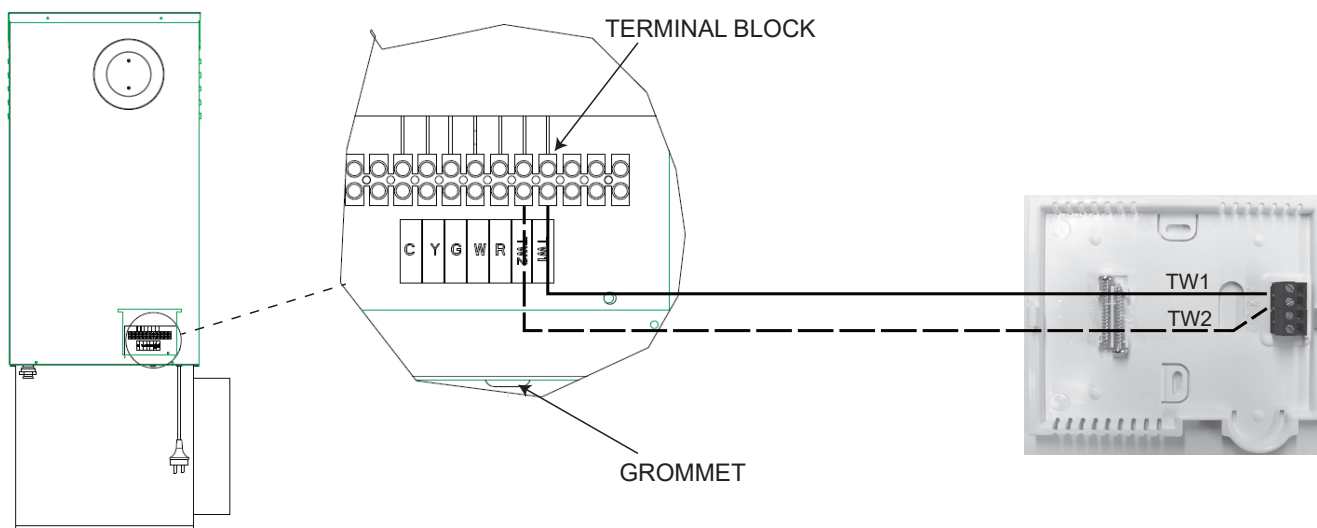


## 10.3 CONNECT A NETWORKER TO A BX5 HEATER

- Run a twin wire cable from the heater to the networker (for example, figure-eight cable, 0.75mm<sup>2</sup>).
- Remove the backing plate from the networker by unclipping it at the sides.
- Draw the wires from the wall cavity and feed them through the opening in the backing plate.
- Connect the cable to the terminal connections on the backing plate before mounting it on the wall and reassembling the networker.
- At the heater, access the terminal block by removing the cover panel.
- Feed the cables through the grommet at the base of the unit to the heater terminal block.
- Connect to TW1 and TW2 on the heater terminal block, refer to Diagram 20.



**Diagram 20. BX5 Networker Connections**



## 10.3.1 Connect Multiple Heaters to a Networker

Configure multiple heaters to the networker as follows:

- Wire each heater to the network in parallel (refer to Diagram 21);
- Assign a different identification number (address) to each heater, starting at '1' (refer to Section 12.1), and
- Assign each heater to a zone (refer to the Network 516 Manual).



