kaden

INSTALLER'S MANUAL

Ducted Gas Heaters



Safety Information
Installation
Commissioning

Models

Internal
KN315INT, KN320INT
KN325INT, KN330INT
KN420INT, KN430INT
KN521INT, KN530INT

External
KEX315C, KEX320C, KEX328C
KN420EXT, KN430EXT
KN521EXT, KN530EXT

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, serviced and removed ONLY by an authorised person. An authorised person will have the licensing and insurance required by the relevant state/territory gas regulating authority and will issue any required compliance certificates for their work.

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

The Australian Gas Association

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

Table of Contents

Warnings and Important Information 5

1. Scope 7

1.1 Heater Overview 7
Definitions 7
1.2 Installer Due Diligence for Changeovers 8
Disclaimer 8

2. General Product Guidelines 9

2.1 Application and Sizing 9
2.2 Inspection 9
2.3 Unpacking the Heater 9
2.4 Unloading or Lifting the Heater 9
2.5 Service Connection Guidelines 10
2.5.1 Gas Inlet Connection 10
2.5.2 Electrical Power Supply 10

3. Internal Model Guidelines 11

3.1 Internal Heater Dimensions 11
3.2 Service Clearances – Internal 12
3.2.1 KN3 Internal Models 12
3.2.2 KN4 & KN5 Internal Models 13
3.3 Splitting Internal Model Heaters 15
3.3.1 KN3 Heaters 15
3.3.2 KN4 & KN5 Heaters 15
3.4 Changing the Return Air Pop Orientation 15
3.4.1 KN3 Heaters 15
3.4.2 KN4 & KN5 Heaters Pop Orientation 17
3.5 Internal Model Flueing Instructions 18
3.5.1 General 18
3.5.2 KN4 & KN5 Internal Models – 100mm non-corrosive metal flue. 18
3.5.3 Remote Terminal - All Internal Model Applications 18

4. External Model Guidelines 19

4.1 Heater Dimensions 19
4.2 Service Clearances 20
4.2.1 KN4 &KN5 Service Clearances 20
4.2.2 KEX3C Service Clearances 20
4.3 Reversing the Heater 21
4.3.1 KN4 & KN5 Duct Orientation 21
4.4 Installation of Duct Connection Pops 22

5. Heater Positioning 23

5.1 Installation of Internal Heaters 23
5.1.1 Installation in the Roof Space 23
5.1.2 Installation Beneath the Floor 23
5.2 Ventilation Calculations 23
5.3 Installation of External Heaters 24

6. Installation 25

6.1 KN4 & KN5 Series Thermistor Installation ... **25**
6.2 Installation ... **26**
6.2.1 Area to Cut Out in Wall ... **26**
6.2.2 Temperature Limit Positioning (applicable to KEX3/4C only) ... **26**
6.2.3 Installation of Flashing - KEX3C ... **27**
6.2.4 Installation of Flashing - KN4 & KN5 External ... **28**
6.2.5 Installation of Flue Terminal ... **29**
6.2.6 Flue Terminal Clearances ... **29**

7. Fan Speed KN3 & KEX3C 30

7.1 Fan Speed Setting For KN3 & KEX3C Models ... **30**
7.1.1 To Adjust The Fan Speed ... **30**

8. Ducting and Outlets 31

8.1 Duct Design and Sizing ... **31**
8.2 Return Air Grille ... **31**
8.3 Outlet Chart Information ... **32**
8.4 Return Air Pop Configuration Changes ... **32**

9. Thermostat Installation 34

9.1 KN4 and KN5 Series Thermostat Positioning Guidelines ... **34**
9.2 Manual Thermostat Installation ... **34**
9.2.1 Connect a Manual Thermostat ... **35**

10. Networker Installation: Single and Multiple Connections 36

10.1 Networker Installation ... **36**
10.2 Connect a Networker to KN4 or KN5 Series Heaters ... **36**
10.2.1 Connect Dual Networkers ... **36**
10.2.2 Change a Networker from Slave to Master ... **37**
10.2.3 Network 516 Manual ... **38**
10.2.4 ZonePlus ... **38**
10.2.5 Wiring the Manual Wall Control to a KEX3C Heaters ... **38**

11. Adaptive Zoning and Add-on Air Conditioning 40

11.1 Options ... **40**
11.2 Damper Motor Connections ... **40**
11.3 Connect a Damper Motor to the Control Module ... **41**

12. Commissioning and Control Settings 42

12.1 KN4 and KN5 Heater Control Settings ... **42**
12.2 Commissioning Instructions ... **44**
12.2.1 Initial Damper Settings ... **44**
12.2.2 Initial Ignition and Gas Inlet Pressure Check ... **44**
12.2.3 Heater Temperature Settings and Fan Speed ... **44**
12.3 Final Checks ... **46**
12.4 Fault Code Identification on Heater PCB ***(KN4/KN5 only)*** ... **46**

13. Technical Specifications 48

14. Technical Support 49

15. Contacts 52

WARNINGS AND IMPORTANT INFORMATION

WARNING

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.

WARNING

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, serviced and removed ONLY by an authorised person. An authorised person will have the licensing and insurance required by the relevant state/territory gas regulating authority and will issue any required compliance certificates for their work.

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.

NOTE

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.

NOTE

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.

WARNING

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. Kaden 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:

Kaden models	
Internal	**External**
KN315INT	KEX315C
KN320INT	KEX320C
KEX328C	KEX328C
KN325INT	
KN330INT	
KN420INT	KN420EXT
KN430INT	KN430EXT
KN521INT	KN521EXT
KN530INT	KN530EXT

1.1 Heater Overview

All Kaden model heaters are non-condensing.

For more details refer to Technical Specifications section.

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.

Internal

An appliance designated ‘Internal’ above may only be installed indoors. Indoors is within a building as defined by the National Construction Code and does not include balconies or decks which are exposed to the external environment.

External

An appliance designated ‘External’ above may only be installed outdoors. Outdoors being an above ground open-air environment with natural ventilation, without stagnant areas, and where gas leakage and products of combustion are rapidly dispersed by wind and natural convection. Refer to AS5601.1 – Gas Installations for more information.

1.2 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.

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 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. INTERNAL MODEL GUIDELINES

3.1 INTERNAL HEATER DIMENSIONS

Diagram 1. KN3 Heater Dimensions

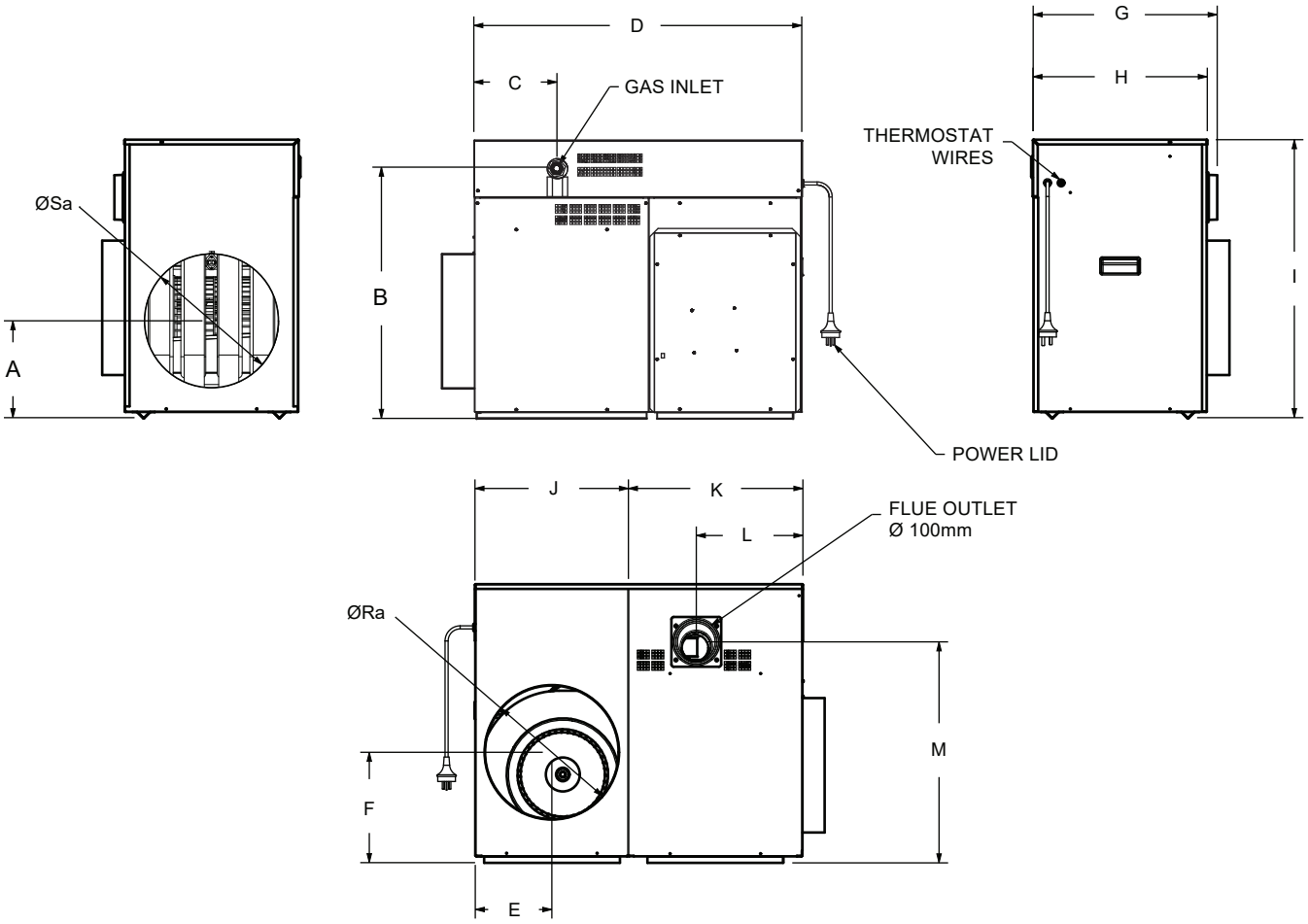


Table 1. KN3 Heater Dimensions (mm)

MODEL	A	B	C	D	E	F	G	H	I	J	K	L	M	øSa	øRa
KN315INT	215	553	183	724	168	244	407	385	615	338	386	236	485	300	300
KN320INT	215	553	183	724	168	244	407	385	615	338	386	236	485	300	300
KN325INT	215	553	183	724	168	244	407	385	615	338	386	236	485	350	350
KN330INT	250	588	183	843	229	244	559	537	651	457	386	236	520	350	350

Diagram 2. KN4 & KN5 Heater Dimensions

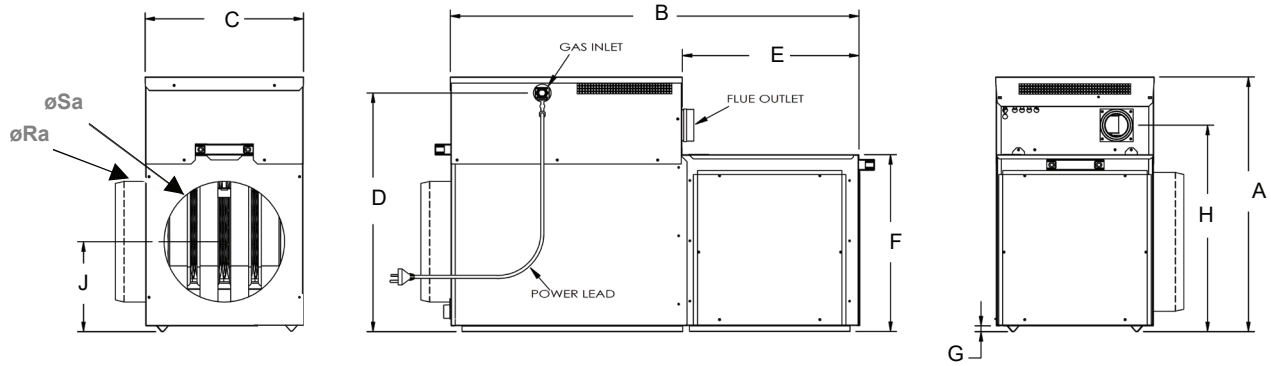


Table 2. KN4 & KN5 Internal Heater Dimensions (mm)

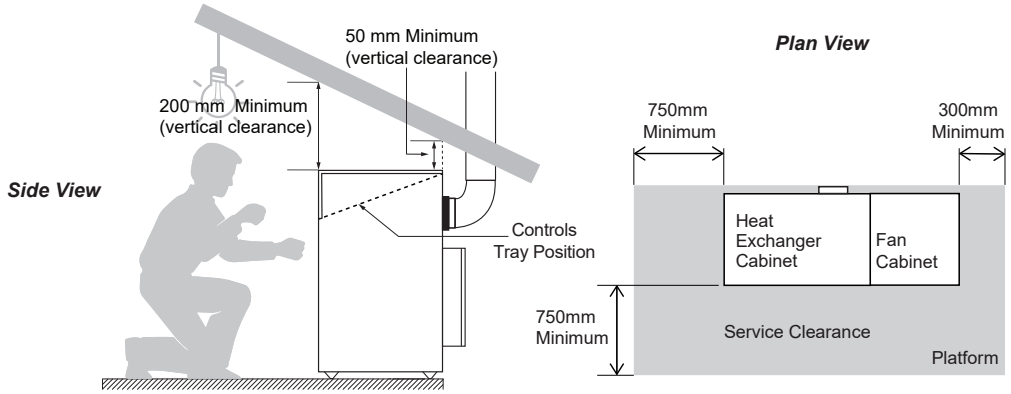
INTERNAL MODEL	A	B	C	D	E	F	G	H	J	øSa	øRa
KN421INT / KN521INT	634	1021	395	594	440	440	15	513	224	300	300
KN430INT / KN530INT	684	1070	547	643	491	490	15	563	253	350	350

3.2 SERVICE CLEARANCES – INTERNAL

3.2.1 KN3 Internal Models

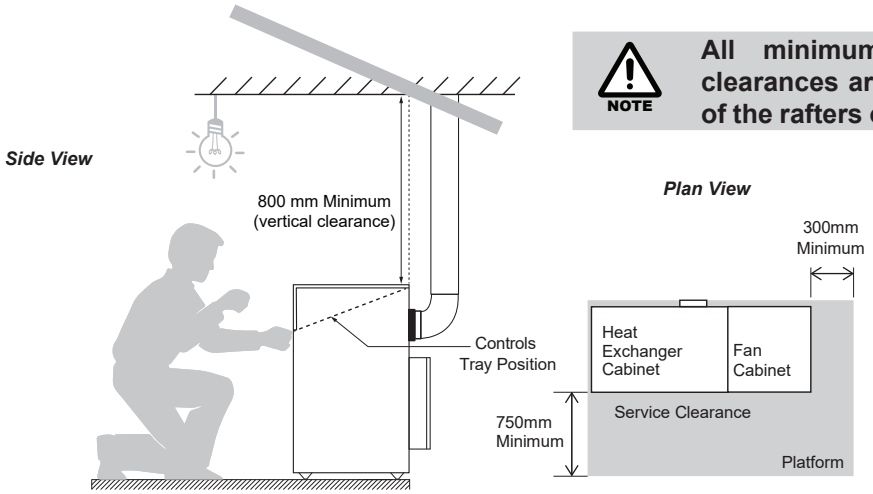
All KN3 Internal models can be installed in accordance with 'Method 1', 'Method 2' and 'Method 3' below.

