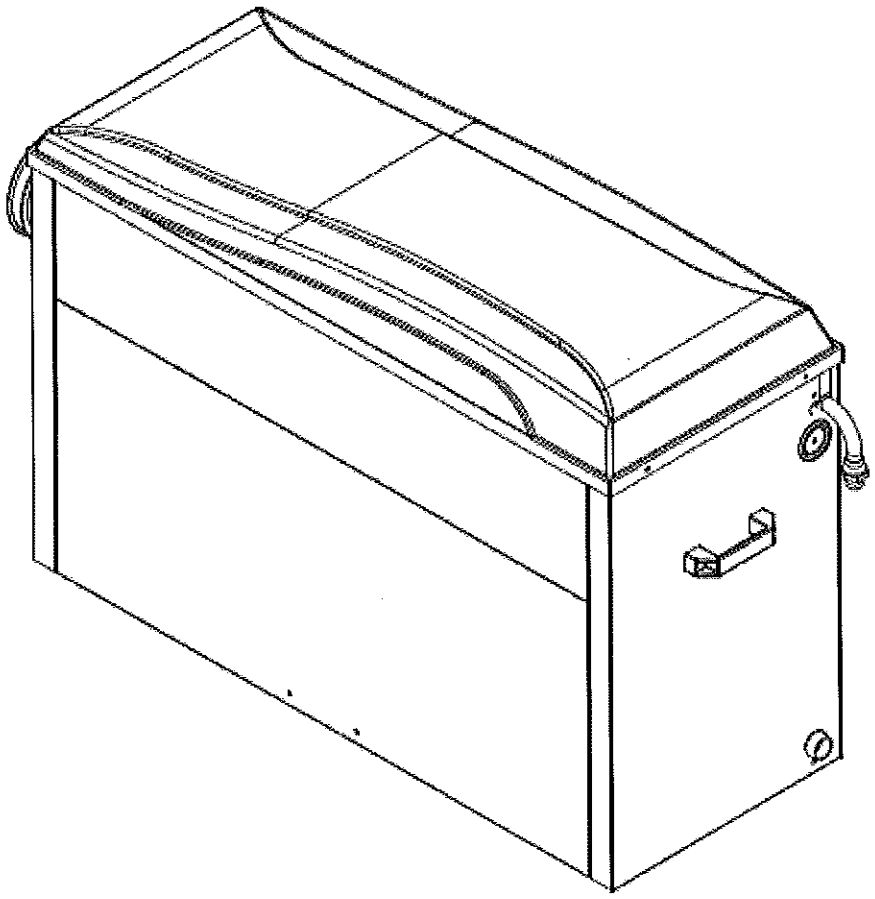
Brivis StarPro Ducted Gas Heater

Installer's Manual

SP4, SP5 & SP6 Series



PLEASE READ THESE INSTRUCTIONS CAREFULLY BEFORE INSTALLING THIS PRODUCT

brivis

GWA Heating & Cooling

Scope

This Installer's Manual is intended to be used as a guideline for the installation of Brivis 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 Installer's Manual is based on Australian codes – for all other applications, please refer to local codes and regulations

Brivis heaters must be installed and serviced by qualified personnel.

Models covered in this manual are as follows:

Brivis StarPro 6 Star Heaters

Internal Models	External Models
SP623IN	SP623EN
SP623IN-XA	SP623EN-XA

Brivis StarPro 5 Star Heaters

Internal Models	External Models
SP521IN	SP521EN
SP521IN-XA	SP521EN-XA

Brivis StarPro 4 Star Heaters

Universal Models
SP421UN
SP430UN

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

Disclaimer

IMPORTANT NOTICE: 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.

Table of Contents

1. General Guidelines

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

Brivis 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.

Brivis 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 5601 - Gas installations
- AS 4254 - Ductwork for air-handling systems in buildings
- HB 276
- Local Gas and Electricity Authorities
- Brivis "SuperSizeGuide"
- Local Building Regulations
- Environment Authorities
- Building Code of Australia (BCA)

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

It is recommended the Brivis "SuperSizeGuide" be 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, see the appliance data label located inside the service compartment.

> ***Note:*** *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 Brivis Customer Service Centre for advice.*

1.1 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 it is intended to be connected to. Immediately report to Brivis any discrepancies or damage.

1.2 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 that is wrapped with a plastic film to protect the surface.

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

1.3 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.

> ***Note:*** *Do not use the lifting handles provided to lift the heater above head height. Instead, secure the heater with suitable lifting equipment if lifting to elevated heights is required, such as onto a house roof.*

1.4 Gas Inlet Connection

- All piping must be in accordance with AS 5601 and any local gas regulations.
- The connection point for external model heaters is a female G3/4 compression fitting to AS 3688 located on the outer cabinet of the heater.
- The connection point for internal model heaters is a male G3/4 compression fitting to AS 3688 located in the heater cabinet.
- 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 should in no way interfere with any servicing of the heater.

> ***Note:*** *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.*

1.5 Electrical Power Supply

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

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

IMPORTANT: 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 to 240 V at 50 Hz, and from an authorised power supplier. Generators should never be used, as their output may be incompatible with, or prone to damage the heater's electronic components.

1.6 Installation of Duct Connection Pops

On all StarPro internal heaters, the 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 INNER supply air wall of the cabinet for StarPro heaters.
- Spread pop flange to fit tightly into the hole in the cabinet (the notch side overlapping the other).
- Secure pops with the rivets supplied.

1.7 Heater Positioning

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

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

1.8 Installation of Internal Heaters

All internal StarPro models, including Universal models are designed to be installed in the roof or beneath the floor. This must be done in accordance with the following guidelines and AS 5601.

Installing 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.

Installing 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" under the "StarPro Internal Model Guidelines" section on page 3.
- The heater must be located within 2m of the access opening, or there is to be 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 5601, making sure 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 5601. For StarPro Heaters, termination can be performed using a Brivis Remote Terminal. Refer to Internal Model Flueing instructions - StarPro series on page 5.

1.9 Installation of External Heaters

StarPro and 4 & 6 Star External and 4 Star models are designed to be installed outside the house. For installations under a house floor, a StarPro 5 & 6 Star Internal or StarPro 4 Star 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.