**The two networkers must be wired in parallel (not in series).**

## 10.3.2 Connect Dual Networkers

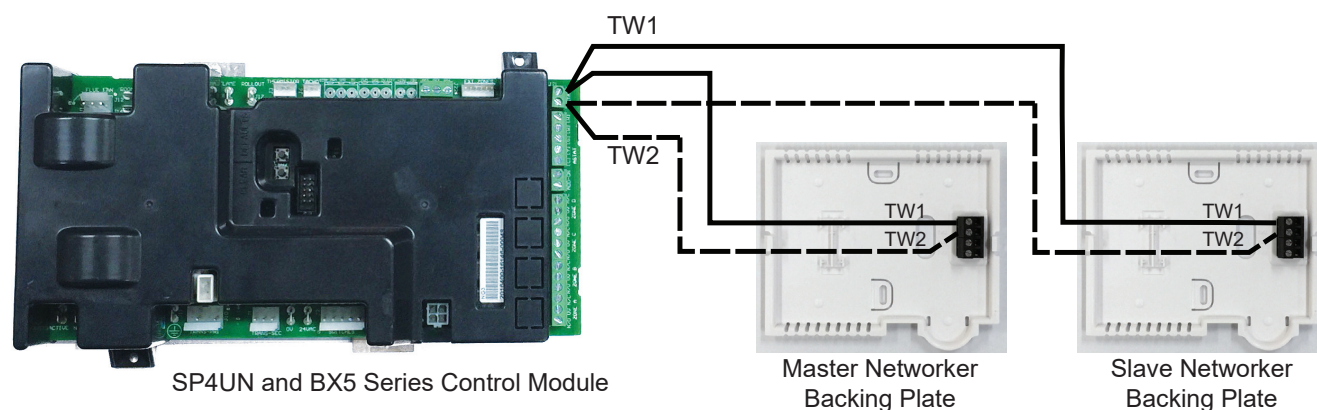
Two networkers can be connected to a single SP series heater to provide dual controls. This is particularly useful with adaptive zoning to enable dedicated zone control. For example, one networker can be used to control one zone, while the other networker is used to control another zone.

Heater settings can be adjusted from either networker and will remain common to both networkers. That is, when a heater setting is adjusted using one networker, the setting is immediately reflected on the other networker.



**A master networker can be identified by the word 'Clock' beside Key 5 (while the networker is switched off).**

**Diagram 21. Dual Networker Connections**



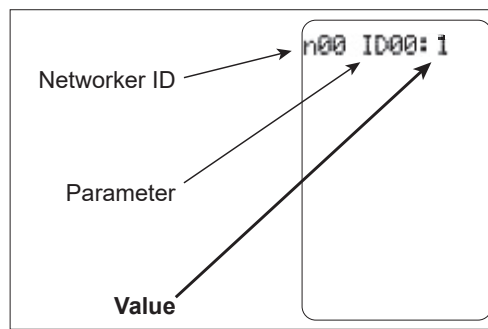


- a. Mount the networkers (refer to para 10) and connect the wiring as shown in Diagram 21.
- b. For a dual networker system to operate correctly, the networkers must be configured with one as master and one as slave. Networkers are configured as master by default, so only the slave networker needs to be configured.
- c. Determine which networker will be the master and which will be the slave.
- d. Press Key 5 on the slave. 'Clock setting mode' displays. Confirm that the clock display is flashing.
- e. Press and hold Key 2 and Key 4 until 'Installer parameter access' displays.
- f. After the message clears, press the mode key (M) until 'n01 ID00:1' displays (refer to Diagram 22).
- g. Turn the rotary dial to change 'ID00: #' to 'ID00: 1' (1 = master, 2 = slave).
- h. Press the on/off button to save and exit.



Installation parameters are not available from slave networkers. Therefore, after a networker is configured as a slave, the master networker must be used to access the parameters.

**Diagram 22. Networker Identification**



### 10.3.3 Change a Networker from Slave to Master

- a. Detach the networker from the backing plate. The controller powers down.
- b. While continually pressing Key 3 and Key 5:
  - mount the networker onto the backing plate, and
  - wait until *Set this Networker's address!* displays.
 If the message does not display, repeat from Step a.
- c. Turn the rotary dial to change 'ID00: #' to 'ID00: 1' (1 = master, 2 = slave).
- d. Press the on/off button to save and exit.

### 10.3.4 Network 516 Manual

Refer to the Network 516 manual for further information about the following:

- Networker installation parameters
- Adaptive zoning
- Controlling multiple appliances with one networker
- Grouping multiple appliances into zones using one networker.