Method 1: In Ceiling



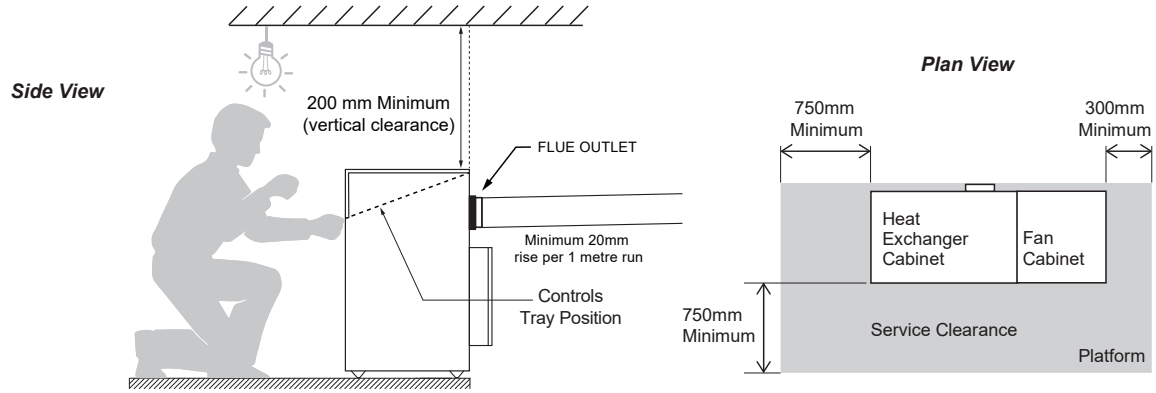
NOTE **Heater shall be positioned in the above orientation only for service access**

Method 2: In Ceiling and Under Floor



NOTE **All minimum service height clearances are to the underside of the rafters or any obstruction.**

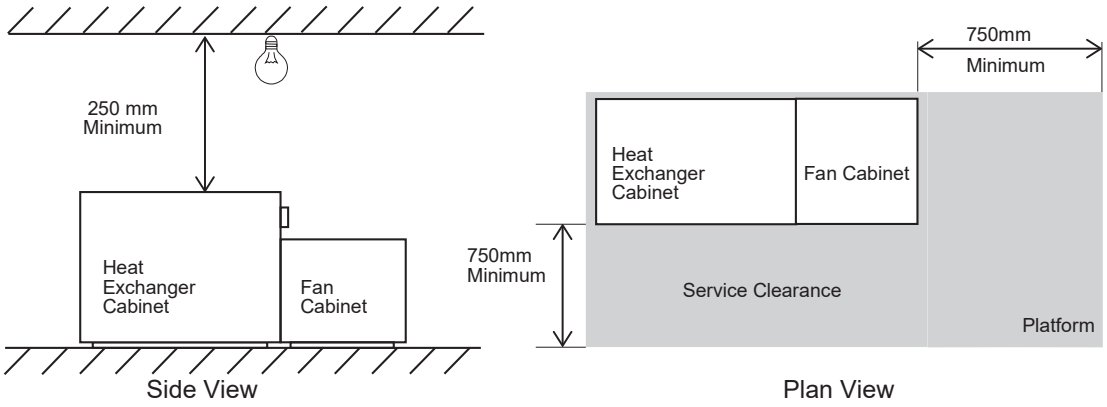
Method 3: Under Floor



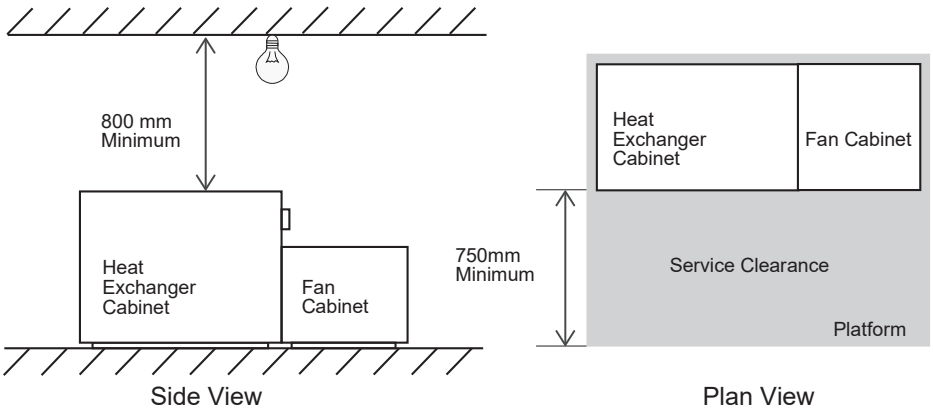
3.2.2 KN4 & KN5 Internal Models

All KN4 & KN5 Internal models can be installed in accordance with 'Method 1', 'Method 2', 'Method 3' and 'Method 4' below.

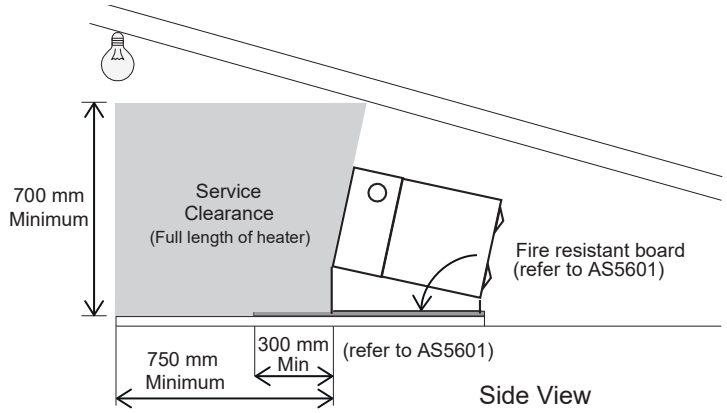
Method 1: In Ceiling and Under Floor



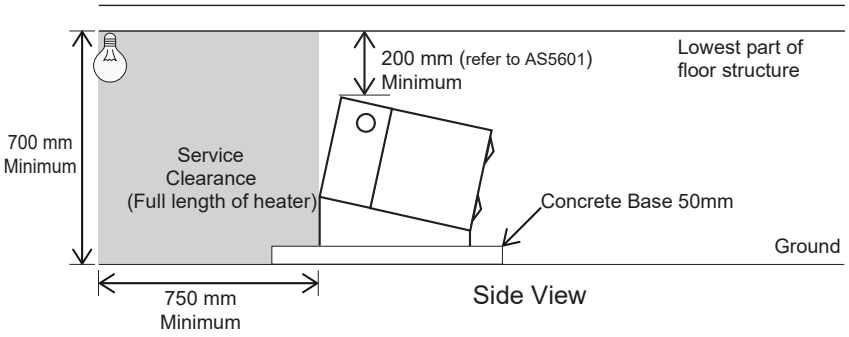
Method 2: In Ceiling and Under Floor



Method 3: Lay-down Option – In Ceiling



Method 4: Lay-down Option – Under Floor



3.3 SPLITTING INTERNAL MODEL HEATERS

3.3.1 KN3 Heaters

The KN3 internal model heaters can be split in half to allow for ease of installation. To split the heater, follow these simple instructions:

- Remove the four screws securing the roof and remove
- Disconnect the main loom quick-connect plug located on the cabinet centre wall
- Disconnect spark igniter from the control board and feed back into heat exchanger cabinet
- Remove the two large metric screws above the controls securing the fan cabinet to the heat exchanger cabinet
- Split the heater by firstly tilting then pulling the fan cabinet from the heat exchanger cabinet
- To reassemble conduct the above in reverse order

3.3.2 KN4 & KN5 Heaters

The KN4 & KN5 Internal model heaters can be split for ease of installation. To split the heater, follow these simple instructions:

a. Remove the heater's roof after removing the 4 roof screws.

b. Disconnect the speed sensor loom from the control board and remove it from the heat exchanger cabinet.

c. Remove the main fan motor and speed sensor loom access plate located on top of the fan cabinet compartment by removing the single screw.

d. Unplug the main fan loom at the connection located inside the access hole which has just been uncovered.

e. Remove the 2 screws fastening the fan cabinet tabs to the heat exchanger cabinet. These are located at the top of the fan cabinet on the heater's split line.

f. Pivot the fan cabinet upwards high enough to dislodge the lower locking tabs fixed to the fan cabinet near the base.

g. The heater is now split in two.

h. Protect the exposed looms and tabs from damage while the heater is split in two parts.

i. Once ready, reassemble in reverse order.

NOTE **Ensure when reassembling the heater that everything is put back and connected correctly.**

3.4 CHANGING THE RETURN AIR POP ORIENTATION

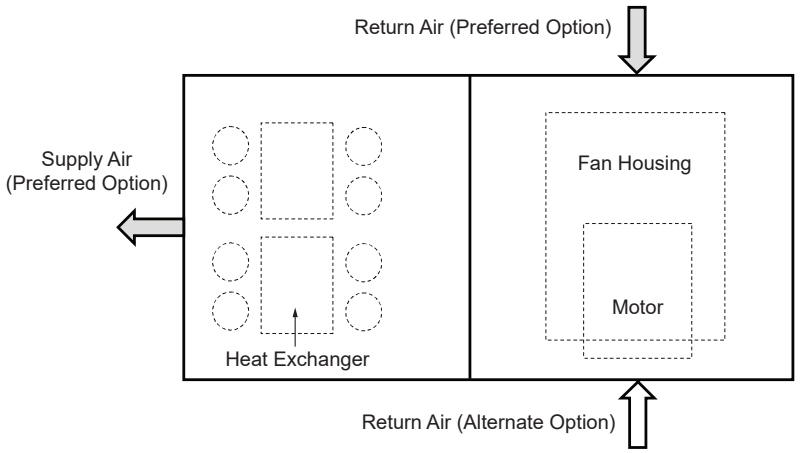
3.4.1 KN3 Heaters

There are two options available for the Return Air. Please refer to Diagram 3 for configuration of the unit.

1. Preferred Option is Return Air on fan housing side (ex factory)
2. 'Alternate Option' on motor side (Refer to Diagram 4)

NOTE **When connecting return air to 'Alternate Option', there will be a nominal airflow reduction of 10% when connected to required size duct that is straight and taught.**

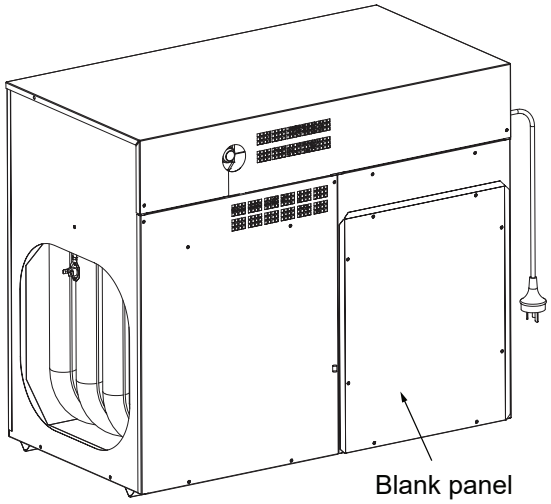
Diagram 3. Supply and Return Air



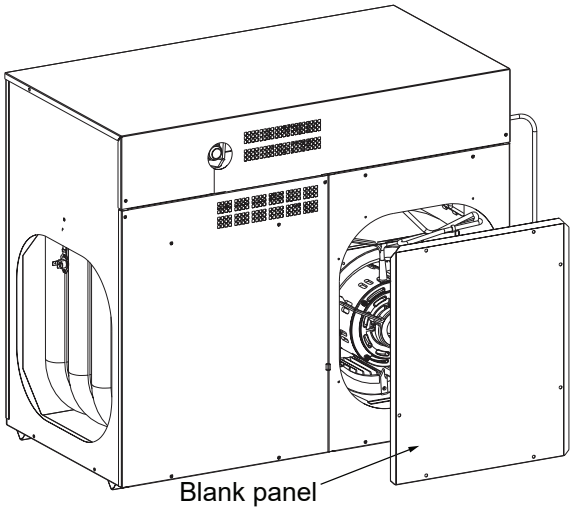
NOTE **The ducting should be well insulated and it is mandatory under building codes to install insulated fire rated duct.**

Diagram 4. Installation of Alternative Pop Position

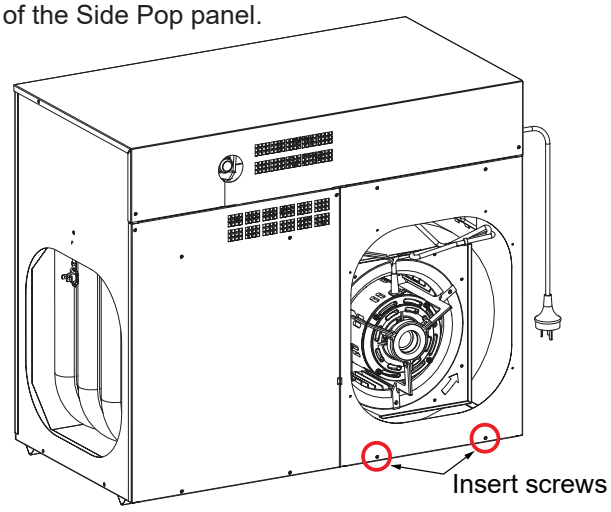
1. Remove all eight screws securing the Blank Panel.