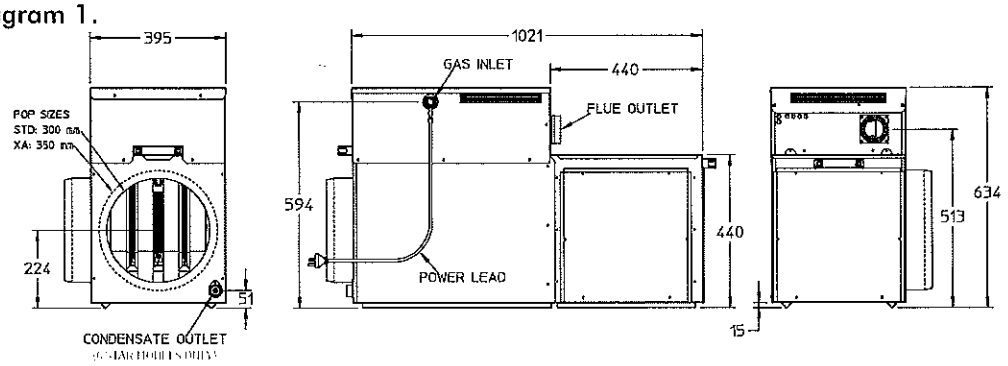
If the heater is to be installed in an elevated position, or on a roof, the installation must comply with AS 5601 Gas installations. It must be secured to prevent movement, and it must have adequate provision for service access.

2. StarPro 5 & 6 Star Internal Model Guidelines

2.1 Heater Dimensions

SP623IN & SP521IN (Includes XA)

Diagram 1.



2.2 Service Clearances

There are 3 methods of installing internal model heaters. The platform and clearance requirements are shown below under each method with accompanying diagrams.

Method 1 (Preferred Option)

Top

- **Installing in the ceiling:** Access to the heater is to be provided from the gas connection side only. There is to be 250mm minimum access above the heat exchanger cabinet to any obstruction. Clearances above the fan cabinet end can be reduced to 200mm.
- **Installing beneath the floor:** A minimum clearance of 250mm must be provided between the heater's roof and any obstruction above the heater. This clearance must be maintained for the entire surface area of the roof.

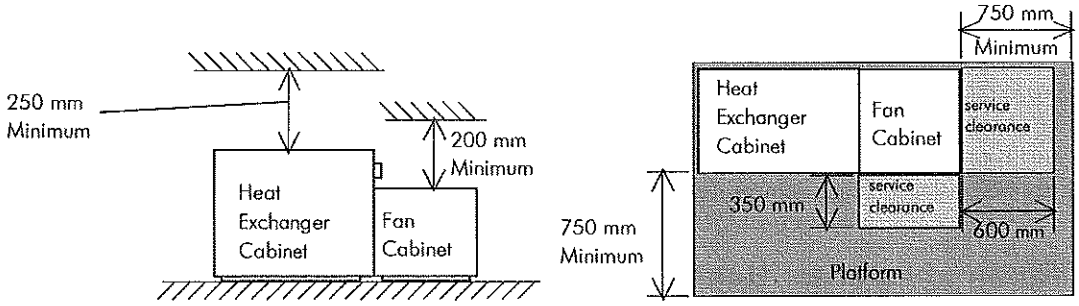
Side

- **Installing in the ceiling:** A platform is to extend 750mm out from the gas connection side for the full length of the heater and continue past the fan cabinet end for 750mm.
- **Installing beneath the floor:** A minimum service clearance of 350mm is required in front of the fan cabinet on the gas inlet side of the heater.

End

- **Installing in the ceiling:** A platform is to extend out 750mm at the fan cabinet end with a minimum service clearance of 600mm. This clearance must allow provision for the entire fan cabinet to be disconnected and shifted 600mm away from the heat exchanger cabinet for heat exchanger removal.
- **Installing beneath the floor:** A minimum service clearance of 600mm is required as described for ceiling installations.

Diagram 2.



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

Method 2 (Alternative Option)

This method may be used as an alternative only when the side and end clearances shown in the preferred method are not achievable.

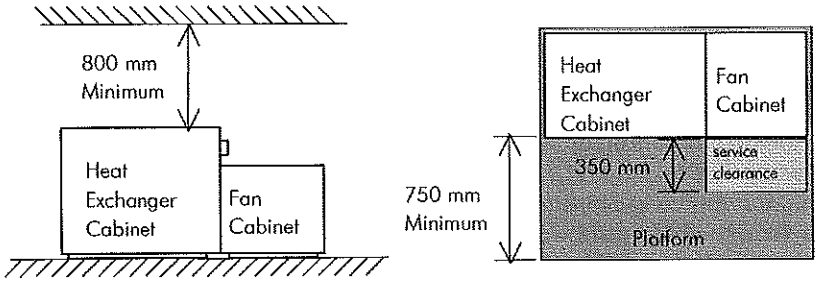
Top

A minimum clearance of 800mm must be provided between the heater roof and any obstruction above the heater. The clearance must be maintained for the entire length of the heater.

Side

A platform is to extend 750mm out from the gas connection side for the full length of the heater. A minimum service clearance of 350mm is required in front of the fan compartment on the gas inlet side of the heater.

Diagram 3.



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

Method 3 (Lay down)

In addition, all StarPro internal units can be installed with an option to lay the unit on its side. The unit must be installed with the lay down kit provided by Brivis. The kit includes all components needed to lay the unit on its side as well as complete detailed instructions.

Service clearances for StarPro (Using Brivis optional laydown kit):

Front

- A minimum of 750mm must be provided in front of the unit for the entire surface area of the controls access panel

Sides

- A minimum clearance of 300mm must be provided at the supply air end to access the condensate drain (6 Star models only)

Top

- Where unit is installed beneath floor, there must be a minimum clearance of 200mm between the unit and the lowest part of the floor structure.
- 700mm from ground level to the underside of the floor joists or bearers must be maintained in front of the unit for access.

Platform

- When installed on a combustible surface, the heater must rest on a fire-resistant board (at least 6mm thick) which complies with AS 5601 and that is as large as the heater and extend at least 300mm beyond the appliance in front of the louvres or fixed opening in the roof. There must be an air gap of no less than 25mm between the bottom of the heater and the board.

2.3 Splitting Internal Model Heaters

The StarPro 5 & 6 Star Internal model heaters can be split in half to allow for ease of installation. To split the heater, follow these simple instructions:

- Remove the heater's roof after removing the 4 roof screws.
- Disconnect the speed sensor loom from the control board and remove it from the heat exchanger cabinet.
- Remove the main fan motor and speed sensor loom access plate located on top of the fan cabinet compartment by removing the single screw.
- Unplug the main fan loom at the connection located inside the access hole which has just been uncovered.
- 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.
- Pivot the fan cabinet upwards high enough to dislodge the lower locking tabs fixed to the fan cabinet near the base.
- The heater is now split in two.
- Protect the exposed looms and tabs from damage while the heater is split in two parts.
- Once ready, reassemble in reverse order.