### 10.3.5 ZonePlus

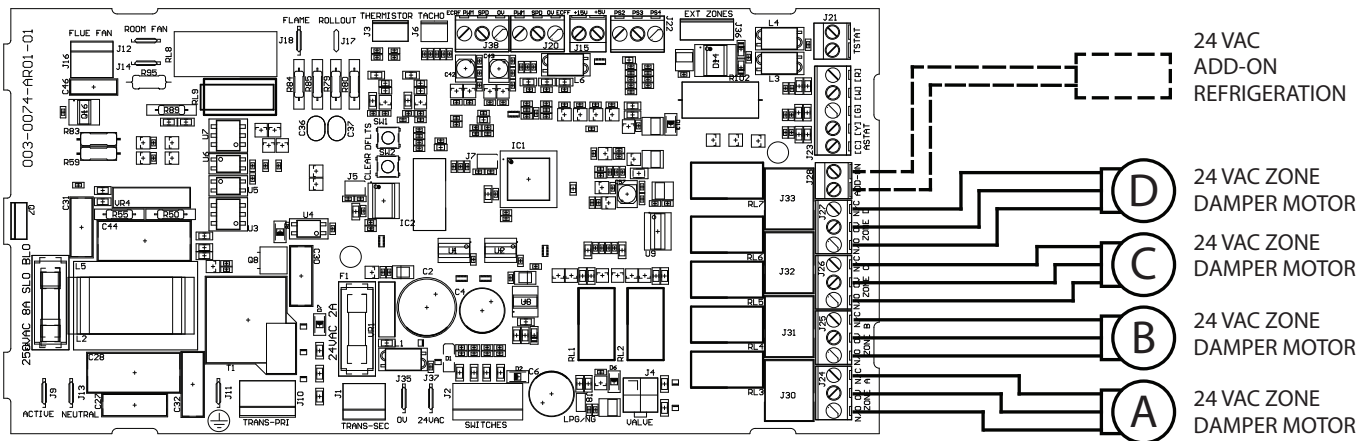
Refer to the ZonePlus Installation Manual if installing a ZonePlus control system.

# 11. ADAPTIVE ZONING AND ADD-ON AIR CONDITIONING

## 11.1 OPTIONS

SP4UN and BX5 series heaters can be configured for zoning and/or add-on refrigerative air conditioning. There are four 24 VAC relays on the PCB control module, which can be configured either for four zone motors, or for four zone motors and an add-on refrigerative air-conditioning control, as shown in Diagram 23.

**Diagram 23. Zoning/Add-on Connections - NG-3 PCB**



**Refer to the Add-On Cooling brochure for further information. For ZonePlus configuration, please refer to the ZonePlus Installation manual.**

## 11.2 DAMPER MOTOR CONNECTIONS

All SP4UN and BX5 series gas ducted heaters come with four RJ12 socket connectors preconfigured for Belimo® 24V damper motors.

### RJ Socket Connections

The plastic cover on the PCB includes moulded cut-outs to enable access to the RJ12 socket. For each socket to be used, press out and remove the cut-out and connect the RJ plug from the Belimo® damper motor.

If not a Belimo damper motor confirm suitability of the terminal on the damper motor before connecting to the RJ12 socket on the heater PCB. The RJ12 socket in Diagram 24 contains six terminal wires, the left two are connected to Normally Open (N/O) on the 3-way terminal block, the middle two are connected to '0V', and the right two are connected to Normally Open (N/C). Check the installation manual accompanying the damper motor to determine if the RJ12 socket on the heater PCB is suitable.

**Diagram 24. RJ12 socket detail on heater PCB**

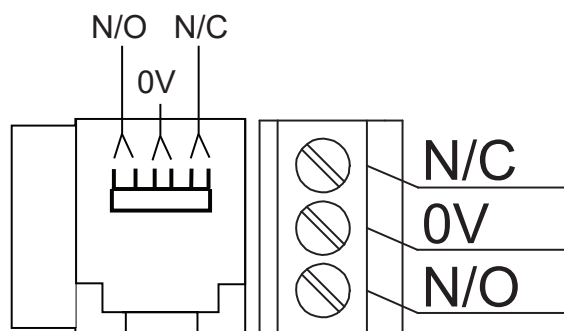


Diagram 24 details the Normally Closed (N/C), Zero Volt (0V) and Normally Open (N/O) connections for the RJ12 socket and terminal block connections for zones A, B, C and D on heater PCB.

### Three-way Terminal Connections

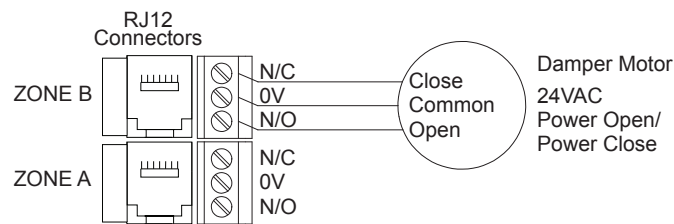
Diagram 25, Diagram 26 and Diagram 27 detail the Normally Open (NO), Normally Closed (NC) and zero volt (0V) connections required to enable the networker outputs to control the damper motors.