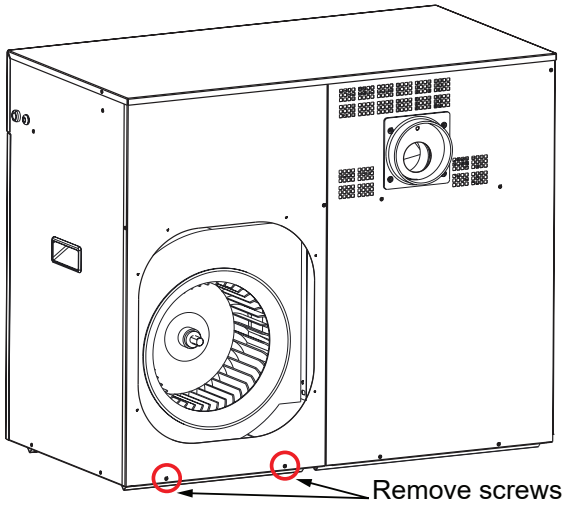
2. Remove Blank Panel from the appliance.



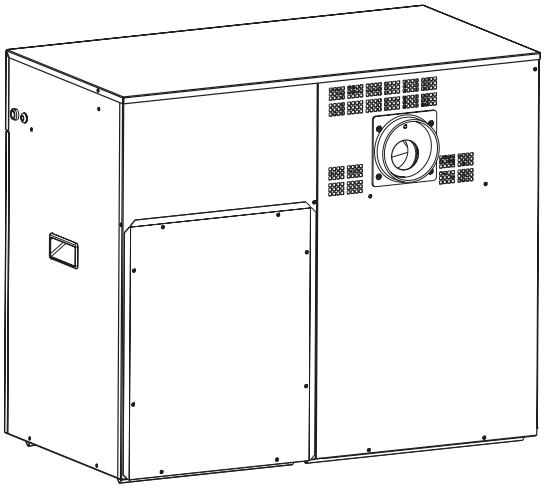
3. Insert two screws removed in Step 1 to the bottom of the Side Pop panel.



4. Remove two bottom screws from the side Pop Panel.



5. Secure Blank Panel to open fan side of the appliance with remaining eight screws.



3.4.2 KN4 & KN5 Heaters Pop Orientation

The return air pop orientation can be changed from side to side or to the rear of the heater if necessary.

Reversing the Side Entry

- Remove the screws securing the side pop blanking plate and remove the blanking plate.
- Swap to the other side and fasten with the same screws.

Changing to Rear Entry (KN4 & KN5 only).

NOTE

If this is done, predominantly when a unit is laid down, then the total number of outlets normally permitted for that installation must be reduced by 2 (refer to the outlet register chart, Table 10 on page 33).

- Remove the screws securing the end pop blanking plate and remove the blanking plate.
- Swap to the open side and fasten with the same screws.

IMPORTANT

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

On applicable models, connecting the Return Air duct to the end of the unit (rear entry) will result in reduced air flow – for example, when using a Lay Down Kit. In this situation:

- **The total number of outlets normally permitted for a heating system shall be reduced by 2 (refer to the outlet register chart, Table 10 on page 33).**

Change Duct Connection Locations

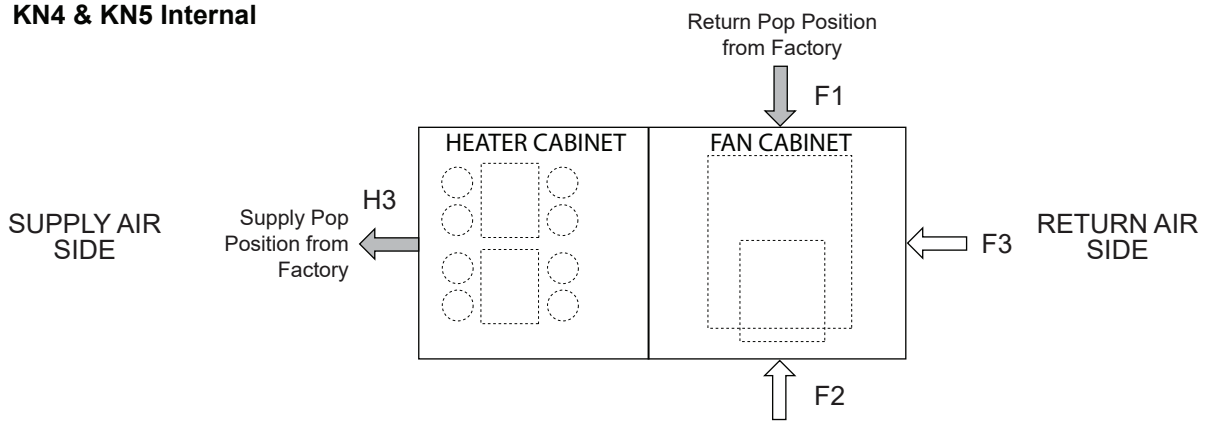
Simplistically, the heater unit is made up of two cabinets: a heater cabinet (air heating components) and a fan cabinet, (supply air fan). Diagram 5 identifies three pop positions on the heater cabinet (H3) and two pop positions on the fan cabinet (F1,F2,F3).

Table 3. Pop Installation Matrix

		Return Air		Supply Air	
		No. of Walls	Install Pop	No. of Walls	Install Pop
Internal Model Cabinet	KN4 & KN5	1	No Option	2	Inner Wall

Diagram 5. Duct Connection Options

KN4 & KN5 Internal



3.5 INTERNAL MODEL FLUEING INSTRUCTIONS

3.5.1 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 45º bend is equivalent to one half 90º bend (i.e. two 45º bends = one 90º bend).
- Provide adequate support to flue sections (e.g. saddles / strapping).

3.5.2 KN4 & KN5 Internal Models – 100mm non-corrosive metal flue.

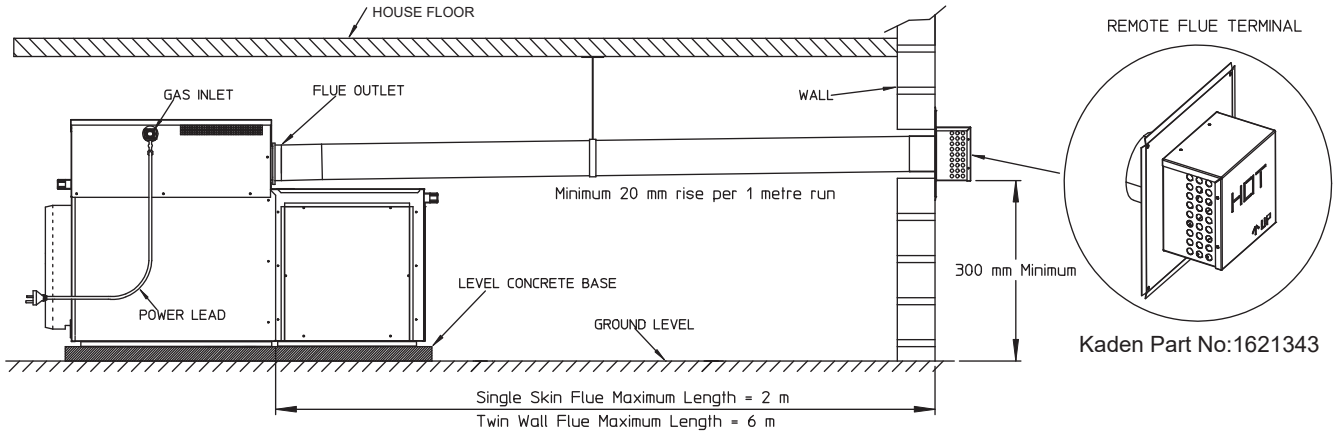
- Requires a 100mm round single or twin wall non-corrosive metal flue, suitably terminated.
- All flues shall have a bolted flue sleeve connection to allow for repairs and/or removal of the appliance.
- Twin Wall flue – maximum flue length of 6m.
- Single Wall flue – maximum flue length of 2m.
- Up to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

3.5.3 Remote Terminal - All 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 6 depicts a typical Internal underfloor configuration.

Diagram 6. Typical Remote Terminal Configuration - All Internal Models



4. EXTERNAL MODEL GUIDELINES

4.1 HEATER DIMENSIONS

Diagram 7. KN4 & KN5 External

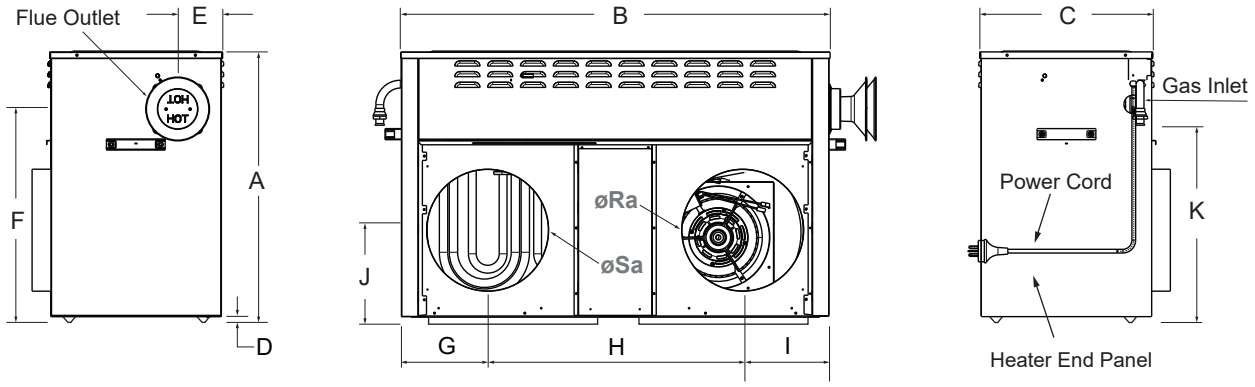


Table 4. External Heater Dimensions

Model (mm)	A	B	C	D	E	F	G	H	I	J	K	øSa	øRa
KN420EXT / KN521EXT	657	1046	416	15	104	520	211	620	210	224	430	300	300
KN430EXT / KN530EXT	707	1096	568	15	255	570	236	620	236	249	480	350	350

Diagram 8. KEX3C Heater Dimensions

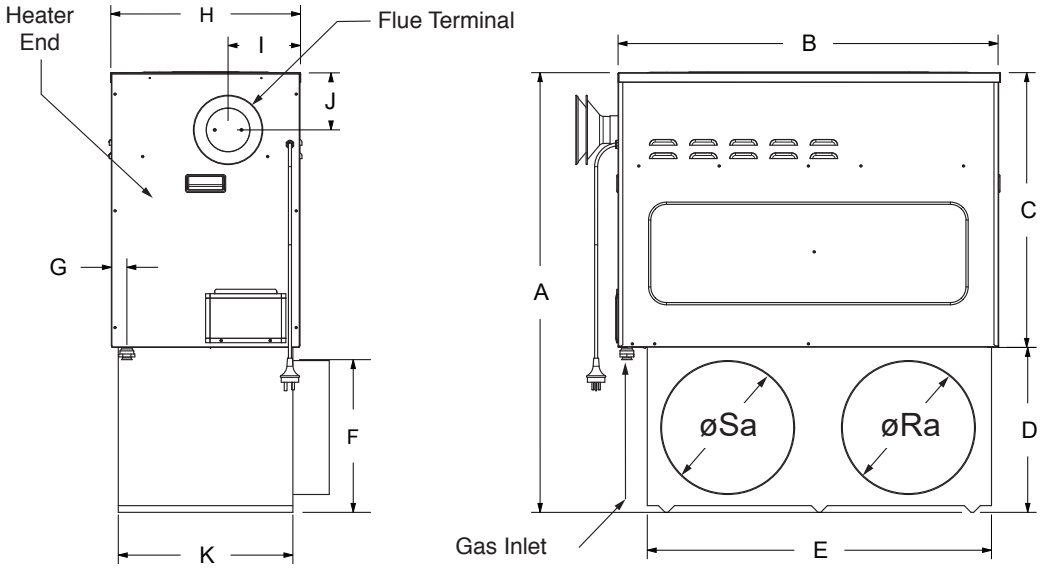


Table 5. KEX3C Heater Dimensions (mm)