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

2.4 Changing the Return Air 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

> ***Note:*** *If this is done, then the total number of outlets normally permitted for that installation must be reduced by 2 (refer to the outlet register chart located on page 14).*

- 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.

2.5 Internal Model Flueing Instructions – StarPro Series

2.5.1 General

- All flues must be installed in accordance with AS 5601 Gas Installation Code.
- Horizontal flues must have a minimum rise of 20mm per 1m run.
- Horizontal flues terminating on a wall must be at least 300mm above ground level.
- Systems with both vertical and horizontal flue runs should be treated as all horizontal.
- One x 45° bend is equivalent to 0.5 x 90° bend (i.e. 2 x 45° bends = 1 x 90° bend).
- Provide adequate support to flue sections (e.g. saddles / strapping).

2.5.2 StarPro 5 Star Internal Models – 100mm non-corrosive metal flue.

- Requires a 100mm round single or twin wall non-corrosive metal flue, suitably terminated.
- All flues must 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 4 x 90° elbows are permitted with the same length requirements specified above.

2.5.3 StarPro 6 Star Internal Models – Standard 65mm DWV (Optional 100mm DWV)

The flue connection to 6 Star models is 65 mm Drain Waste and Vent pipe (DWV to AS/NZS 1260) and must be installed in accordance with the following:

- Exit heater with 300mm straight run of 65mm flue before first elbow (or expansion to 100mm**).
- All flue joints must be adequately sealed to prevent condensate leakage.
- Ensure there is continual fall back to the flue outlet on the heater from the flue termination point.
- Flue must be removable from the heater to allow for repairs and/or removal of the appliance.

The **maximum length of DWV flue pipe** is dependent on its diameter, and on the number of bends incorporated in the flue system as per the following table. One x 45° bend is equivalent to 0.5 x 90° bend.

Table 1.

All Internal 6 Star Models		Standard 65mm DWV Flue						Optional 100mm DWV Flue	
HEATER ORIENTATION	FLUE ORIENTATION	NUMBER OF 90° BENDS 0	1	2	3	4	TERMINAL TYPE	90° BENDS Up to 4	TERMINAL TYPE
Standard	Vertical	n/a*	7m	6m	5m	4m	65mm DWV Plain Vent Cowl	25m	100mm DWV Plain Vent Cowl
	Horizontal	7m	5m	4m	2m	0	Brivis Remote Flue Terminal	25m	Brivis Remote Flue Terminal
Laydown	Vertical	n/a*	4m	3m	2m	0	65mm DWV Plain Vent Cowl	25m	100mm DWV Plain Vent Cowl
	Horizontal	0	0	0	0	0	N/A	25m	Brivis Remote Flue Terminal

* All Vertical Flue Orientations will have at least one 90° bend.

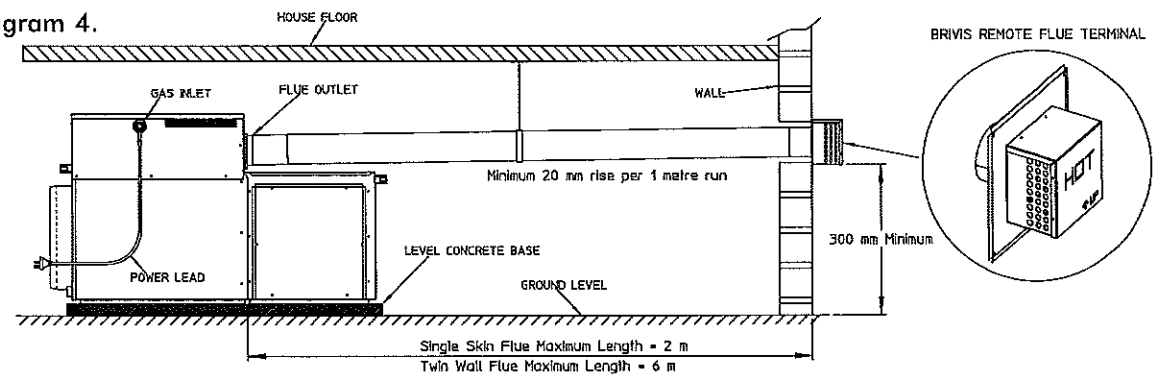
OPTIONAL 100mm DWV StarPro 6 Star Flue:

** To transition from 65mm to 100mm, use only DWV 100mm x 65mm 'Level Invert Taper' fitting (field-supplied) with 'flat side' at bottom if installed horizontally.

2.5.4 Brivis Remote Terminal (Part No. B018384) All Internal 4, 5 & 6 Star Models

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 instructions supplied with a Brivis Remote Flue Terminal. Figure below depicts typical StarPro 5 Star underfloor configuration.

Diagram 4.

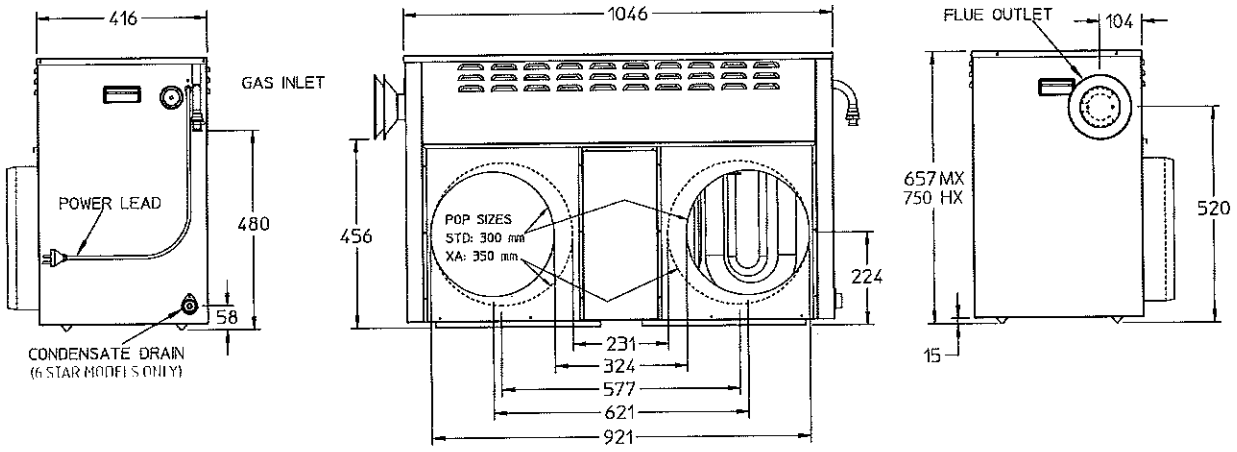


3. StarPro 5 & 6 Star External Model Guidelines

3.1 Heater Dimensions

SP623EN & SP521EN (Includes XA)

Diagram 5.