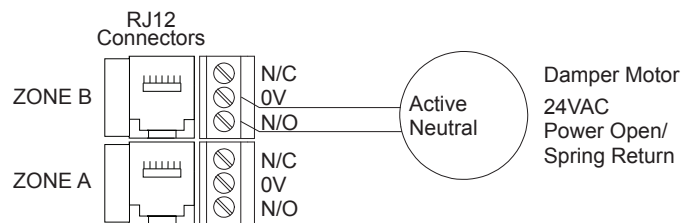
Ensure that the circuits are correct to Diagram 25, Diagram 26 or Diagram 27 as applicable.

## 11.3 CONNECT A DAMPER MOTOR TO THE CONTROL MODULE

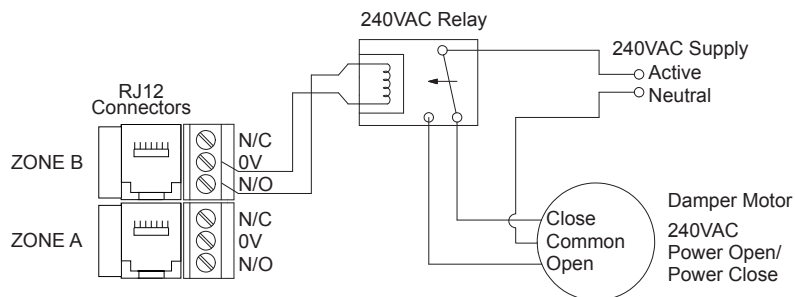
**Diagram 25. 24VAC Power Open/Power Close Damper Motor**



**Diagram 26. 24VAC Power Open/Spring Return Damper Motor**



**Diagram 27. 240VAC Power Open/Power Close Damper Motor**



## 12.COMMISSIONING AND CONTROL SETTINGS

All of these heaters have been factory tested, but should be commissioned and adjusted in accordance with the following instructions to ensure efficient and optimal heating performance. Remember:

- Mains power must be switched OFF before any wiring is touched.
- Commissioning must be carried out by a qualified trades person.
- If the heater cannot be adjusted to operate in accordance with these instructions, contact the Customer Service Centre (refer to the back cover).

### 12.1 SP4UN AND BX5 HEATER CONTROL SETTINGS

Heater settings (installer parameters) are adjusted via a networker controller. If dual networkers are configured, either networker can be used to adjust the heater parameters.