Model	A	B	C	D	E	F	G	H	I	J	K	Base Box	ØSa	ØRa
KEX315C	985	852	616	370	772	342	36	426	162	126	392	Std	300	300
KEX320C	985	852	616	370	772	342	36	426	162	126	392	Std	300	300
												XA	350	350
KEX328C	1120	1028	706	415	952	388	42	588	244	126	558	Std	350	350
												XA	400	400

All dimension in mm

4.2 SERVICE CLEARANCES

4.2.1 KN4 &KN5 Service Clearances

Front/Back

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

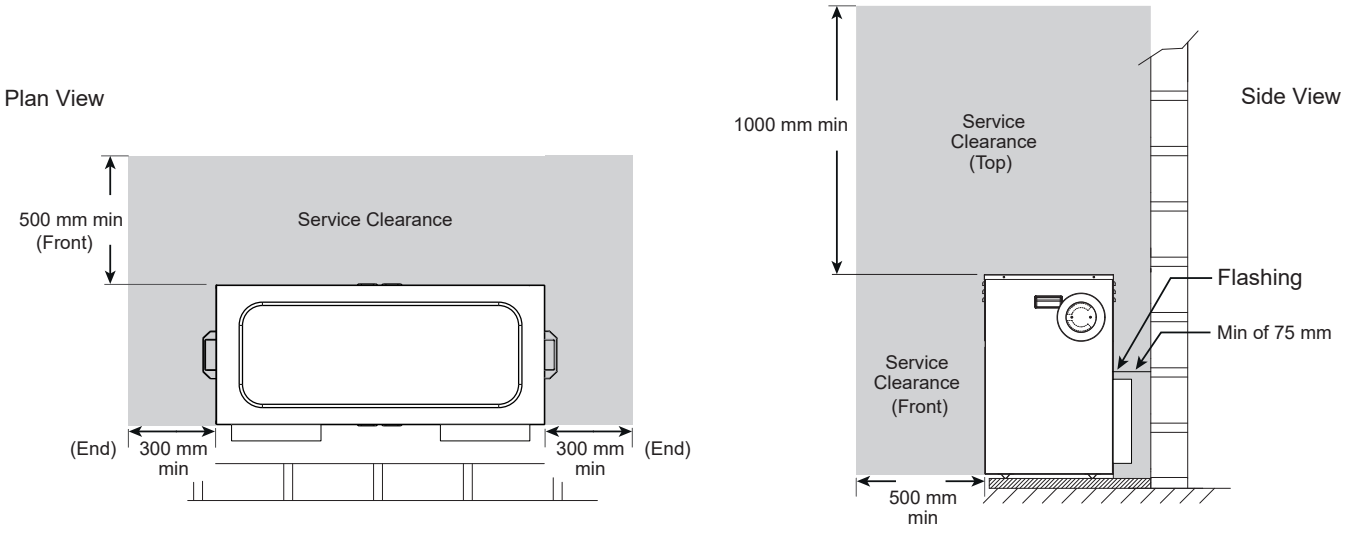
End

A minimum clearance of 300mm must be provided at each end of the heater.

Top

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

Diagram 9. KN4 &KN5 Clearances



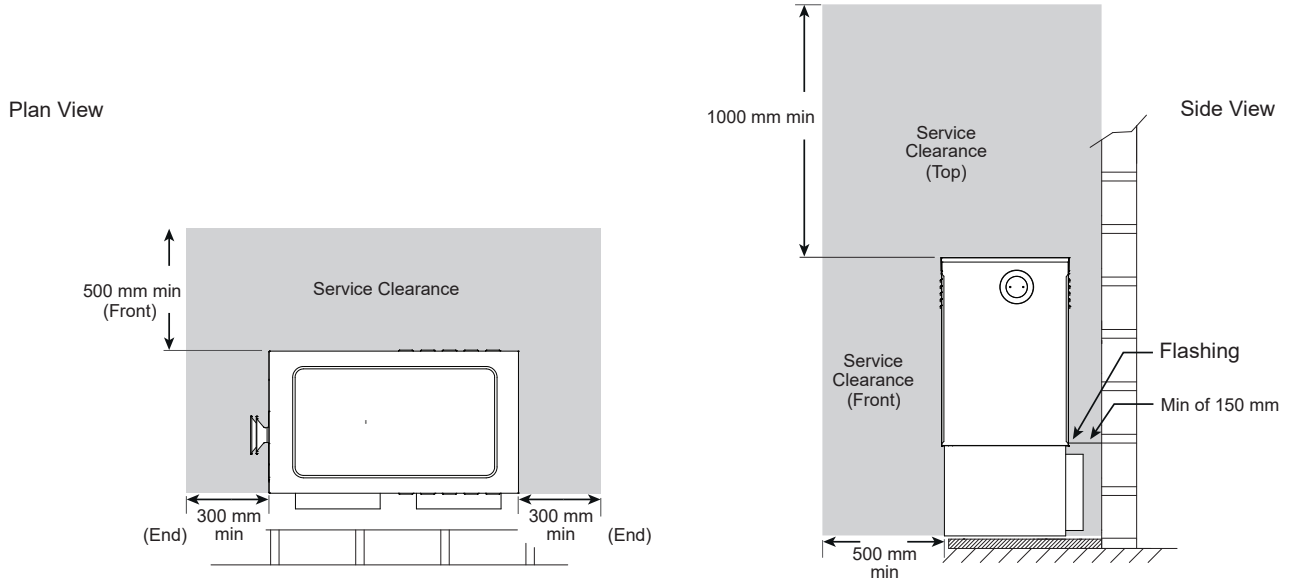
4.2.2 KEX3C Service Clearances

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 10. KEX3C Clearances



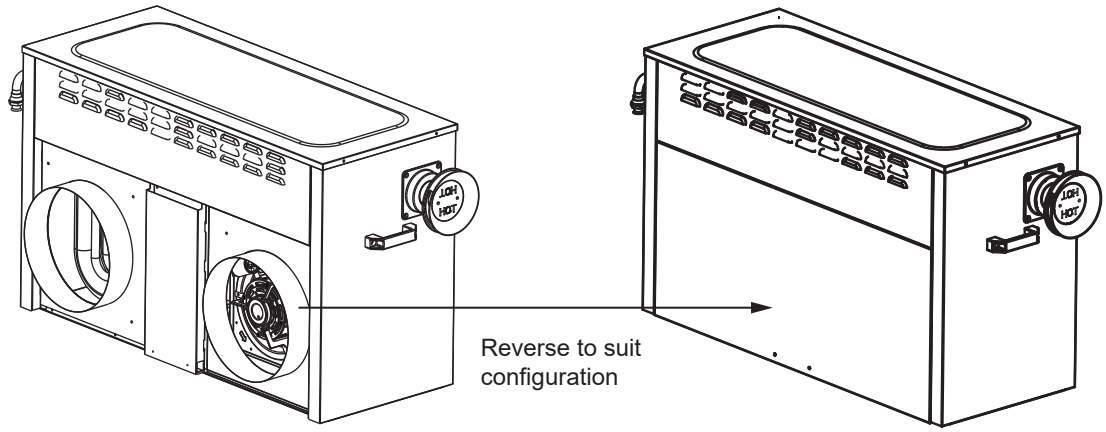
4.3 REVERSING THE HEATER

4.3.1 KN4 & KN5 Duct Orientation

The duct orientation of Kaden External heaters can be reversed if the installation requires it.

- Remove the screws at the bottom edge of the front panel of the heater, and carefully lift away the front panel, without scratching or marking it.
- There are two blanking plates behind the front panel, which cover the two pop holes. Remove the two blanking plates.
- Fit the two blanking plates to cover the original pop holes to prevent air leakage.
- Above the original pop holes there will be a flashing bracket secured by screws, which needs to be reversed. Remove the flashing bracket, and fit it to the new pop outlet side of the heater.
- Gently fit the front panel back in place on the reverse side from where it was removed, and fasten using the screws along the bottom edge.

Diagram 11. KN4 & KN5 External Orientation



4.4 INSTALLATION OF DUCT CONNECTION POPS

On all Kaden 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 6. Pop Installation Matrix".
- Spread pop flange to fit tightly into the hole in the cabinet (the notch side overlapping the other).
- Secure pops with the rivets supplied.

Change Duct Connection Locations

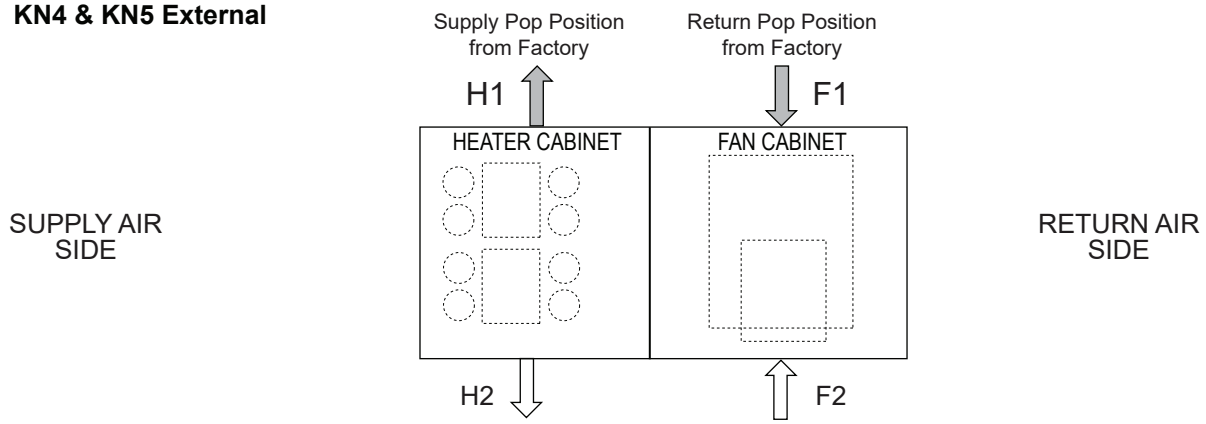
Simplistically, the heater unit is made up of two cabinets: a heater cabinet (air heating components) and a fan cabinet, (supply air fan). Diagram 12 identifies three pop positions on the heater cabinet (H1 and H2) and two pop positions on the fan cabinet (F1 and F2).

Table 6. Pop Installation Matrix

		Return Air		Supply Air	
		No. of Walls	Install Pop	No. of Walls	Install Pop
External Model Cabinet	KN4 & KN5	1	No Option	1	No Option

Diagram 12. Duct Connection Options

KN4 & KN5 External



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.

Note: *All service clearance measurements must be adhered to, otherwise this will impede the serviceability of the heater.*

5.1 INSTALLATION OF INTERNAL HEATERS

All internal KN internal models are designed to be installed in the roof or beneath the floor. This shall be done in accordance with the following guidelines and AS/NZS 5601.

5.1.1 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.

5.1.2 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 "4.2 Service Clearances" on page 16 (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. Termination can be performed using a remote terminal. Refer to Section 3.5.3 - Remote Terminal All Internal Model Applications on page 14.

5.2 VENTILATION CALCULATIONS

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

Installation of a gas appliance in a room or enclosure for properties approved for construction <u>prior to</u> 31st March 2014

a. Determine if the unit(s) MJ/hr rating for each cubic metre of the room or enclosure, is greater than 3 MJ/hr per m^3.

Example:

Unit rating (Ur) = 120MJ/hr

Room volume (Rv) = 1m x 1m x 2.4m = $2.4m^3$

Ur/Rv = 120/2.4 = 50 MJ/hr per m^3

As the result if 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 for a Downflow unit. 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 x F, where:

A = minimum free ventilation area, mm^2

T = total gas consumption of all gas appliances, MJ/hr. e.g. KN420 = 90 MJ/hr

F = factor (detailed in the table below)

Table 7. 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
* **Directly to outside** means through an outside wall, into a cavity vented to outside, into an underfloor space or roof space vented to outside.		

Installation of a gas appliance in a room, enclosure, residential garage or plant room for properties approved for construction <u>after</u> 31st March 2014

c. Determine if the unit(s) MJ/hr rating for each cubic metre of the room, enclosure, residential garage or plant room is greater than 0.4 MJ/hr per m^3.

Example:

Unit rating (Ur) = 90MJ/hr

Room volume (Rv) = 1m x 1m x 2.4m = $2.4m^3$

Ur/Rv = 90/2.4 = 37.5 MJ/hr per m^3 > 0.4 MJ/hr per m^3

As the result if 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 all other applications, e.g. Mechanical Ventilation, refer AS/NZS 5601.

5.3 INSTALLATION OF EXTERNAL HEATERS

KEX3C, KN4 and KN5 External models can be installed outside of the house. For an installation under a house floor, a KN3, KN4 or KN5 Internal model should be chosen.

All heaters that are installed externally on the ground should be installed on a level concrete base or pad, and there must be provision made to drain away any surface water from the heater. 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.

6.1 KN4 & KN5 SERIES THERMISTOR INSTALLATION

All KN4 & KN5 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.