3.2 Service Clearances

Side

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

Front/Back

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.

3.3 Reversing the Heater

The duct orientation of StarPro SP5 & SP6 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 will be 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.

3.4 Installation of Pops

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

3.5 Installation of Flashing

The 75mm flashing must be fitted to ensure the ductwork is adequately weather protected.

- Clip flashing into position by placing the lugs of the flashing firmly into the slots either side of cabinet wrap flanges at rear of appliance.
- 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.*

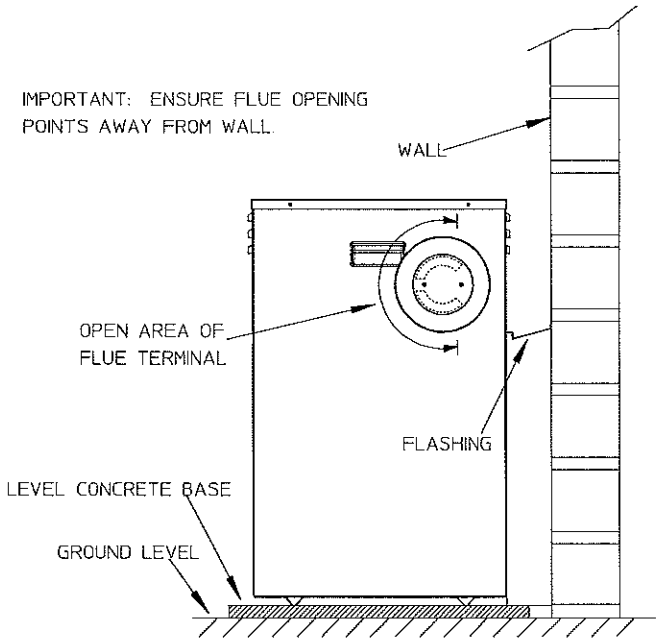
3.6 Installation of Flue Terminal

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

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

> ***Note:*** *The flue terminal must always be installed before starting up the heater.*

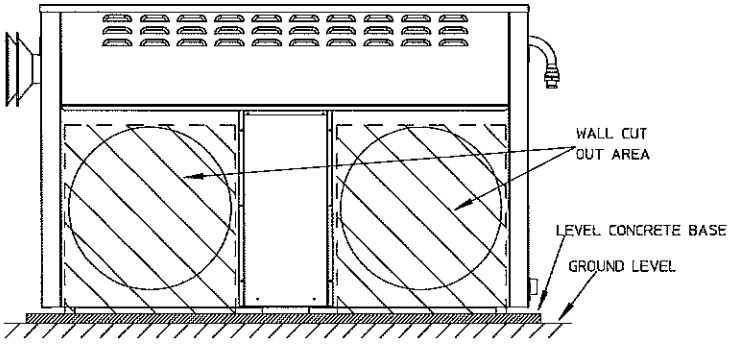
Diagram 6.



3.7 Area to Cut in the Wall

When installing the heater at ground level, create two holes to suit the pops all the way to ground level (see diagram). It is possible to create one rectangular hole to cover the distance of both pops and install a lintel, provided that there is no impediment to the structural integrity of the dwelling.

Diagram 7.



> ***Note:*** *Refer to heater dimensions to obtain the required dimensions.*

3.8 Flue Terminal Clearances

Heaters that are to be 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 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

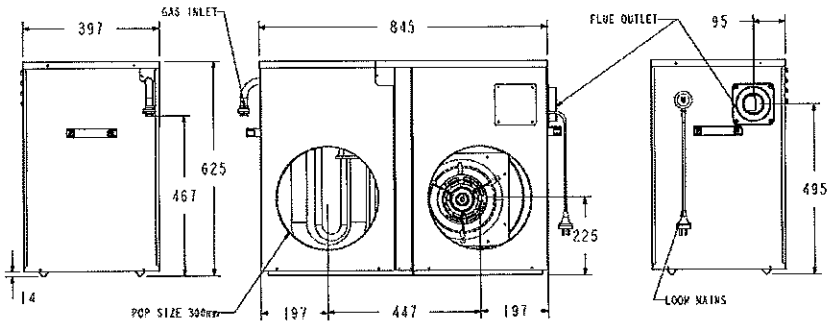
- Measured vertically, from an opening window, door, non-mechanical air inlet or any other opening into the building (except sub floor ventilation).
- From a gas meter.
- From a mechanical air inlet, including a spa blower, measured both vertically and horizontally.
- A flue terminal of this type shall 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.

4. StarPro 4 Star Model Guidelines

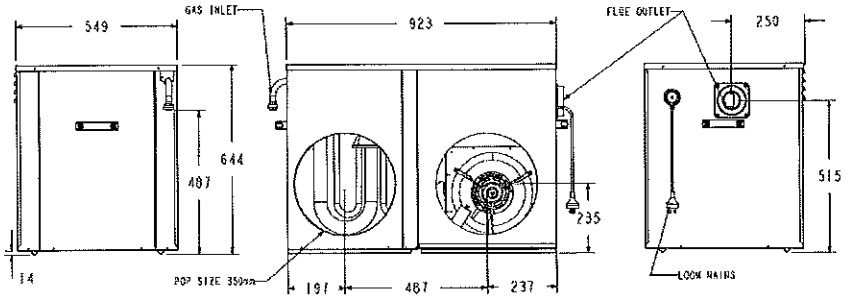
4.1 Heater Dimensions

Diagram 8.

SP421UN



SP430UN

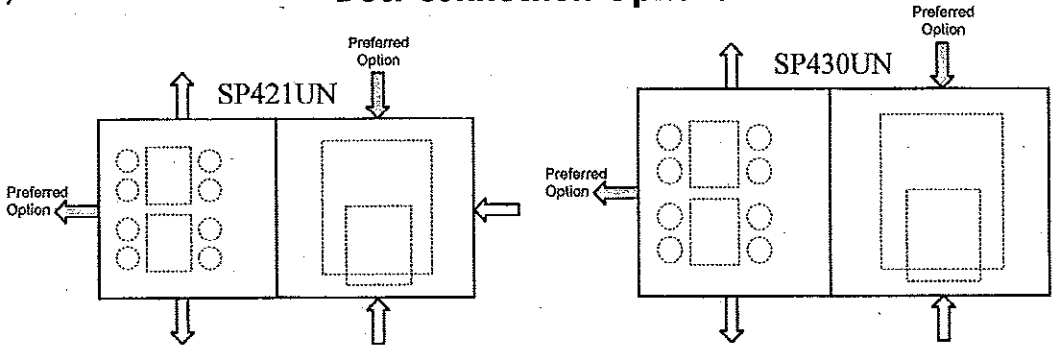


Note: *Unit is approved for internal or external applications.*

4.2 Internal Installation

Drawing 9

Duct Connection Options



4.2.1 Service Clearances

There are three methods of installing the SP421 and SP430 internally. The platform and clearance requirements are as for the StarPro Internal Models.