**Table 7. Heater Installer Parameters – SP4UN and BX5**

No.	DISPLAY	DESCRIPTION																																													
1	H01 ID01: 1350	<b>HEATING: MAXIMUM FAN SPEED SETTING</b> The number displayed is the default fan speed setting. That is, the fan RPM setting for normal heating operation. This setting can be adjusted from 500 to 1450 and should be set to meet the installation airflow requirements. It is recommended that a fan speed of at least 1000 be selected as lower speeds are more likely to result in overheating if the system has not been balanced correctly.																																													
2	H01 ID02: 1350	<b>COOLING: MAXIMUM FAN SPEED SETTING</b> The fan RPM setting for normal cooling operation. This setting can be adjusted from 500 to 1350.																																													
3	H01 ID03: 950	<b>HEATING: ZONING MINIMUM FAN SPEED SETTING</b> The minimum RPM to which the fan will operate with the maximum number of outlets closed, with the networker zoning in heating mode. This setting can be adjusted from 500 to 1350 (default is 950).																																													
4	H01 ID04: 1	<b>HEATER IDENTIFICATION NUMBER</b> <b>(Do not alter unless multiple heaters are installed)</b> In systems with multiple heaters installed, identifies each heater unit in priority order, for example ID04: 1, ID04: 2, ID04: 3.																																													
5	H01 ID05: 500	<b>CIRCULATION FAN OPERATION</b> The fan RPM setting in circulation mode. That is, fan operation between heating or cooling cycles when the set room temperature has been achieved.																																													
6	H01 ID06: 65	<b>SUPPLY AIR THERMISTOR SET POINT TEMPERATURE</b> The temperature that the heater gas valve modulates to maintain. This setting can be adjusted from 45°C to 70°C (default setting varies between different models) and should be set to provide a comfortable outlet temperature.																																													
7	H01 ID07: 0	<b>ZONE/REFRIGERATION /HUMIDIFIER MODE</b>																																													
		<table><tr><th>Value</th><th>System Configuration</th><th>Zone Connection</th><th>Add-On Connection</th><th>Humidifier Connection</th></tr><tr><td>0</td><td>Heating</td><td>N/A</td><td>N/A</td><td>N/A</td></tr><tr><td>1</td><td>Heating</td><td>Heater PCB – up to 4</td><td>N/A</td><td>N/A</td></tr><tr><td>2</td><td>Heating + Add-On</td><td>Heater PCB – up to 4</td><td>Heater PCB ‘ADD-ON’ terminal</td><td>N/A</td></tr><tr><td>3</td><td>Heating + Humidification</td><td>Heater PCB – up to 4</td><td>N/A</td><td>Heater PCB ‘ADD-ON’ terminal</td></tr><tr><td>4</td><td>Heating + Humidification + Add-On</td><td>Heater PCB – up to 3 (A,B,C) Zone Module – 1 only (D)</td><td>Heater PCB ‘ADD-ON’ terminal</td><td>N/A</td></tr><tr><td>5</td><td>Heating</td><td>Zone Module – up to 4</td><td>N/A</td><td>N/A</td></tr><tr><td>6</td><td>Heating + Add-On</td><td>Zone Module – up to 4</td><td>Heater PCB ‘ADD-ON’ terminal</td><td>N/A</td></tr><tr><td>7</td><td>Heating + Add-On</td><td>Zone Module – up to 3</td><td>Zone Module ‘ADD-ON’ terminal</td><td>N/A</td></tr></table>	Value	System Configuration	Zone Connection	Add-On Connection	Humidifier Connection	0	Heating	N/A	N/A	N/A	1	Heating	Heater PCB – up to 4	N/A	N/A	2	Heating + Add-On	Heater PCB – up to 4	Heater PCB ‘ADD-ON’ terminal	N/A	3	Heating + Humidification	Heater PCB – up to 4	N/A	Heater PCB ‘ADD-ON’ terminal	4	Heating + Humidification + Add-On	Heater PCB – up to 3 (A,B,C) Zone Module – 1 only (D)	Heater PCB ‘ADD-ON’ terminal	N/A	5	Heating	Zone Module – up to 4	N/A	N/A	6	Heating + Add-On	Zone Module – up to 4	Heater PCB ‘ADD-ON’ terminal	N/A	7	Heating + Add-On	Zone Module – up to 3	Zone Module ‘ADD-ON’ terminal	N/A
		Value	System Configuration	Zone Connection	Add-On Connection	Humidifier Connection																																									
		0	Heating	N/A	N/A	N/A																																									
		1	Heating	Heater PCB – up to 4	N/A	N/A																																									
		2	Heating + Add-On	Heater PCB – up to 4	Heater PCB ‘ADD-ON’ terminal	N/A																																									
		3	Heating + Humidification	Heater PCB – up to 4	N/A	Heater PCB ‘ADD-ON’ terminal																																									
		4	Heating + Humidification + Add-On	Heater PCB – up to 3 (A,B,C) Zone Module – 1 only (D)	Heater PCB ‘ADD-ON’ terminal	N/A																																									
		5	Heating	Zone Module – up to 4	N/A	N/A																																									
		6	Heating + Add-On	Zone Module – up to 4	Heater PCB ‘ADD-ON’ terminal	N/A																																									
7	Heating + Add-On	Zone Module – up to 3	Zone Module ‘ADD-ON’ terminal	N/A																																											

No.	DISPLAY	DESCRIPTION
8	H01 ID08: 1000	<b>COOLING: ZONING MINIMUM FAN SPEED SETTING</b> The minimum RPM to which the fan will operate with the maximum number of outlets closed, with the networker zoning in heating mode. DO NOT SET BELOW 1000
9	H01 ID09: 0	<b>DO NOT ADJUST</b>
10	H01 ID10: 30	Damper motor Open/Close time can be adjusted between 5 and 240 seconds - factory default 30 seconds

### Adjust Networker Parameters

Adjust heater parameters via a networker, as follows:

- Press Key 5. 'Clock setting mode' displays. Confirm that the clock display is flashing.
- Press and hold Key 2 and Key 4 until 'Installer parameter access' displays.
- After the message clears, press the mode key (M) to toggle between networker parameters (n01), and heater parameters (H01). If more than one networker or heater unit is configured in the system, repeatedly press the mode key until the desired heater unit is selected, e.g. **H01** ID01: 1.
- Press Key 1 or Key 2 to scroll through, and select, the required parameter ID, e.g. H01 **ID01**: 1 (refer to Table 7). (Key 1 = next ID, Key 2 = previous ID.)
- Turn the rotary dial to adjust the parameter value, e.g. H01 ID01: **1**.
- Press the on/off button to save and exit.