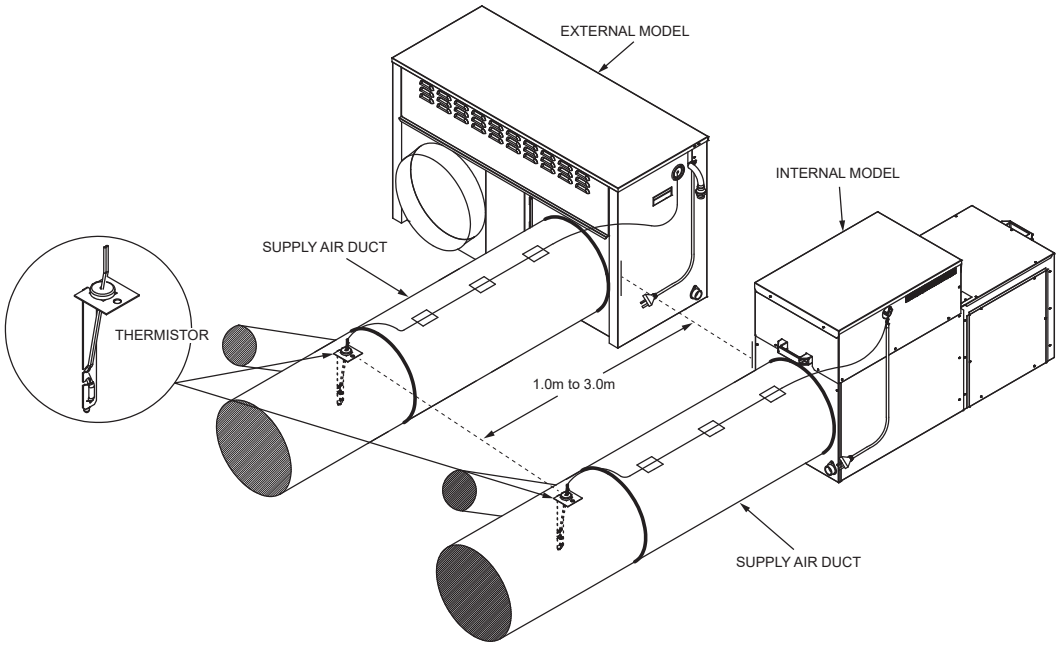
NOTE **Where an Add-On air conditioning indoor evaporator coil is installed, the thermistor must be located in the discharge air pop of the indoor coil.**

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. KN4 & KN5 Duct Joiner Location & Thermostat Position



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

6.2 INSTALLATION

6.2.1 Area to Cut Out in Wall

When installing the heater at ground level, create two holes to suit the pops all the way to ground level (see Diagram 14), or one rectangular hole to cover the distance of both pops ensuring there is no impediment to the structural integrity of the dwelling.

Refer to Table 4 and Table 5 on page 19 for required wall cut out dimensions.

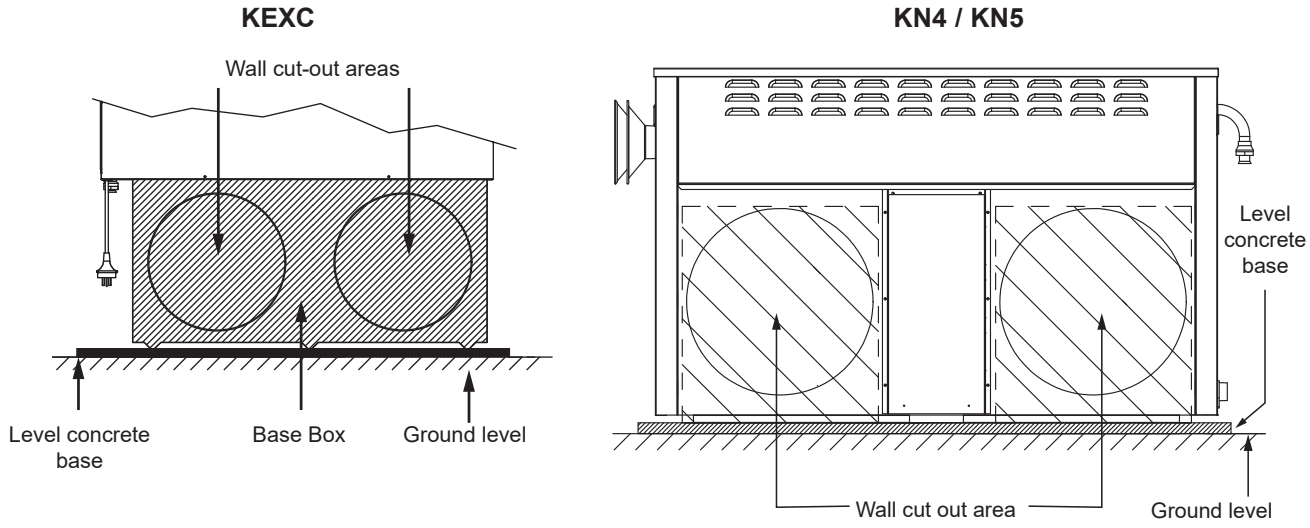
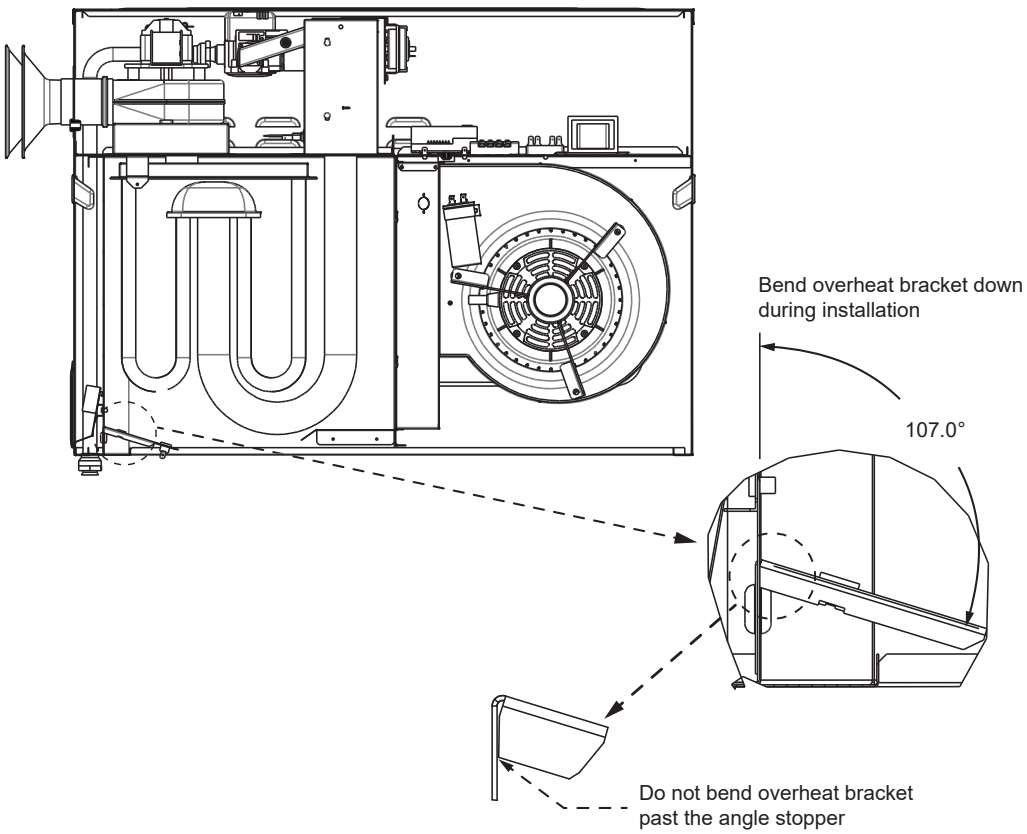


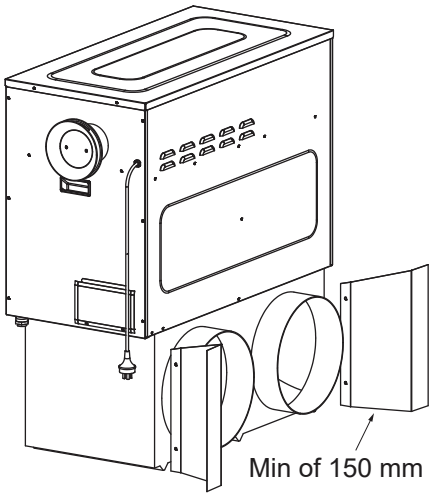
Diagram 14.

6.2.2 Temperature Limit Positioning (applicable to KEX3/4C only)

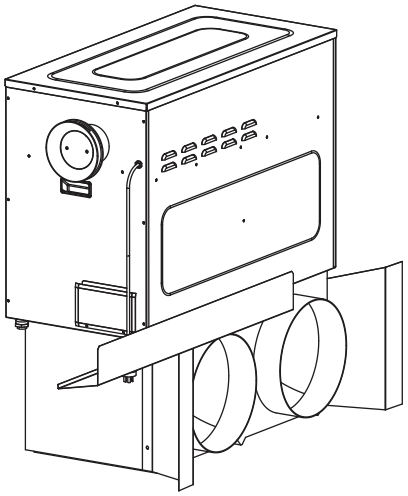


6.2.3 Installation of Flashing - KEX3C

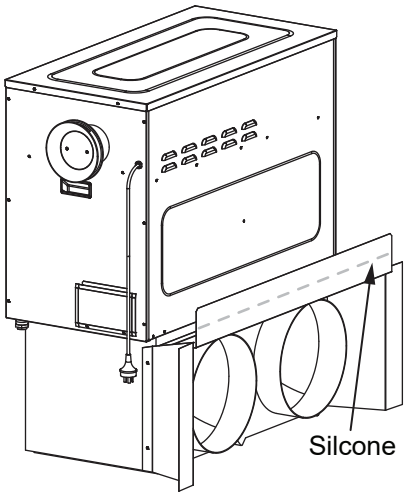
Flashing MUST BE fitted to ensure the ductwork is adequately weather protected. A minimum 150 mm clearance with flashing from the wall must be fitted. Refer to diagram below.



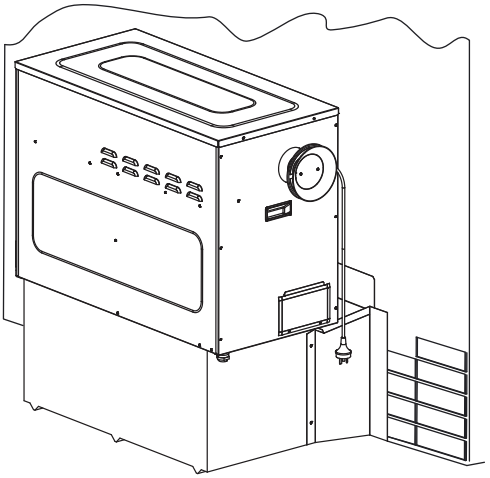
Step 1. Fit side flashing using existing screws on cabinet sides.



Step 2. Slide top flashing under flashing rail on base box



Step 3. Sit top flashing on top of side flashing edges. Once in place silicone along the upstanding face of top flashing.



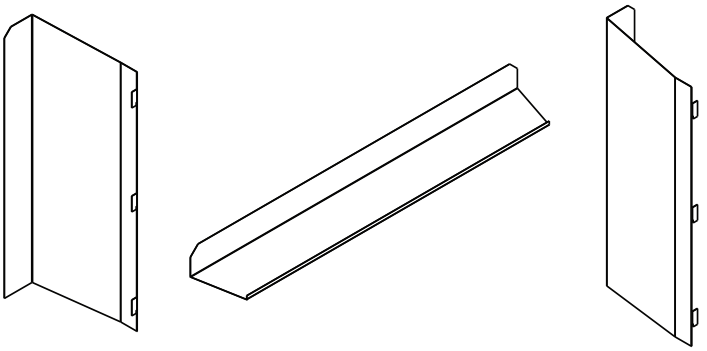
Step 4. Push the heater up against the wall and secure side flashing to the wall.

6.2.4 Installation of Flashing - KN4 & KN5 External

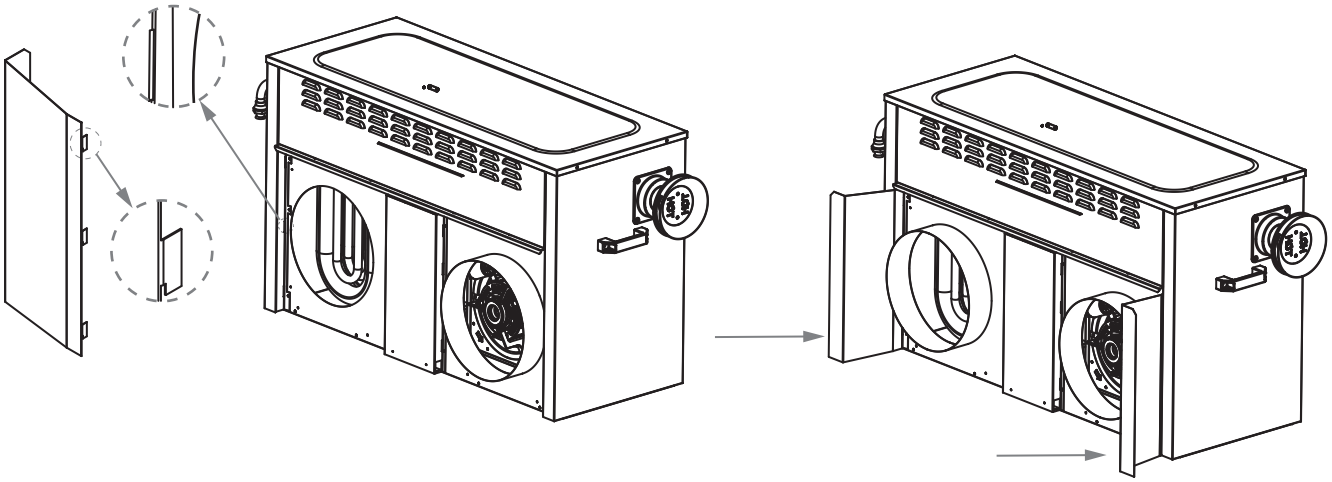
The flashing must be fitted to ensure the ductwork is suitably weather protected, with 75mm minimum clearance.

