All Heaters
Part L2B Compliant

BENSON
HEATING


# Technical Data –

## PV Range Vertical Room Sealed/Fan Assisted Flue Gas Cabinet Heaters

Qualified for Energy Technology List
www.eca.gov.uk

For Models

PVN Vertical Nozzled

PVD Vertical Ducted

## Range & Configuration

Room Sealed or Fan Assisted Flue Gas Fired
Vertical Cabinet Heater

| | |
|---|---|
| Nozzled Discharge | 29 kW to 144 kW |
| Ducted Discharge | 29 kW to 144 kW |

## Specification

**Cabinet:** Machine punched and folded from electro-zinc coated steel to form a robust monocoque case construction. Access to the burner and controls compartment is via a front full width hinged door. The cabinet is stove hardened, epoxy powder coated with a durable Kestrel Grey paint finish.

**Heat Exchanger:** Formed from aluminised steel tube into a compact yet highly efficient four pass 'S' shaped assembly the PV heat exchanger has been designed so that manufacture can be accomplished without the use of any stress inducing welding processes. Stainless steel heat exchanger tubes available as an option.

**Burner:** PV family heaters are fitted with a quiet multi-flame low Nox burner which in turn is complete with automatic electronic spark ignition and ionisation flame proving. The burner, in conjunction with the heat exchanger is capable of delivering efficiencies in excess of 91% nett.

**Efficiency:** Each heater within the range has been designed and developed with fuel efficiency in mind and efficiencies exceed the mandatory requirements of CE legislation. Additionally for the United Kingdom market all heater efficiencies are compliant with the needs of Part L2B of the 2006 Building Regulations and have been rated to meet the criteria necessary for inclusion into the Enhanced Capital Allowance (ECA) scheme.

**Fuel:** Heaters can be specified to operate on either natural gas (G20) or Lpg (Propane G31).

**Sealed Combustion Circuit:** PV heaters are all factory fitted with a power flue venter that enables the heater to be operated in either room sealed or fan assisted flue mode. The flue fan is safety interlocked with the burner control system via a pressure differential sensor.

**Air Distribution:** Free blowing heaters are fitted with aerodynamic discharge nozzles each of which can be rotated through 360°. Each nozzle is fitted with adjustable horizontal louvre blades to provide lateral distribution. Models 250 and above include raised nozzles (one per three nozzled heater and two per four nozzled heaters) however for height sensitive applications lower standard nozzles can be specified. Heaters for ducted applications are supplied with a duct outlet spigot. Generally return air to the heaters is via louvred inlet panels permitting air entry directly into the fan compartment. However heaters can, as an option, be fitted with alternative return air arrangements including fresh air spigots and filters.

**Controls:** PV cabinet heaters are supplied ready for fully automatic operation and are complete with both safety and comfort controls. Each heater is fitted with a safety overheat thermostat as well as a time and temperature control system. Two alternative control options are available.

As standard, heaters are fitted with a digital time switch, mechanical day temperature and frost protection thermostats. Alternatively heaters may be specified with a fully optimised control which includes a secure entry code facility, temperature dependent start time, digital time switch with override facility, electronic day thermostat and frost protection thermostat.

Unless otherwise specified the controls are factory fitted. As an option controls can be supplied within a console for remote mounting. Inter-connecting wiring between heater and remote consoles is by others.

All heaters have the facility of 'fan only' operation for summer air movement.

**Testing, Approvals & Certification:** Benson Heating is accredited with ISO 9001 quality assurance certification – certificate number FM14923. All gas fired heaters have been type tested and approved to CE standards by an independent notified body. Each heater is function tested and fired prior to despatch.

**Guarantee:** Benson PV gas cabinet heaters are provided with a comprehensive package of guarantees covering both the appliance and the heat exchanger, which has the further benefit of an extended guarantee. For sales within the United Kingdom the guarantee includes a 'whole appliance' twelve months parts and labour guarantee supported by a further twelve months 'parts only' guarantee whilst the heat exchanger assembly has a ten year time related warranty. For PV heaters supplied to overseas markets please refer to the relevant country documentation. All guarantees are subject to terms and conditions.