All settings are saved automatically when the on/off button is pressed to exit networker set-up mode.

## 12.2 SP4UN AND BX5 COMMISSIONING INSTRUCTIONS

### 12.2.1 Initial Damper Settings

Generally, a correctly designed and installed ducted system should have the following initial damper settings:

- Living areas: 100% open
- Bedrooms: 50% open
- Bathrooms, ensuite and laundry: 25% open.

### 12.2.2 Initial Ignition and Gas Inlet Pressure Check

- a. Disconnect the power supply from the system at the power point.
- b. Connect a networker to enable access to the heater installation parameters (refer to para 10).
- c. Locate the inlet gas pressure test point and loosen the captive screw three full turns anti-clockwise. DO NOT remove the screw.
- d. Attach a manometer to the inlet gas pressure test point on the gas valve (refer to the label on the gas valve for the test point location).
- e. Purge air from the gas piping and turn on the gas at the supply tap.
- f. Connect and switch on the 240V power supply at the power point.
- g. Turn on the thermostat and set the temperature to maximum (see the Owner's Manual for operating instructions). Ensure that all zones (if any) are open. It should be possible to see the burners operating at the heater.



**If there is air in the gas line, the heater may not ignite on the first attempt. Ignition attempts will occur automatically. Allow time for the heater to rectify itself as it may simply be purging air. If ignition is not successful, the heater will cease ignition attempts and lock out with an error code. If this occurs, take note of the code and reset the heater (refer to the Operation manual).**

Initially the fan will run at a low speed (approximately 500 RPM) and then to ramp up to the preset fan speed for heating (refer to Table 7, Item 1).

- i. Wait for the heater to operate for at least 1 minute and then measure the gas inlet pressure. **While all other gas appliances are operating at full capacity**, the gas pressure must not, at any time, fall below:
  - 1.1 kPa for NG models

If the pressure cannot be maintained above these measurements, then the incoming gas supply is inadequate. Check the supply pipe for blockages, and check the gas pipe and meter sizing.
- j. Switch off the heater, remove the manometer, and tighten the captive screw at the inlet gas pressure test point.
- k. Ensure that the system is functioning correctly up to this point before continuing with the commissioning procedure.

### 12.2.3 Heater Temperature Settings and Fan Speed

In this step, the heating settings are adjusted to suit the installation. These settings are critical to the provision of adequate and efficient heating for the installation.

- a. Access the heater control settings (refer to Section 12.1) and confirm that the thermostat is set much higher than the current room temperature.
- b. Set the fan speed (H01 ID01) to provide sufficient but not excessive airflow. (Typically, the fan speed is less for floor outlet systems than for ceiling outlet systems.) The airflow from down-vent ceiling diffusers in main living areas should be felt near floor level.

- c. Do not adjust the thermistor set temperature unless the system is NOT achieving the following temperature rises:
- Ceiling outlets: 25° to 30°C, and
  - Floor outlets: 35° to 40°C.

These temperatures are calculated by measuring the temperature at the closest outlet to the heater, then subtracting the return air intake temperature. The difference should never exceed 45°C.

*For example*, noting the maximum allowable floor outlet temperature rise is 40°C, with a return air intake temperature of 20°C, the closest floor outlet temperature rise must not exceed 60°C.

### Adjustments

If the desired temperature rise is too low or too high the following adjustments may be required.

- a. Increase the room temperature setting to maximum to turn the heater on, then wait until the thermistor temperature until it stabilises.

Ideally, the fan speed setting will be sufficient for the heater to operate at full capacity when all of the outlets are open and balanced as described previously. The gas rate will then be maintained at the maximum rate during the initial heating cycle and will decrease (modulate) only when the supply air temperature is reached on subsequent heating cycles. This will initially allow the heater to increase the house temperature at a faster rate to maintain the customer's desired room temperature.