Flashing Kit Content External:

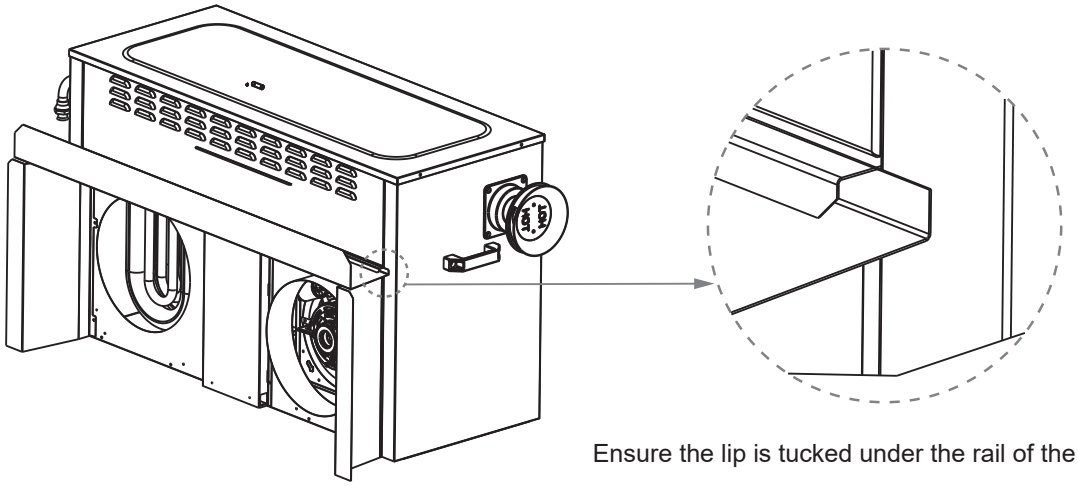
Item	Qty
LHS Flashing	1
RHS Flashing	1
Top Flashing	1



Step 1.	Install the LHS and RHS flashing to the heater. Align and insert the tabs into the slots of the heater.



Step 2.	Install the top flashing.



Ensure the lip is tucked under the rail of the heater.

Step 3.	Place a bead of silicone along the upstanding face of the top flashing then push the heater up against wall and secure sides of flashing to the wall.

NOTE **It is important to allow for sufficient slack in the ducting connected to the heater's pops, to allow the heater to be moved out from the wall if required for servicing.**

6.2.5 Installation of Flue Terminal

The flue terminal for KEXC and KN4 models is supplied inside the heater under the roof. On one end of heater you will find the flue outlet socket under an installer instruction label.

- Remove the label (if fitted) 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 15).

IMPORTANT **Remove labels and packaging from the flue terminal, then insert into the flue socket outlet**

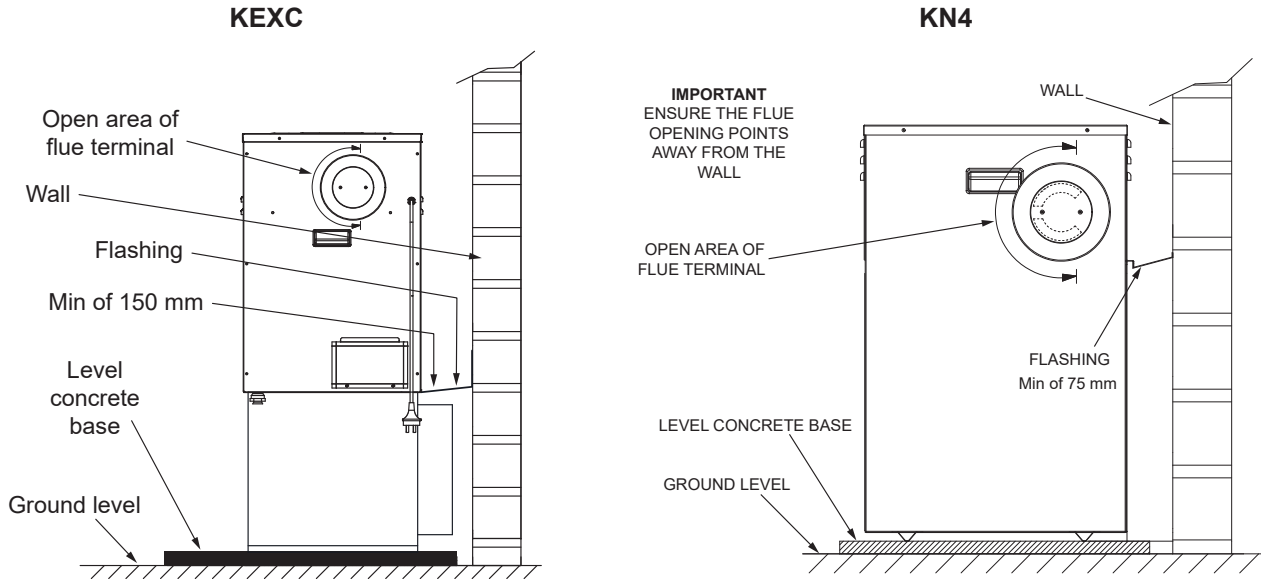


Diagram 15.

IMPORTANT **The flue terminal MUST BE orientated correctly, rotate the flue terminal to ensure that the flue gases are expelled away from the dwelling (refer to Diagram 15).**

The flue terminal MUST always be installed before starting the heater.

6.2.6 Flue Terminal Clearances

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.

Table 8.

Clearance	Description
75mm	From the wall against which the heater 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. FAN SPEED KN3 & KEX3C

7.1 FAN SPEED SETTING FOR KN3 & KEX3C MODELS

There are three fixed fan speed options available on KN3 and KEX3C models, these are:

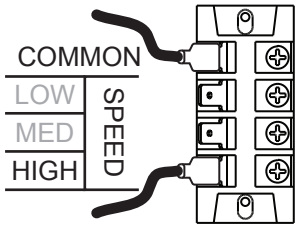
- High - “HIGH” (Factory Default)
- Medium - “MED”
- Low - “LOW”

7.1.1 To Adjust The Fan Speed

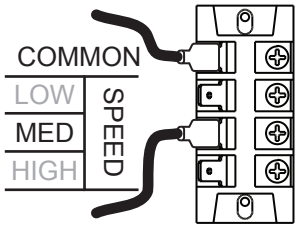
Ensure the power supply to the unit is OFF at the fixed switched socket outlet adjacent to the heater

Access the controls and change as required:

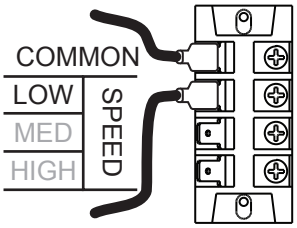
Fan speed high



Fan speed medium



Fan speed low



(Factory Default Connections)

Diagram 16.

- For High fan speed do not adjust
- For Medium fan speed move terminal from “HIGH” to “MED”
- For Low fan speed move terminal from “HIGH” to “LOW”
- Turn the power back on once complete

IMPORTANT

When setting the fan speed ONLY move the HIGH, MED and LOW connection, DO NOT alter the common connection.

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 Kaden 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 9 gives the minimum recommended return air grille sizes for each model heater.

Table 9. Minimum Recommended Return Air Grille Selection

Model	With Filter	
	Grille Size (m^2)	Example of Size (mm)
KN521INT	0.39	400 x 975
KN521EXT	0.39	400 x 975
KN530INT	0.54	400 x 1350
KN530EXT	0.54	400 x 1350
KN420INT	0.44	400 x 1100
KN420EXT	0.39	400 x 975
KN430INT	0.60	400 x 1500
KN430EXT	0.50	400 x 1250
KN315INT	0.30	400 x 750
KN320INT	0.30	400 x 750
KN325INT	0.38	400 x 950
KN330INT	0.51	400 x 1275
KEX315C (300mm)**	0.28	400 x 700
KEX320C (300mm)**	0.32	400 x 800
KEX320C (350mm)**	0.35	400 x 875
KEX328C (350mm)**	0.46	400 x 1150
KEX328C (400mm)**	0.51	400 x 1275

***Model and (Base Box Pop) size*



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



Grille sizes are based on maximum airflow with typical Egg-Crate Grille type. For all other types, consult grille manufacturer's specifications. For example a grille with a free ventilation opening measuring 400mm x 975mm, the grille size is 0.4m x 0.975m = 0.39m^2. This grille would be suitable for a KN521INT heater provided the grille has a filter fitted.

8.3 OUTLET CHART INFORMATION

The outlet chart (Table 10) provides recommendations based on using the Product Sizing Guide or a system designed using accepted design principles. These figures also relate to typical size registers and diffusers used on domestic heating systems i.e. 300mm x 100mm floor registers and 150mm round ceiling diffusers, with 150mm ductwork connection. For all systems, a minimum number of outlets must remain fully open (this includes both the outlet grille and the damper in the duct) if the heater is to operate properly without overheating. Similarly, ceiling outlet systems have a maximum number of outlets that can remain fully open, to ensure that the velocity through each outlet is sufficient. These maximum ceiling outlet figures relate to fully open outlets, however, the system will operate efficiently with more outlets open, if it has been properly balanced. There is no maximum number for floor outlets, so the following chart below lists the typical number of floor outlets for each heater model.

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. The minimum number of outlets that should be fully open for floor/ceiling systems where the system has zone dampers installed, and these zones are being operated from a Networker Thermostat using the heater's on-board zone relays or a Network 516 module. Systems fitting this description are deemed to have Adaptive Zoning active, hence minimum outlet numbers are reduced. Where it shows half figures such as 1.5, it is possible to operate with 1 outlet fully open, and another outlet half closed (such as a bathroom). Refer to Section 12 for balancing guidelines.

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.**

NOTE

For KN4 & KN5 Internal models, the normal return air pop configuration is side entry, but can be changed to the end of the fan cabinet if necessary. If this is done, a total of two outlets must be removed from the allowable maximum number of outlets.

8.4 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%.

NOTE

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

On applicable models, connecting the Return Air duct to the end of the unit (rear entry) will result in reduced air flow by up to 30% – for example, when using a Lay Down Kit. In this situation:

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 (refer to the outlet register chart located on Table 10 on page 33).

Table 10. *Recommended Outlet Chart*

System Model	Airflow Rate (L/s)	A Maximum No. Ceiling Outlets	B Minimum No. Floor/ Ceiling Outlets	C (Adaptive Zoning) Minimum No. Floor/Ceiling Outlets
KN5 Heaters				
KN521INT	785	12	5	2
KN530INT	1080	17	7	2
KN521EXT	700	12	5	2
KN530EXT	960	16	7	2
KN4 Heaters				
KN420INT	785	13	6	2
KN430INT	1080	18	9	2
KN420EXT	710	12	6	2
KN430EXT	900	15	7	2
KN3 Heaters				
KN315INT	540	10	9	5
KN320INT	540	10	9	5
KN325INT	680	12	10	7
KN330INT	920	13	16	8
KEX315C (300mm)**	498	8	4	-
KEX320C (300mm)**	581	11	5	-
KEX320C (350mm)**	622	11	5	-
KEX328C (350mm)**	819	16	8	-
KEX328C (400mm)**	921	16	8	-

*** Model and base-box duct size*



Network 516 modules can only be used on heaters manufactured after 1 March 2010.

9. THERMOSTAT INSTALLATION

9.1 KN4 AND KN5 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.

NOTE

- **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^2 in cross-section and less than 100m in length.

9.2 MANUAL THERMOSTAT INSTALLATION

Manual thermostats can be connected directly to KN5, KN4, KN3 and KEX3C series heaters.

9.2.1 Connect a Manual Thermostat

Connect a manual thermostat as follows:

a. Select a suitable location for the thermostat (refer to Section 9 on page 34).

b. Run the wiring from the heater to the thermostat.

c. Remove the thermostat front cover and connect the wires to thermostat terminals A and B.

d. 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).

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

e. Install the thermostat front cover.

f. Connect the wiring to the heater at terminals R and W (refer to Diagram 17 for a KN4 & KN5 Series heater or Diagram 18 for KEX3C & KN3).

g. For fan-only operation, wire a switch in circuit between heater terminals R and G.