Method 1 (Preferred Option), refer to page 3
Method 2 (Alternative Option), refer to page 4
Method 3 (Lay Down), refer to page 4

4.2.2 Splitting the Heater

The 4 Star model can be split in half for ease of installation. To split the heater, follow these simple instructions.

- Remove the heater's roof after removing the 4 roof screws.
- Disconnect the gas valve, overheat/pressure switch loom, ignitor and flame sensor from the control board.
- 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's split line.
- Pivot the fan cabinet upwards high enough to dislodge the lower locking tabs fixed to the fan cabinet near the base.
- The heater is now split in two.
- Protect the exposed looms and tabs from damage while the heater is split in two.
- Once ready, reassemble in reverse order.

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

4.2.3 Changing the Return Air and/or Supply Air Pop Orientation

SP421UN: The return air pop and supply air pop can be changed from side to side or to the rear/front of the heater if necessary.

SP430UN: The return air pop can be changed from side to side only. The supply air pop can be changed from side to side or end of heater. Please refer to Diagram 9.

Reversing Side Entry/Exit

- 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/front exit

- Remove the screws securing the rear/front panel and discard handles.

4.2.4 Internal Flueing Instructions

Refer to sections 2.5.1, 2.5.2 and 2.5.4 on page 5.

4.3 External Installation

4.3.1 Service Clearances

Side

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

Front/Back

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.

4.3.2 Installation of Flashing

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

4.3.3 Installation of Flue Terminal

On one end of the heater you will find the flue outlet socket under an installer instruction label.
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 (see Diagram 6 on page 7).

Note: *The flue terminal must be ordered separately when used externally, BO21385.*

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

4.3.4 Flue Terminal Clearances

Heaters should be positioned so that when measured from the edges of the flue the following minimum clearances exist.

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.

5. StarPro 4, 5 & 6 Star
Installation of Thermistor

All StarPro heaters are supplied with a remote thermistor assembly. The thermistor must be installed in the supply air duct, between 0.5 to 3m away from the heater, but never beyond the first branch take off (BTO) fitting.

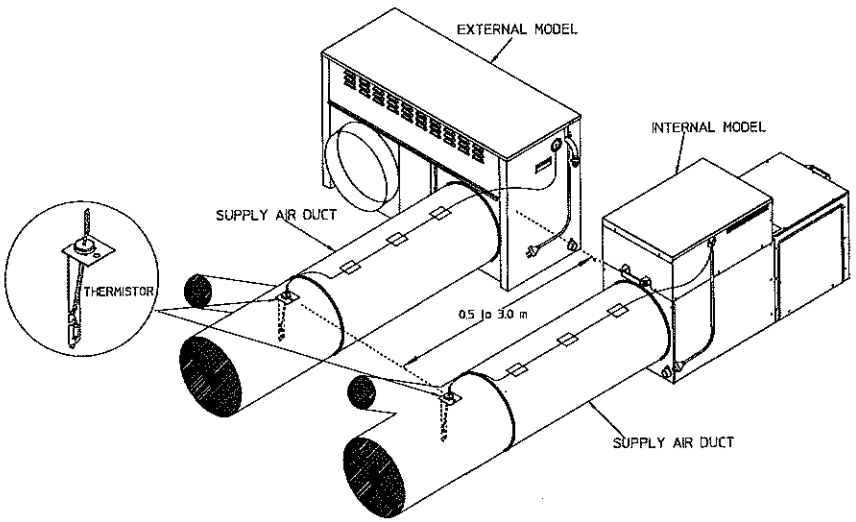
Note: *Where an add-on air conditioning evaporator coil is installed, the thermistor should again be located as far away from the heater as possible, but always before the evaporator coil (air inlet side).*

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

- Ensure that there is at least 500mm 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 (see diagram below) or through the top of the evaporator coil's inlet 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 (see diagram) to prevent damage.

Where the first BTO fitting or the evaporator coil are 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 0.5 to 3m away from the heater ensuring that the thermistor can reach this joint. Then follow the steps above as per normal practice.

Diagram 10.



6. StarPro 6 Star Condensate Removal

All StarPro 6 Star models have a condensate drain outlet. A fitting and clamp are provided for connection to the drain (see diagram below).

- For External models, the outlet is located in the bottom corner below the gas supply connection point.
- For Internal models, the outlet is located in the bottom corner of the supply air pop hole panel.
- The condensate is mildly acidic, and should be run via a PVC pressure pipe (to AS 1477), with an outside diameter of approximately 27 mm, away from the heater to a suitable area (e.g. drain, sewer, pit).
- Use PVC cement on all joints to prevent any condensate leakage.
- Do not connect the condensate drain directly to the sewer or storm water drain. A blockage in the drain system would cause the heater's condensate tank to flood with water and shut down. Check for any additional local drainage codes which may apply.
- Under no circumstances should it be allowed to run onto electrical connections, earth stakes, copper pipes or concrete paths. It should also not discharge onto metallic roofs or guttering, however the condensate drain may terminate into the vertical section of a downpipe.
- Tube length should be minimised and a continuous fall created. Maximum equivalent tube length of 12m is recommended (or increase diameter size).
- Under no circumstances should any part of the tube run up hill.
- Special consideration is required for installation in sub zero temperature as condensate could freeze in the drain. In these cases, larger diameter drainage piping is required.
- Approximately 2 to 3 litres per hour of condensate may be produced under continuous running conditions, depending on the size of the heater.

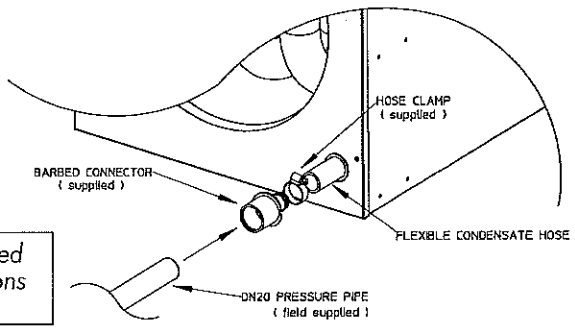
Note: *It is important that the above guidelines are adhered to as incorrect drainage may cause serious damage to the heater or surroundings.*

Diagram 11.