- b. With a **floor outlet system** (which usually requires a low fan speed), as required adjust the thermistor set temperature to achieve a 35° to 40°C rise and avoid modulation. If the heater still reaches the thermistor set temperature or the rise is greater than 40°C, increase the fan speed.
- c. With a **ceiling outlet system** (which usually requires a higher fan speed), if the heater reaches the thermistor set temperature and modulates (this is unlikely), increase the thermistor set temperature and/or increase the fan speed to achieve a 25° to 30°C rise and avoid modulation.

If the temperature rise is above 40°C, investigate the reason. It may be due to the following:

- A low number of outlets on the system.
- Restrictive or poorly balanced ductwork.
- An oversized heater for the installation.
- Inadequate fan speed.
- Inadequate thermistor set point.

### Adaptive Zoning

Systems that have zone damper motors operated from a networker (adaptive zoning) require the zone minimum fan speed to be set to suit the duct system. This ensures optimum performance from the adaptive zoning functions within the heater. Set the zone minimum fan speed as follows:

- a. Using the networker, close all but one zone.
- If the system does not have a common zone, select and turn on only the zone key that operates the least number of outlets (ensure this zone does not have less than the minimum number of outlets required for the heater size).
  - If the system has a common zone then all zone keys can be turned off.
- b. Adjust the EHTG fan speed setting (H01 ID03) to provide the required amount of air through the remaining open outlets, ensuring that the temperature rise does not exceed 45°C. Do not adjust the thermistor set temperature while setting up the EHTG fan speed.

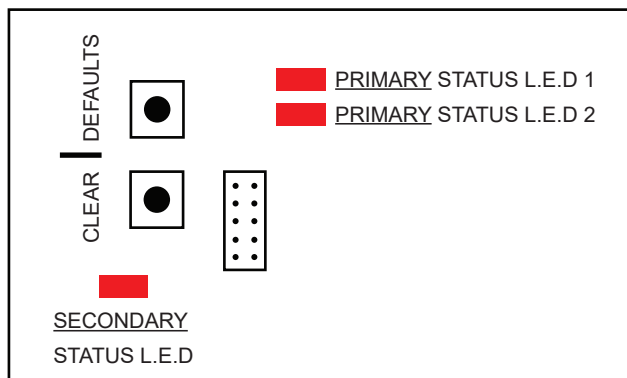
## 12.3 FINAL CHECKS (SP4UN AND BX5 HEATERS)

- Check the temperature rise at the outlets. The temperature of the warm air at any outlet should not be more than 45°C above the return air temperature. If it is, the heater will be approaching an overheat condition.
- Check that the fan continues to run while the gas burner is operating.
- Check that the fan operates in fan-only mode by operating the networker in fan-only mode (refer to the Owner's Manual).
- Ensure that the required gas inlet pressure is supplied at all times during heater operation (including when all other gas appliances are operating at full capacity).
- Ensure that the heater is switched off.
- If the manometer still connected, turn off the gas supply at the supply tap, remove the manometer and tighten the captive screw at the inlet gas pressure test point.
- Turn on the gas supply at the supply tap and test for leaks using a soapy water solution or leak detector spray.
- Install the heater top panel.
- Instruct the customer on the correct operation of the system.
- Issue any required documentation to the relevant people/authorities in regard to the installation of the heater, the gas connection and the power supply. (For example, a Certificate of Compliance and Certificate of Electrical Safety.)

## 12.4 FAULT CODE IDENTIFICATION ON HEATER PCB

If the heater fails to start the fault may display on the heater control board with a dual L.E.D flash sequence. The two L.E.D's that display the fault code are 'PRIMARY STATUS L.E.D 1' and 'PRIMARY STATUS L.E.D 2'. Refer to Diagram 28 for location of these status L.E.D's in reference to the 'CLEAR' and 'DEFAULTS' buttons on the heater control board cover.

**Diagram 28. NG-3 L.E.D identification**



The 'PRIMARY STATUS L.E.D 1' shows the first digit (tens) of the fault code and 'PRIMARY STATUS L.E.D 2' shows the second digit (ones), e.g. fault code 35 would display as 3 flashes on 'PRIMARY STATUS L.E.D 1' and 5 flashes on 'PRIMARY STATUS L.E.D 2'.

Both L.E.D's will flash together for the first three flashes and then 'PRIMARY STATUS L.E.D 1' will stop while 'PRIMARY STATUS L.E.D 2' will flash two more times, example flash sequence below.