Diagram 17. KN4 & KN5 Series Manual Thermostat

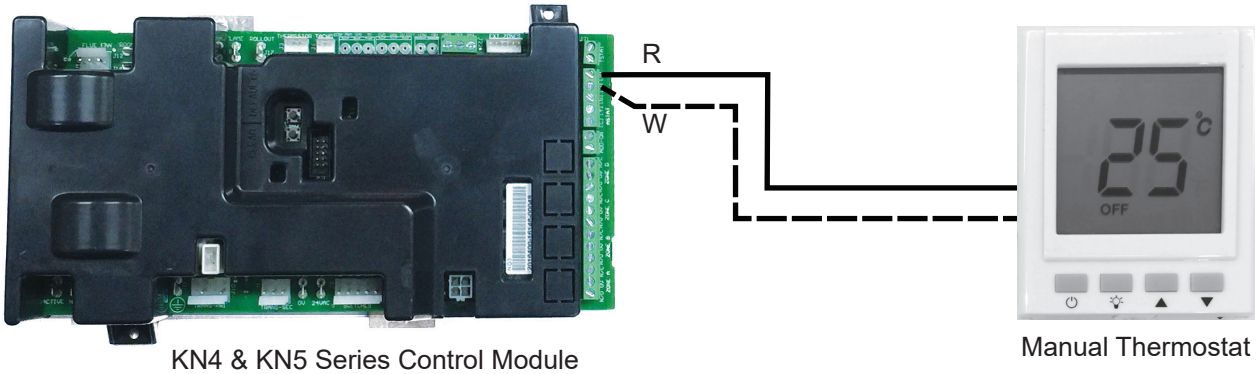
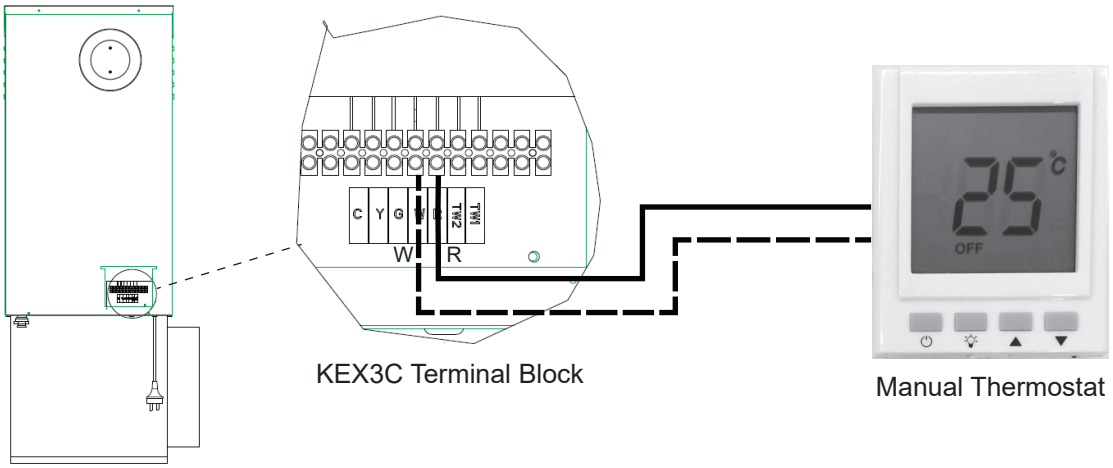


Diagram 18. KEX3C Manual Thermostat



10. NETWORKER INSTALLATION: SINGLE AND MULTIPLE CONNECTIONS

10.1 NETWORKER INSTALLATION



Networkers can be wired directly to KN4 and KN5 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.

NOTE **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 KN4 OR KN5 SERIES HEATERS

a. Run a twin wire cable from the heater to the networker (for example, figure-eight cable, 0.75mm^2).

b. Remove the backing plate from the networker by unclipping it at the sides.

c. Draw the wires from the wall cavity and feed them through the opening in the backing plate.

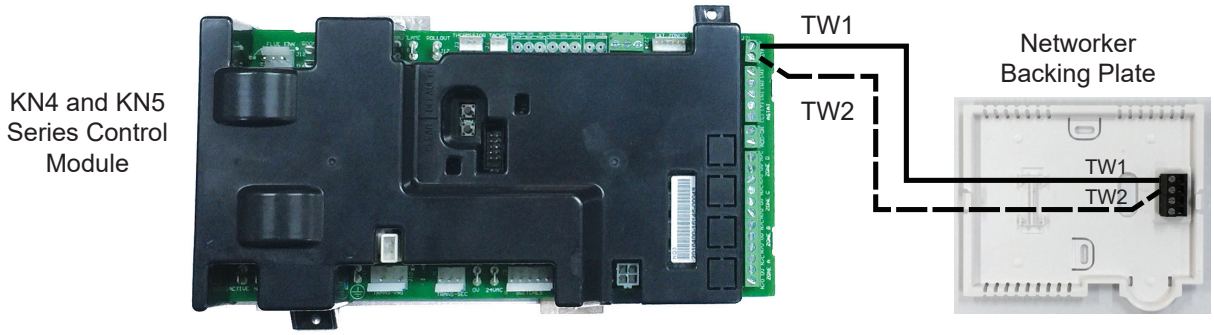
d. Connect the cable to the terminal connections on the backing plate before mounting it on the wall and reassembling the networker.

NOTE **A piece of tape may be placed over the cable hole on the backing plate to prevent nuisance draughts interfering with the Networker temperature sensor.**

e. 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.

NOTE **To connect multiple heaters, refer to Section 10.**

Diagram 19. KN4 & KN5 Series Networker Connections



NOTE **To connect two Networkers to a system they may be wired in parallel.**

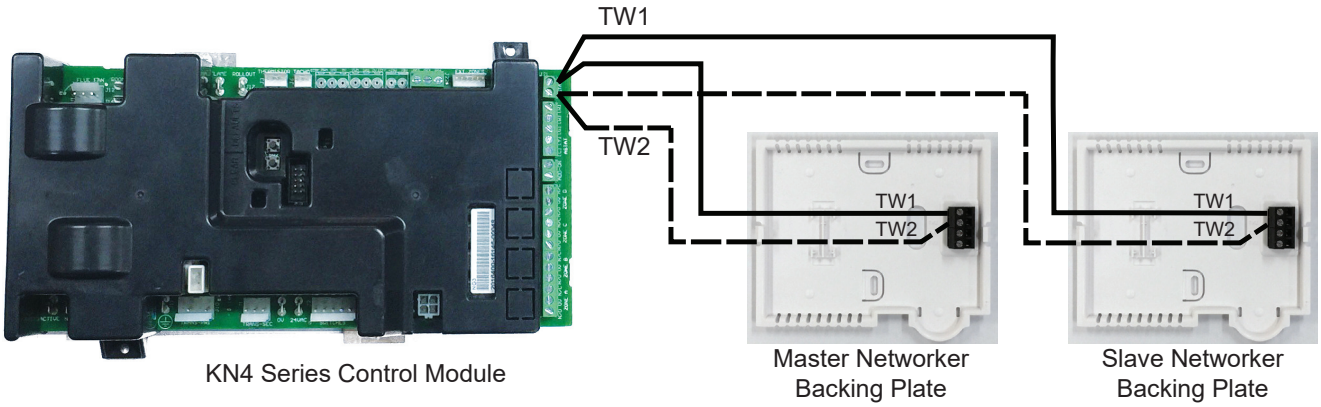
10.2.1 Connect Dual Networkers

Two networkers can be connected to a single KN 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 20. Dual Networker Connections



a. Mount the networkers (refer to para 10) and connect the wiring as shown in Diagram 20.

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.

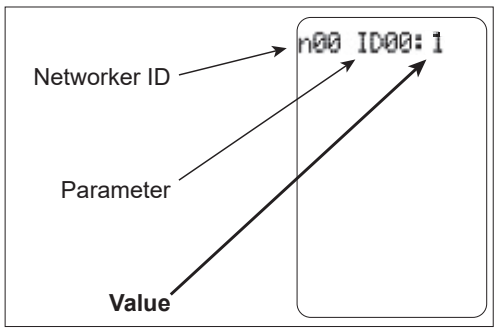
f. After the message clears, press the mode key (M) until 'n01 ID00:1' displays (refer to Diagram 21).

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 21. Networker Identification



10.2.2 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.

10.2.3 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.

10.2.4 ZonePlus

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

10.2.5 Wiring the Manual Wall Control to a KEX3C Heaters

IMPORTANT

The Manual control backing plate has 2 terminal points for the connection of control wires. These connections are not polarity sensitive.

- Run a twin wire cable (i.e. figure 8 cable - 0.75mm²) from the heater to the Manual Wall Control.
- Remove the backing plate from the Manual Wall Control by unclipping it from the bottom.
- Draw the wires from the wall cavity and feed them through the opening in the backing plate, remove round knockout.
- Mount the backing plate onto the wall and insert the batteries.
- Connect the cable to the terminal connections to the rear of the thermostat face before mounting it to the backing plate. Refer to Diagram 22.
- Mount the thermostat face onto the backing plate to reassemble the controller.
- Feed your cable through the grommet located at the base of the heater underneath the access panel.
- Connect the other end of the cable to the terminals marked R and W in the heater's electronic control module, refer to Diagram 22. KEX3C Wiring.

Diagram 22. KEX3C Wiring

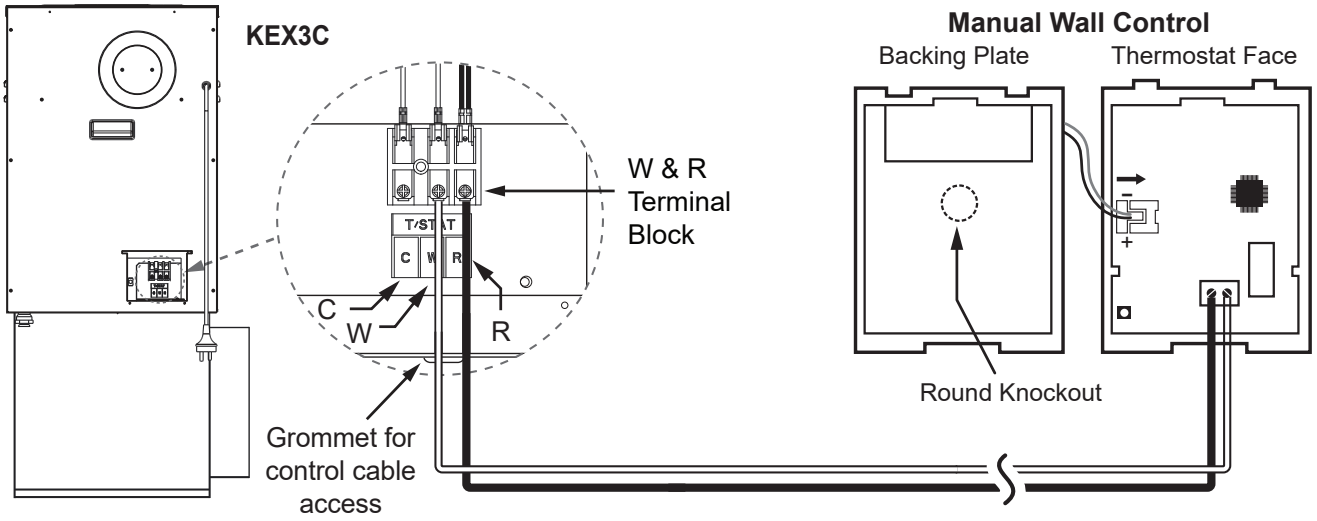
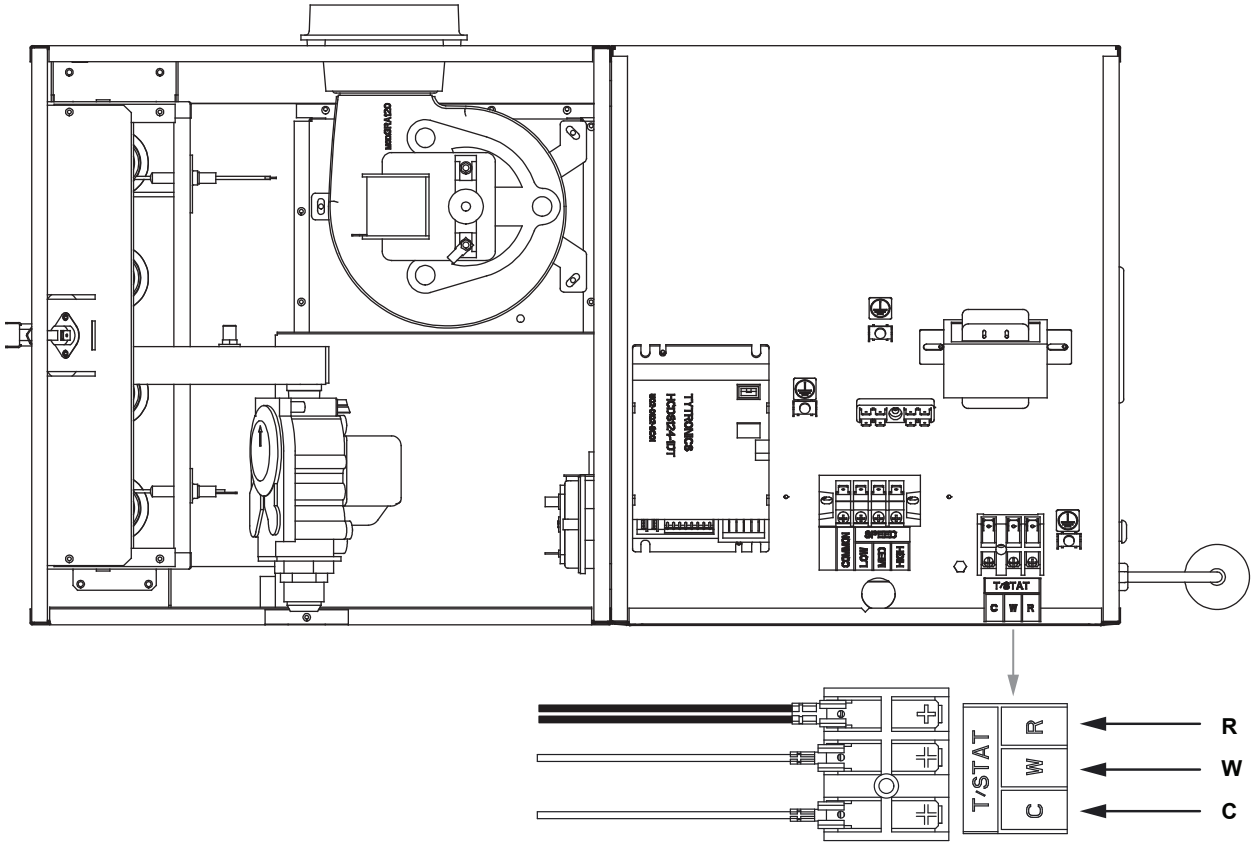