FITTING CONDENSATE DRAIN TO INTERNAL STARPRO 6 STAR

1. FIT BARBED CONNECTOR TO FLEXIBLE CONDENSATE HOSE
2. FIT CLAMP TO HOSE
3. FIT DN20 PRESSURE PIPE DRAIN INTO BARBED CONECTOR

Note: *Always use the correct PVC cement to bond the field supplied PVC pressure pipe to the barbed connector, following the instructions as detailed for the PVC cement for proper bonding and curing.*

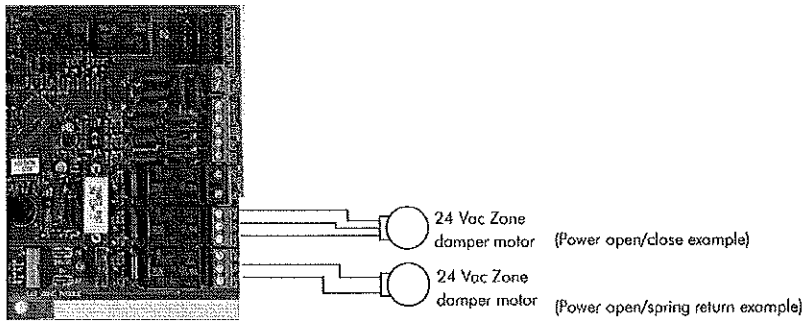


7. StarPro 4, 5 & 6 Star - Adaptive Zoning & Add-On Air Conditioning

All Brivis Series Heaters (SP4, SP5 & SP6) fitted with an NG-2 PCB, will require the use of a Brivis Network 516 Module (Part no. B023178) when used with Brivis ICE Add-on Cooling.

StarPro heaters can be configured for adaptive zoning and/or Add-On Refrigerative Air Conditioning.
There are two 24 Vac relays on the heater's control module, which can be configured for control of up to two zone motors, shown in the Diagram 12 below.
For Add-on refrigerative air conditioning and control of up to three zones a 'Brivis Network 516 module' (Part No. B023178) must be fitted, Brivis ICE Add-On Cooling sizing information is provided on page 18.

Diagram 12.



StarPro Control module

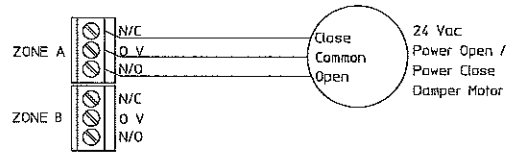
Note: *Refer to Brivis Network 516 module installation instructions for further information.*
Refer to Brivis Networker Advanced Programming manual for zone setup on the Brivis Networker Thermostat.
Refer to Brivis ICE Add-On Cooling brochure for further information.

Note: *Brivis Network 516 modules can only be used on heaters manufactured after 1 Mar 2010.*

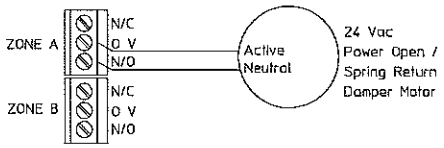
7.1 Wiring a Damper Motor to the Heater's Control Module

Diagram 12.

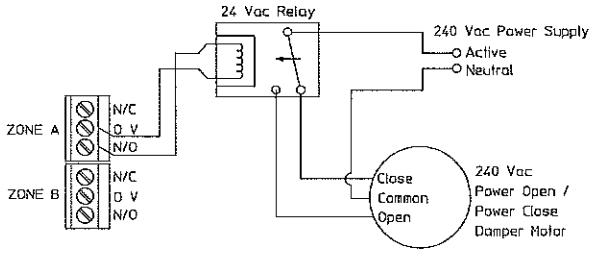
a) 24 Vac Power Open / Power Close Damper Motor



b) 24 Vac Power Open / Spring Return Damper Motor



C) 240 Vac Power Open / Power Close Damper Motor



7.2 Electronic Air Filter or Humidifier

It is possible to connect an electronic air filter or humidifier to the heater via a Brivis Network 516. Refer to the installation instructions supplied with such equipment for the wiring requirements.

8. Ducting Information

Good duct design and sizing are essential to every Brivis Central Heating system. Use the Brivis "SuperSizeGuide" 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.O (R1.5 in some areas). Ensure that ducting complies with the Building Code of Australia.
- The ducting should be well fastened to pops, BTO's, outlet boots and neck adapters adequately with duct tape, in accordance with AS 4254.
- 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 StarPro 4, 5 & 6 Star heaters, access to the ductwork must be provided for general maintenance and service to the supply air thermistor sensor.

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

If a filter is fitted to the return air grille, it should be easily accessible for regular cleaning.
Table 2 gives the minimum recommended return air grille sizes for each model heater.

Minimum Recommended Return Air Grille Selection Chart

Table 2.

Model	Without Filter		With Filter	
	Grille Size (m^2)	Example of Size (mm)	Grille Size (m^2)	Example of Size (mm)
StarPro SP4, SP5 & SP6 Heaters				
SP623/SP521	0.26	(400 x 650)	0.39	(400 x 1000)
SP623/SP521 XA	0.28	(400 x 700)	0.42	(400 x 1050)
SP421	0.26	(400 x 650)	0.39	(400 x 1000)
SP430	0.36	(400 x 900)	0.54	(400 x 1350)

Note: *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 750mm, the grille size is 0.4m x 0.75m = 0.3m^2. This grille would be suitable for a StarPro SP521 heater provided the grille does not have a filter fitted.

9. Outlet Guide

The outlet chart provides recommendations based on using the Brivis "SuperSizeGuide" 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 has been divided up 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 Brivis 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 Brivis 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 9 for balancing guidelines.

***Note:** Column D only applies to StarPro SP5 & SP6 heaters and should not be used unless the Brivis Networker has been configured for Adaptive Zoning only. If not refer to column C instead.*

***Note:** For StarPro SP5 & SP6 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.*

Outlet Register Chart

Table 3.