# Specification

## Room Sealed/Fan Assisted Flue Vertical Cabinet Heater PVN/PVD

| Model | | | | 100 | 170 | 250 | 330 | 410 | 490 |
|---|---|---|---|---|---|---|---|---|---|
| Output | | | kW | 29 | 49 | 72 | 96 | 120 | 144 |
| ECA Approved | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Airside Data | Airflow | | $m^3/s$ | 0.80 | 1.05 | 1.50 | 2.30 | 3.05 | 3.66 |
| | Nozzles | PVN | no. | 2 | 2 | 3 | 3 | 3 | 4 |
| | Throw | PVN | m | 18 | 19 | 19 | 26 | 29 | 26 |
| | Fan Static | Standard | Pa | 80 | 110 | 100 | 130 | 150 | 150 |
| Electrics | Standard | | V/ph/hz | 230/1/50 | | | 415/3/50 | | |
| | Optional | | V/ph/hz | n/a | | | 230/1/50 | | n/a |
| Overall Dimensions | PVN | Height | mm | 1908 | 1974 | 2507 | 2507 | 2775 | 2775 |
| | PVD | Height | mm | 1725 | 1725 | 1890 | 1890 | 2020 | 2020 |
| | All | Width | mm | 700 | 700 | 840 | 840 | 840 | 840 |
| | | Depth | mm | 1080 | 1080 | 1395 | 1395 | 1625 | 1625 |
| Flue Diameter | | | mm ø | 100 | 100 | 130 | 130 | 130 | 130 |
| Combustion Air Spigot | | | mm ø | 100 | 100 | 130 | 130 | 130 | 130 |
| Noise Level | | | dBA | 63 | 64 | 71 | 74 | 74 | 76 |
| Nett Weight | PVN | | kg | 192 | 202 | 330 | 380 | 440 | 460 |


Note

Where heaters are selected for the UK Enhanced Capital Allowance (ECA) scheme then they must be specified with CP4 controllers

All models have efficiency levels which meet with the minimum efficiency requirements of UK PartL2B Building Regulations

Air handling data is assessed at room ambient conditions

Throw figures provide the distance to the point where the average air velocity is 0.25 m/s

Overall height dimension includes flue/combustion air spigots, heads or extended heads where appropriate

Standard height heads can be ordered where site height is restricted

Combustion air connection not required when heater is used in 'flue only' configuration

Noise levels measured 3m from appliance.

# Installation

**Installation Standards:** PV cabinet heaters must be installed and commissioned by a competent person and in accordance with Benson's installation and commissioning instructions, relevant local and national standards, Codes of Practice, and any requirements of Local Authorities, Fire Officer or insurers

**Siting:** The position chosen for the heater will need to take account of the following points -

All heaters should be mounted on a flat non-combustible base capable of supporting the weight.

Care should also be taken to ensure that the recommended clearances for maintenance, air discharge, return and re-circulation are observed.

Consideration should be given to the route and length of the flue, the provision and connection of gas and electrical supplies, potential public access issues and protection from overhead cranes, fork lift trucks etc.

For effective warm air distribution free blowing heaters should be both selected and positioned to take account of the throw characteristics and sited such that the discharge avoids any immediate obstructions, partitions or other significant obstacles. In areas where it is proposed to install more than one heater then a general scheme of uniform air circulation should be employed to provide optimum distribution.

Generally, heaters will be operated with in-built controls and temperature sensors which carefully monitors the room air temperature. In applications where heaters are installed with fresh air intakes then consideration should be given to ensure that the control and/or temperature sensors are located in a position which adequately reflects the working zone serviced by the heater. Sensors should not be located in areas subject to cold draughts.

In case of doubt relating to any aspect of heater or control siting please consult with Benson.

**Gas Pipework**: The gas supply pipework must be sized and installed with due regard for all current standards and legislation, flow rates and the maximum/minimum inlet pressure requirements of the heater. Isolating gas cocks and service unions must be provided adjacent to each heater.