Some error codes that may be encountered during installation are detailed in Table 8 below.

**Table 8. Error codes associated with installation**

Fault Code	Primary L.E.D 1 Flashes	Primary L.E.D 2 Flashes	Description
30	3	0	Fan Limp Mode
35	3	5	Supply Air Thermistor Fault
36	3	6	Bad Supply Air Thermistor Location
40	4	0	Return Air Overheat
41	4	1	Supply Air Overheat
48	4	8	Pressure Lost
60	6	0	Motor Open Circuit
69	6	9	Fuse Blown 24Vac 2A
50	5	0	Ignition Lockout
51	5	1	Rollout No Gas
54	5	4	Rollout Lockout
56	5	6	Pressure Switch Stuck Open
57	5	7	Pressure Switch Stuck Closed
58	5	8	Pressure Switch Fail

To reset the appliance and clear a lockout fault press and hold the 'CLEAR' button for three seconds on the heater control board or reset through a Networker controller if connected.



**Assist the customer with filling in the Warranty Details on the company website:**  
<http://www.rinnai.com.au> or [www.brivis.com.au](http://www.brivis.com.au) and follow the links.

# 13. TECHNICAL SPECIFICATIONS

Table 9.

Models	Gas Input MJ/hr		Heat Output kW		Duct Connection Pop Sizes (mm)	Minimum Recommended Return Opening		Airflow @ Total Static Pressure (L/s)				Weight (kg)	Fan Motor		Total Maximum Current (A)	Maximum Recommended Add-On Cooling Capacity (kW)
	Max Input NG	Max Input ULPG	Max Output NG	Max Output ULPG		No Filter (m²)	With Filter (m²)	50 Pa	75 Pa	100 Pa	125 Pa		Power (W)	Current (A)		
SP4UN																
SP415UN (Internal)	65	N/A	14	N/A	300	0.26	0.39	620	585	555	530	65	315	4.2	6	10
SP415UN (External)	65	N/A	14	N/A	300	0.26	0.39	583	550	522	498	65	315	4.2	6	10
SP421UN (Internal)	90	N/A	21	N/A	300	0.26	0.39	620	585	555	530	65	315	4.2	6	10
SP421UN (External)	90	N/A	21	N/A	300	0.26	0.39	583	550	522	498	65	315	4.2	6	10
SP430UN (Internal)	130	N/A	30	N/A	350	0.31	0.47	1010	984	953	918	84	650	4.3	6	15
SP430UN (External)	130	N/A	30	N/A	350	0.31	0.47	919	895	867	835	84	650	4.3	6	15
SP435UN (Internal)	150	N/A	35	N/A	400	0.36	0.54	1098	1068	1041	1004	84	650	4.3	6	18
SP435UN (External)	150	N/A	35	N/A	400	0.36	0.54	988	961	937	904	84	650	4.3	6	17
BX5																
BX520EN (300mm)**	82	N/A	20	N/A	300	0.26	0.39	604	576	545	519	57	315	4.2	6	-
BX520EN (350mm)**	82	N/A	20	N/A	350	0.26	0.39	667	631	609	582	57	315	4.2	6	10
BX526EN (350mm)**	125	N/A	30	N/A	350	0.36	0.54	1026	998	972	944	67	650	4.3	6	-
BX526EN (400mm)**	125	N/A	30	N/A	400	0.36	0.54	1099	1069	1042	1011	67	650	4.3	6	18

\*\* Model and base duct size



- The manufacturer reserves the right to change specifications without notice.
- Rated air flow of universal units is in the factory default 'internal' configuration.
- Internal units in 'lay down' position reduces rated airflow by up to 30%



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Monday to Friday, 8.00 am to 5.00 pm EST.

*\*Cost of a local call higher from mobile or public phones.*

For further information visit [www.rinnai.com.au](http://www.rinnai.com.au)  
or email [enquiry@rinnai.com.au](mailto:enquiry@rinnai.com.au)

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or email [info@rinnai.co.nz](mailto:info@rinnai.co.nz)

Rinnai has a Service and Spare Parts network with personnel who are fully trained and equipped to give the best service on your Rinnai appliance. If your appliance requires service, please call our National Help Line. Rinnai recommends that this appliance be serviced every 2 years.

With our policy of continuous improvement, we reserve the right to change, or discontinue at any time, specifications or designs without notice.