Diagram 23. KN3 Thermostat Wiring Diagram



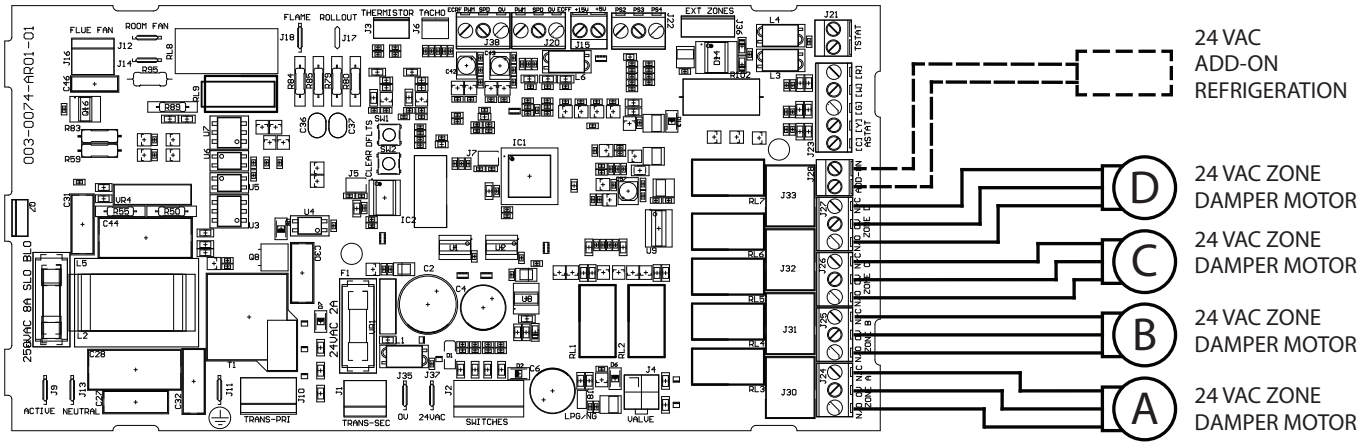
Note: *Connect the W & R wire from the thermostat to the terminal block accordingly. Incorrect connection may result in a short circuit and could cause damage to the appliance.*

11. ADAPTIVE ZONING AND ADD-ON AIR CONDITIONING

11.1 OPTIONS

KN4 and KN5 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 24.

Diagram 24. Zoning/Add-on Connections - N-G3 PCB



NOTE **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 KN4 and KN5 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 25 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 25. RJ12 socket detail on heater PCB

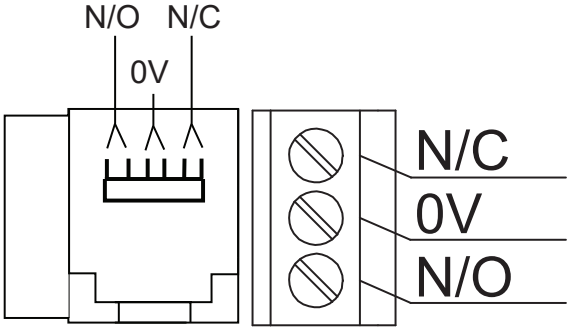


Diagram 25 details the Normally Closed (N/C), Zero Volt (OV) and Normally Open (N/O) connections for the RJ12 socket and terminal block connections for zones A, B, C and D on heater PCB.

Three-way Terminal Connections

Diagram 26, Diagram 27 and Diagram 28 detail the Normally Open (NO), Normally Closed (NC) and zero volt (0V) connections required to enable the networker outputs to control the damper motors.

NOTE **Ensure that the circuits are correct to Diagram 26, Diagram 27 or Diagram 28 as applicable.**

11.3 CONNECT A DAMPER MOTOR TO THE CONTROL MODULE

Diagram 26. 24VAC Power Open/Power Close Damper Motor

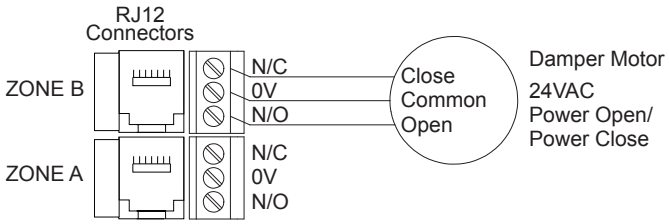


Diagram 27. 24VAC Power Open/Spring Return Damper Motor

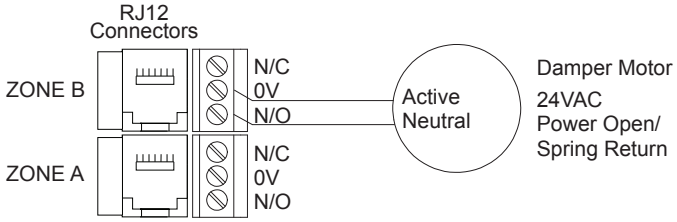
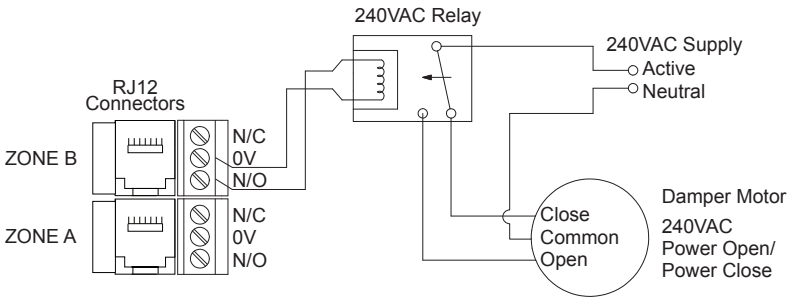


Diagram 28. 240VAC Power Open/Power Close Damper Motor



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 KN4 AND KN5 HEATER CONTROL SETTINGS

Heater settings (installer parameters) are adjusted via the Master networker controller.

Table 11. Heater Installer Parameters – KN4 and KN5

<table>
<tr><th>No.</th><th>DISPLAY</th><th colspan="5">DESCRIPTION</th></tr>
<tr><td>1</td><td>H01 ID01: 1350</td><td colspan="5">HEATING: MAXIMUM FAN SPEED SETTING
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.</td></tr>
<tr><td>2</td><td>H01 ID02: 1350</td><td colspan="5">COOLING: MAXIMUM FAN SPEED SETTING
The fan RPM setting for normal cooling operation. This setting can be adjusted from 500 to 1350.</td></tr>
<tr><td>3</td><td>H01 ID03: 950</td><td colspan="5">HEATING: ZONING MINIMUM FAN SPEED SETTING
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).</td></tr>
<tr><td>4</td><td>H01 ID04: 1</td><td colspan="5">HEATER IDENTIFICATION NUMBER
(Do not alter unless multiple heaters are installed)
In systems with multiple heaters installed, identifies each heater unit in priority order, for example ID04: 1, ID04: 2, ID04: 3.</td></tr>
<tr><td>5</td><td>H01 ID05: 500</td><td colspan="5">CIRCULATION FAN OPERATION
The fan RPM setting in circulation mode. That is, fan operation between heating or cooling cycles when the set room temperature has been achieved.</td></tr>
<tr><td>6</td><td>H01 ID06: 65</td><td colspan="5">SUPPLY AIR THERMISTOR SET POINT TEMPERATURE
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.</td></tr>
<tr><td rowspan="9">7</td><td rowspan="9">H01 ID07: 0</td><td colspan="5">ZONE/REFRIGERATION /HUMIDIFIER MODE</td></tr>
<tr><td>Value</td><td>System Configuration</td><td>Zone Connection</td><td>Add-On Connection</td><td>Humidifier Connection</td></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>

No.	DISPLAY	DESCRIPTION
8	H01 ID08: 1000	**COOLING: ZONING MINIMUM FAN SPEED SETTING** 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	**DO NOT ADJUST**
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:

a. Press Key 5. 'Clock setting mode' displays. Confirm that the clock display is flashing.

b. Press and hold Key 2 and Key 4 until 'Installer parameter access' displays.

c. 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.

d. Press Key 1 or Key 2 to scroll through, and select, the required parameter ID, e.g. H01 **ID01**: 1 (refer to Table 11). (Key 1 = next ID, Key 2 = previous ID.)

e. Turn the rotary dial to adjust the parameter value, e.g. H01 ID01: **1**.

f. 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 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 12). *(KN3/KN5 only).*

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.

NOTE

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). *(KN3/KN5 only)*.

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 11, Item 1). *(KN3/KN5 only).*

h. 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.

i. Switch off the heater, remove the manometer, tighten the captive screw at the inlet gas pressure test point and test for leaks.

j. 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 on page 42) 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. For setting fan speed for KN3 and KEX3 models, refer to "7.1.1 To Adjust The Fan Speed" on page 30

c. Do not adjust the thermistor set temperature unless the system is NOT achieving the following temperature rises:

- Ceiling outlets: 25º to 30ºC, and
- Floor outlets: 35º to 40ºC.

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 45ºC.

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

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 35º to 40ºC rise and avoid modulation. If the heater still reaches the thermistor set temperature or the rise is greater than 40ºC, 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 25º to 30ºC rise and avoid modulation.

If the temperature rise is above 40ºC, 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 *(KN4/KN5 only)*

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 45ºC. Do not adjust the thermistor set temperature while setting up the EHTG fan speed.

12.3 FINAL CHECKS

a. Check the temperature rise at the outlets. The temperature of the warm air at any outlet should not be more than 45ºC above the return air temperature. If it is, the heater will be approaching an overheat condition.

b. Check that the fan continues to run while the gas burner is operating.

c. Check that the fan operates in fan-only mode by operating the networker in fan-only mode (refer to the Owner's Manual). *(KN3 / KEX3C models excluded)*

d. 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).

e. Ensure that the heater is switched off.

f. 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.

g. Turn on the gas supply at the supply tap and test for leaks using a soapy water solution or leak detector spray.

h. Install the heater top panel.

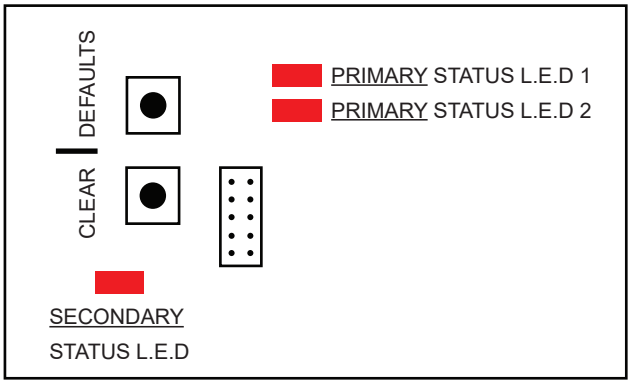
i. Instruct the customer on the correct operation of the system.

j. 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 *(KN4/KN5 ONLY)*

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 29 for location of these status L.E.D's in reference to the 'CLEAR' and 'DEFAULT' buttons on the heater control board cover.

Diagram 29. 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 12 below.

Table 12. 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	Thermistor Overheat
36	3	6	Bad Supply Air Thermistor Location
40	4	0	Return Air Overheat
41	4	1	Supply Air Overheat
42	4	2	Thermistor Open Circuit
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
85	5	8	Thermistor Location incorrect - Lockout

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.kadenwarranty.com and follow the links.

13. TECHNICAL SPECIFICATIONS

Table 13.

Models	Gas Input MJ/hr	Heat Output kW	Injector Size	Duct Size	Return Air Size (With Filter)	Airflow @ Total Static Pressure (L/s)				Weight (kg)	Fan Motor	Total Maximum Current (A)	Maximum Recommended Add-On Cooling Capacity (kW)
	Max Input	Max Output	(mm)	(mm)	(m²)	50 Pa	75 Pa	100 Pa	125 Pa		(W)		
KN5													
KN521INT	90	21	2.25	300	0.39	785	765	740	715	53	315	6	13
KN530INT	130	30	2.25	350	0.54	1170	1140	1110	1080	71	650	6	18
KN521EXT	90	21	2.25	300	0.39	700	675	645	615	66	315	6	13
KN530EXT	130	30	2.25	350	0.54	1055	1030	995	960	85	650	6	18
KN4													
KN420INT	90	20	2.25	300	0.44	785	765	740	715	52	315	6	13
KN430INT	130	30	2.25	350	0.60	1179	1140	1110	1080	70	650	6	18
KN420EXT	90	20	2.25	300	0.39	710	690	680	665	65	315	6	13
KN430EXT	130	30	2.25	350	0.50	1000	975	940	900	84	650	6	18
KN3													
KN315INT	70	15	2.25	300	0.30	540	520	500	480	52	425	6	10
KN320INT	90	20	2.25	300	0.30	540	520	500	480	53	425	6	10
KN325INT	107	23	2.40	350	0.38	680	650	620	593	53	425	6	13
KN330INT	133	30	2.25	350	0.51	1000	970	940	920	71	600	6.5	15
KEX3C													
KEX315C (300mm)**	66	15	2.25	300	0.28	498	480	461	443	48	425	4	-
KEX320C (300mm)**	87	20	2.25	300	0.32	581	561	541	521	49	425	6	-
KEX320C (350mm)**	87	20	2.25	350	0.35	622	598	574	553	49	425	6	10
KEX328C (350mm)**	120	28	2.25	350	0.46	896	873	849	819	72	600	6.5	13
KEX328C (400mm)**	120	28	2.25	400	0.51	1012	985	857	921	72	600	6.5	15

** Model and base duct size

NOTE

- **The manufacturer reserves the right to change specifications without notice.**
- **Rated air flow of universal units is in the factory default 'internal' configuration.**

14. TECHNICAL SUPPORT

For technical support please call

1300 4KADEN (1300 452 336)



Product warranty registration forms can be found online at www.kadenwarranty.com or in the owner's manual.

NOTES

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B065800 Issue A December 2024