**Special Risk Areas:** Where it is proposed to install a heater within a special risk area (including but not limited to areas containing flammable vapours, where petrol engined vehicles are stored, parked or serviced, where paint spraying occurs or where wood working or other flammable dust creating process are employed) then restrictions, additional regulations and requirements concerning the heater installation may apply. Additionally areas containing chlorinated or halogenated hydrocarbons, degreasing solvents, styrene's, other laminating materials or airborne silicones can cause corrosion to heat exchange surfaces and It is strongly recommended that you consult Benson before installation commences. Failure to do so may invalidate or reduce guarantee cover.

**Caution:** When specified in certain configurations it may be possible to install heaters in areas containing flammable vapours, high levels of airborne dust, combustible dust, chlorinated or halogenated hydrocarbons, degreasing solvents, styrene's, other laminating materials or airborne silicones however before doing so consult Benson.

**Plant Room/Enclosure Siting:** Provided certain criteria are met it is possible to install a PVD (Ducted) cabinet heaters within a plant room or enclosure. Where it is proposed to install a heater within such a location then the return air and discharge air arrangements must be such that they do not interfere with the operation of the flue or burner. Ideally both the warm air discharge and return air should be positively ducted to and from the heater.

**Air Supply:** Consideration for the provision of an air supply for combustion and appliance ventilation may be a mandatory requirement. For United Kingdom installations ventilation requirements vary according to heater location.

Where heaters are installed directly within the heated space (ie not in a plant room or enclosure) then combustion air or heater related ventilation air will generally not be required if the heater is installed in room sealed mode (ie with the positive connection of both flue and combustion air ductwork) or if the air change rate of the heated space is 0.5 air changes per hour or greater. If it is proposed to install a heater in flue only mode (ie without the positive connection of combustion air ductwork) and if the heated space has an air change rate of less than 0.5 air changes per hour then it will be necessary to provide either natural ventilation openings or mechanical ventilation.

Where heaters are installed within a plant room or enclosure then provision for both combustion air and air for general ventilation will be required by means of high and low level ventilation openings. Alternatively, the plant rooms or enclosures may be mechanically ventilated.

**Flues:** PV cabinet heaters are approved for use in both room sealed and fan assisted flue format. The in-built flue fan permits the heater to be sited several metres away from the point of flue/combustion air ductwork exit.

The PV cabinet heater flue/combustion air spigots are situated on the top of the heater and from which flues/combustion air ductwork may be run either horizontally or vertically. The diameters of flue and combustion air ductwork must not be less than stated in the data sections of this brochure. Benson offer a full range of compatible flue and it is strongly recommended that this flue be used.

The maximum permitted lengths given in the Installation data table on the next page are for guidance purposes and installers should be mindful that the inclusion of 45° and 90° flue bends will reduce the total available length on the basis that every 45° bend is equivalent to 0.5 metres of straight flue and every 90° bend if equivalent to 1.0 metres of straight flue.

The flue route and exit point needs to be selected carefully and it is recommended that the installer consult the installation and commissioning instructions before commencing installation.

**Further Information:** The foregoing is given for guidance purposes. More detailed information can be found within the relevant installation, commissioning and servicing instructions or alternatively contact Benson.

# Installation Data

## Room Sealed/Fan Assisted Flue Vertical Cabinet Heater PVN/PVD

| Model | | | | 100 | 170 | 250 | 330 | 410 | 490 |
|---|---|---|---|---|---|---|---|---|---|
| Fuel Connection | | | BSP/Rc | ½ | ½ | ¾ | ¾ | ¾ | ¾ |
| Minimum Gas Inlet Pressure | | Nat Gas | mbar | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 |
| | | Lpg | mbar | 37.0 | 37.0 | 37.0 | 37.0 | 37.0 | 37.0 |
| Fuel Consumption | | Nat Gas | $m^3/h$ | 3.38 | 5.63 | 8.33 | 11.12 | 13.87 | 16.63 |
| | | Lpg | $m^3/h$ | 1.30 | 2.16 | 3.21 | 4.28 | 5.34 | 6.41 |
| Electrics | | Supply | V/ph/hz | 230/1/50 | | | 415/3/50 | | |
| | | FLC | amp | 3.2 | 3.2 | 7.2 | 3.6 | 5.2 | 6.5 |
| Flue & Combustion Air Details | Flue Diameter | | mm ø | 100 | 100 | 130 | 130 | 130 | 130 |
| | Combustion Air Diameter | | mm ø | 100 | 100 | 130 | 130 | 130 | 130 |
| | Maximum Run | Horiz | m | 6.0 | 6.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| | | Vert | m | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 | 10.0 |
| Installation Clearances | | Front | mm | 700 | 700 | 840 | 840 | 840 | 840 |
| | | Side | mm | 150 | 150 | 150 | 150 | 150 | 150 |
| | | Rear | mm | 400 | 400 | 400 | 400 | 400 | 400 |
| Nett Weight | PVN | | kg | 192 | 202 | 330 | 380 | 440 | 460 |