System Model	Airflow Rate (L/s)**	A Maximum Ceiling	B Typical Floor	C Minimum Floor/Ceiling	D* Minimum Floor/Ceiling (Adaptive Zoning Only)
StarPro SP5 & SP6 Heaters					
External					
SP521EN	700	12	12	5	1.5
SP521EN-XA	740	13	12	5	1.5
Internal					
SP623IN	765	12	13	5	2
SP623IN-XA	795	14	13	5	2
SP521IN	785	12	13	5	1.5
SP521-XA	830	14	13	5	1.5
StarPro SP4 Heaters					
SP421UN	621	10	12	6	2
SP430UN	918	16	23	7	2

***Note:** Airflow figures are based on a total static pressure of 125 Pa for the SP430 and 50 Pa for all other models.*

10. Commissioning and Control Settings

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

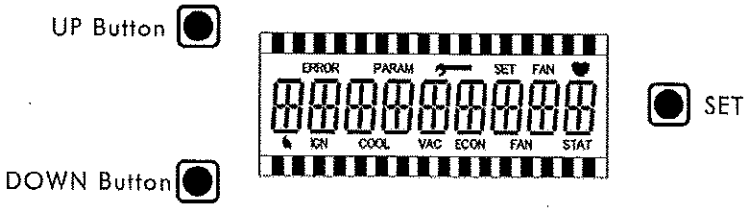
Remember:

- Switch the mains power OFF before touching any wiring.
- All these steps must be carried out by a qualified tradesperson.
- If the heater cannot be adjusted to operate in accordance with these instructions, then contact the Brivis Customer Service Centre (contact details are on the back cover of this manual).

10.1 StarPro 4, 5 & 6 Star Heater Control Settings

The heater module has 3 push buttons. On the right is a SET button and on the left are the UP and DOWN buttons.

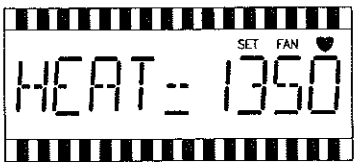
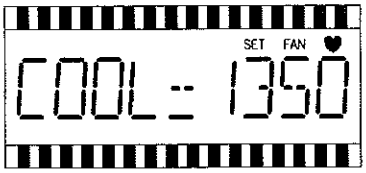
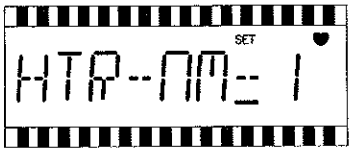
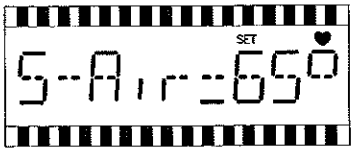
Diagram 13.



- To change an installer set-up parameter, press and quickly release the SET button, the word "SET" should now appear on the top line of the screen.
- The UP and DOWN buttons may now be used to increase or decrease the value on any setting displayed on the screen.
- By pressing the SET button the display will cycle through the installer set-up parameters in the order on the following page.

Starpro 4, 5 & 6 Star Control LCD Display Settings

Table 4.

No.	DISPLAY APPEARANCE	DESCRIPTION
1		**HEATING MAXIMUM FAN SPEED SETTING** The number displayed is the fan's default fan speed setting i.e. the RPM the fan is set to run at for normal heating operation. It can be adjusted between a maximum of 1350 and a minimum of 500, and should be set to meet the installation's airflow requirements. It is recommended to use a fan speed between 1000 to 1350, as lower speeds are more likely to result in overheat conditions if the system has not been balanced correctly.
2		**COOLING MAXIMUM FAN SPEED SETTING** This displays the RPM the fan is set to run at for normal refrigerative cooling. It can be adjusted between a maximum of 1350 and a minimum of 500.
3		**ZONING MINIMUM FAN SPEED SETTING** This is the minimum RPM the fan will operate to with the maximum outlets closed due to the Networker zoning in heating mode. The default is 950, but it can be adjusted between 500 and 1350.
4		**HEATER IDENTIFICATION NUMBER (Do not alter unless multiple heaters are installed)** This parameter is used to identify each heater in priority order when more than one heater is connected on the system.
5		**CIRCULATION FAN OPERATION** This displays the RPM of the fan motor in circulation mode for fan operation between heating/refrigerative cooling cycles. E.g. when the system achieves the set room temperature and is cycled off by the thermostat, the heater's fan will continue to operate, to circulate the room air.
6		**SUPPLY AIR THERMISTOR SET POINT TEMPERATURE** This displays the temperature the heater's gas valve will modulate to maintain. The default will vary across the different models, but it can be adjusted between 45° C and 70° C. This should be set to provide a comfortable outlet temperature.
7		**ZONE / REFRIGERATION MODE (NETWORK 516 MODULE MODE AND ON-BOARD RELAYS)** This is the selection mode for incorporating adaptive zoning and refrigeration onto the system.

Parameter Value	Description
0	No zone or add-on refrigeration
1	On-board or Brivis Network or 516 Module relays can be used for Heating only zone control (up to 2 with on-board or 4 with Module)
2	On-board or Brivis Network 516 Module relays can be used for zone control (up to 2 on-board or 3 with Module) for Heating and Add-On refrigeration.
3	Brivis Network 516 zone control (up to 3), for Heating only.
4	Brivis Network 516 zone control (up to 2), for Heating and Add-On refrigeration.
5	Not applicable to SP Series, for HX, MX & CMX models only.

Note: *All settings are saved automatically as you leave the set up mode. To leave the set up mode and return to normal operation, either leave the control untouched for 20 seconds, or keep pressing the SET button until the normal operation screen resumes, or press and hold the SET button for 3 seconds.*

10.2 StarPro 4, 5 & 6 Star Commissioning Instructions

With a correctly designed and installed ducted system, generally, the balancing damper in an outlet should be initially set as follows:

- Living areas 100% open
- Bedrooms 50% open
- Bathrooms, ensuite & Laundry: 25% open

Initial Ignition and Gas Inlet Pressure Check

- Attach a manometer to the inlet gas pressure test point on the gas valve (refer to label on gas valve for location) after unscrewing the captive screw 3 full turns anti-clockwise (DO NOT remove the screw completely).
- Ensure that all air has been purged from the gas piping, and then turn on the gas supply at the supply tap.
- Turn on the 240 V power supply at the power point.
- Go to the Thermostat and turn it on and temporarily set the temperature setting to maximum for commissioning purposes (see the Owner's Manual for operating instructions). Ensure that all zones (if any) are open.
- Go back to the heater and wait for the heating module screen to display "Heat = ##-#", which is a measure of the supply air temperature to one decimal place (for example the diagram below shows 23.0° C).