Note

Fuel consumption and output figures based upon gross calorific values as -

Natural gas (G20) @ 37.78 MJ/m3

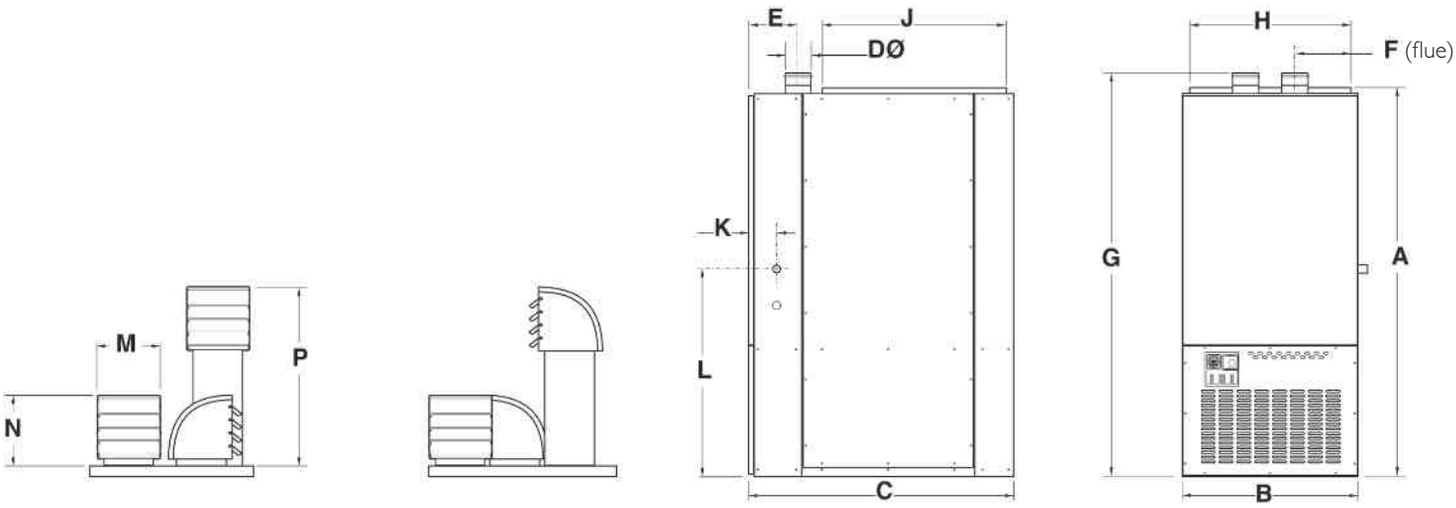
Lpg Propane (G31) @ 95.65 MJ/m3

Flue and combustion air maximum runs for guidance purposes only. Please refer to installation instructions for detailed information

Front clearance = burner compartment side

# Dimensions

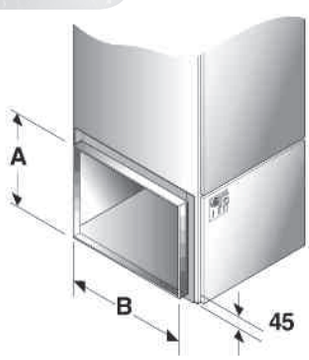
## Room Sealed/Fan Assisted Flue Vertical Cabinet Heater PVN/PVD



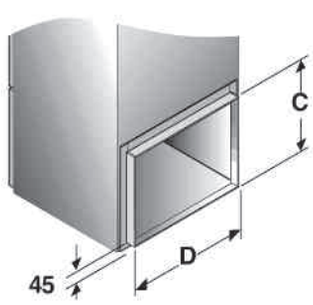

| Model | | | 100 | 170 | 250 | 330 | 410 | 490 |
|---|---|---|---|---|---|---|---|---|
| A | All | mm | 1650 | 1650 | 1830 | 1830 | 1960 | 1960 |
| B | All | mm | 700 | 700 | 840 | 840 | 840 | 840 |
| C | All | mm | 1080 | 1080 | 1395 | 1395 | 1625 | 1625 |
| D | All | mm ø | 100 | 100 | 130 | 130 | 130 | 130 |
| E | All | mm | 189 | 189 | 255 | 255 | 255 | 260 |
| F | All | mm | 263 | 263 | 311 | 311 | 283 | 287 |
| G | All | mm | 1725 | 1725 | 1890 | 1890 | 2020 | 2020 |
| H | PVD | mm | 570 | 570 | 769 | 769 | 769 | 769 |
| J | PVD | mm | 570 | 570 | 984 | 984 | 1214 | 1214 |
| K | All | mm | 103 | 103 | 169 | 169 | 95 | 95 |
| L | All | mm | 967 | 840 | 963 | 849 | 934 | 894 |
| M | PVN | mm | 280 | 280 | 314 | 314 | 355 | 355 |
| N | PVN | mm | 258 | 324 | 352 | 352 | 410 | 410 |
| P | PVN | mm | n/a | n/a | 677 | 677 | 815 | 815 |

# Return Air Detail

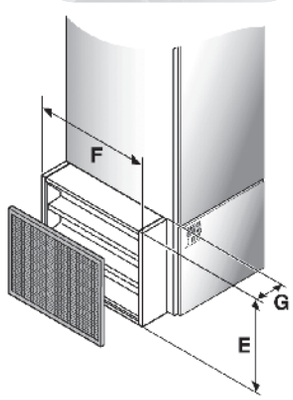
### Side Return Air Inlet




### Rear Return Air Inlet




### Side Filter




| Model | | | | 100 | 170 | 250 | 330 | 410 | 490 |
|---|---|---|---|---|---|---|---|---|---|
| Side Inlet Spigot | All | A | mm | 348 | 348 | 560 | 560 | 560 | 560 |
| | | B | mm | 522 | 522 | 850 | 850 | 1030 | 1030 |
| Rear Inlet Spigot | All | C | mm | 468 | 468 | 560 | 560 | 560 | 560 |
| | | D | mm | 650 | 650 | 677 | 677 | 677 | 677 |
| Inlet Filter Assembly | All | E | mm | 420 | 420 | 645 | 645 | 640 | 640 |
| | | F | mm | 660 | 660 | 990 | 990 | 1110 | 1110 |
| | | G | mm | 300 | 300 | 300 | 300 | 450 | 450 |

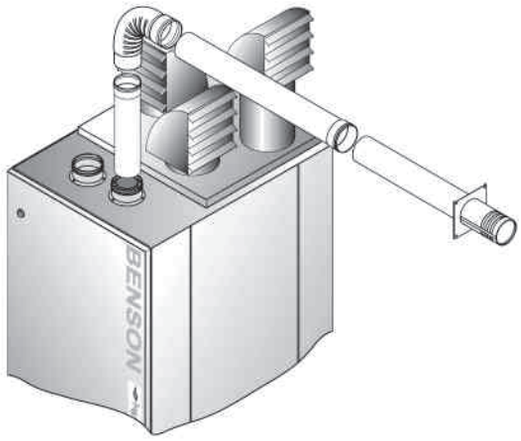
Notes

Side inlet spigots and filter assemblies require to be specified either left hand or right hand side