- You should also be able to see the burners operating; a small flame symbol will be visible on the LCD bottom line along with the words STAT (Thermostat is calling for heat), VAC (vacuum pressure is sufficient for combustion), and FAN (once the fan begins to operate). Note that the heater may not ignite on first attempt due to the presence of air in the gas line. Ignition re-attempts will be repeated automatically.
- Initially the fan will only be running at a low speed (approx 500 RPM) and then begin to ramp up to the "HEAT" set fan speed.
- Measure the gas inlet pressure after the heater has been operating for at least 1 minute. Ensure the gas pressure does not fall below 1.1 kPa for NG models at all times (2.7 kPa for LPG models) **while all other gas appliances are operating at their full capacity.** If the reading is below minimum figures stated above, then the incoming gas supply is inadequate (check supply pipe for blockage, and check pipe sizing and gas meter sizing).
- Remove the manometer after the heater has been set up and switched off, and re-tighten the inlet gas pressure test point screw.

Note: *The gas valve should not be adjusted under any circumstances.*

If everything seems to be functioning correctly up to this point, please continue on with the commissioning procedure. StarPro 4, 5 & 6 Star heaters will automatically reattempt ignition a few times should the ignition process be unsuccessful (IGN_RTRY will be displayed on the LCD), so give the heater time to rectify itself. It may simply be purging any remaining air through the gas components. In any event, the heater will cease ignition re-attempts and lock out with an error code if there is any problem that it can't rectify itself. If the heater does lock out with an error code, please make a note of the code then reset the heater (see the Owner's manual).

Heater Fan Speed and Temperature Settings

The next part of the procedure requires you to set the heating settings to suit the installation. The settings are critical to provide adequate and efficient heating for the installation.

- Ensure that the Thermostat is still set much higher than the actual room temperature.
- Set the fan speed to suit the installation, adjusting it to provide sufficient but not excessive airflow. Remember, typically the fan speed is less for floor outlet systems than for ceiling outlet systems. With down-vent type ceiling diffusers, airflow in main living areas should be able to be felt down near floor level.
- You should not need to adjust the thermistor set temperature. This setting should only be adjusted if the system is NOT achieving the following temperature rise; ceiling outlets: 25° to 30° C and floor outlets: 35° to 40° C. This temperature rise is measured from the closest outlet to the heater, minus the return air intake temperature. (i.e. with a return air intake temperature of 20° C the temperature at the closest floor outlet to the heater should not register more than 60° C). This temperature rise should never exceed 45° C.

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

Increase the room set temperature to maximum to turn the heater on and watch the thermistor temperature until it stabilises.

Ideally, the fan speed setting should 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 only decrease (modulate) the gas rate once the supply air temperature has been 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 temperature level.

So, with a floor outlet system, which usually requires a low fan speed, you may have to increase 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.

With a ceiling outlet system, which usually requires a higher fan speed, it is unlikely the heater will reach the thermistor set temperature and modulate. However, if it does, 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:

- Small number of outlets on the system.
- Restrictive or poorly balanced ductwork.
- Oversized heater for the installation.
- Inadequate fan speed or thermistor set point.

Systems that have zone damper motors that are being operated from the Brivis Networker (Adaptive Zoning) will 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. To do this:

- Go to the Brivis Networker and close all but one zone. If the system does not have a common zone, leave only the zone key that operates the least number of outlets turned ON (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.
- Adjust the ECON fan speed setting to provide the required amount of air from the remaining open outlets. Ensure that the temperature rise does not exceed 45° C. Do not adjust the thermistor set temperature while setting up the ECON fan speed.

Final Checks (StarPro 4, 5 & 6 Star Heaters)

- Check the temperature rise through the heater. 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 situation.
- 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 Brivis Networker in fan only mode (see Owners Manual).
- Ensure the required gas inlet pressure is supplied at all times during the heater's operation (this should be with all other gas appliances operating at the same time and at their full capacity).
- Go back to the Thermostat and press the ON/OFF button to turn the heater off.
- Ensure that the burners and fan turn off, then turn off the gas supply at the supply tap and remove the manometer hose from the inlet test point on the gas valve.
- Tighten the inlet test point screw, turn on the gas supply at the supply tap and test for leaks using a soapy water solution or leak detector spray.
- Replace the heater's roof, and then proceed to instruct the customer on the correct operation of the system and assist the customer with filling in the Warranty Card details enclosed in the Owner's Manual.
- Issue any required documentation to the relevant people/authorities in regard to the installation of the heater, the gas connection and power supply. For example, a Certificate of Compliance and Certificate of Electrical Safety.

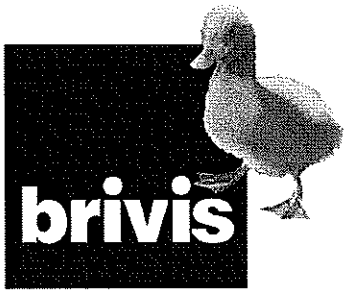
> ***Note:*** *Please assist the customer with filling in the Warranty Card Details in the Owner's Manual or via the Brivis website.*

11. Technical Specifications

Model	Gas Input		Heat Output		Duct Connection Pop Sizes (mm)	Minimum Recommended Return		Airflow @ Total Static Pressure (L/S)				Weight (Kg)	Fan motor		Total Maximum Current (A)
	MJ/hr		kW										Power (W)	Current (A)	
	Max. Input NG	Max. Input LPG	Max. Output NG	Max. Output LPG		No filter (m²)	With filter (m²)	50 Pa	75 Pa	100 Pa	125 Pa				
SP623EN	86	N/A	23	N/A	300	0.26	0.39	715	690	660	630	67	315	4.2	6
SP623EN-XA	86	N/A	23	N/A	350	0.28	0.42	755	730	705	675	67	315	4.2	6
SP623IN	86	N/A	23	N/A	300	0.26	0.39	765	745	720	695	59	315	4.2	6
SP623IN-XA	86	N/A	23	N/A	350	0.28	0.42	795	775	755	730	59	315	4.2	6
SP521EN	90	N/A	21	N/A	300	0.26	0.39	700	675	645	615	66	315	4.2	6
SP521EN-XA	90	N/A	21	N/A	350	0.28	0.42	740	710	685	655	66	315	4.2	6
SP521IN	90	N/A	21	N/A	300	0.26	0.39	785	765	740	715	53	315	4.2	6
SP521IN-XA	90	N/A	21	N/A	350	0.28	0.42	830	800	770	735	53	315	4.2	6
SP421UN	90	N/A	21	N/A	300	0.26	0.39	620	585	555	530	65	315	4.2	6
SP430UN	130	N/A	30	N/A	350	0.31	0.47	1010	984	953	918	84	650	4.3	6

Notes

Notes



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