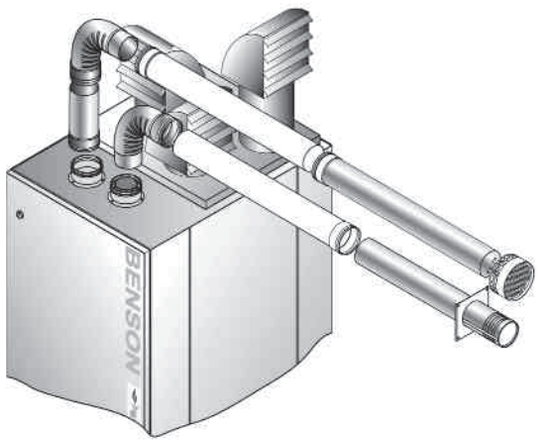
Filter assemblies can be side mounted only

# Flueing Systems

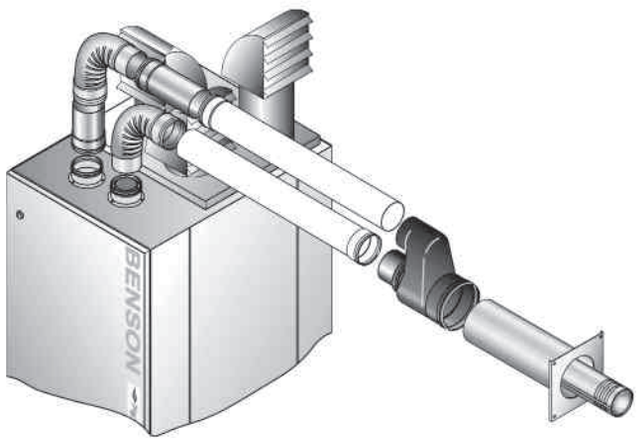
Horizontal flue only



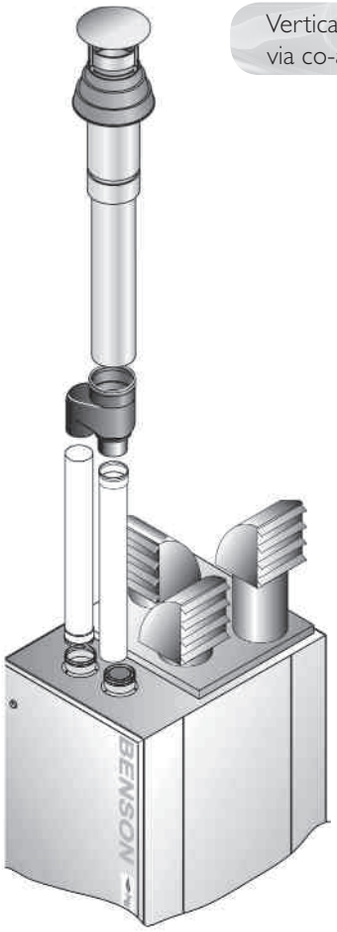

Horizontal room sealed via separate pipes



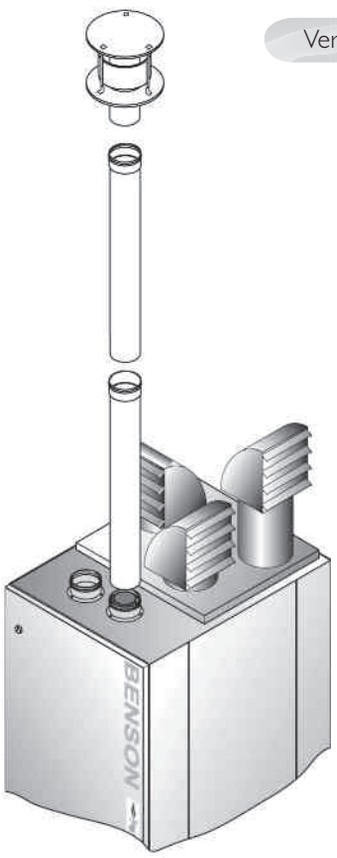

Horizontal room sealed via co-axial assembly




Vertical room sealed via co-axial assembly




Vertical flue only




Notes

Flue components shown shaded form the horizontal and vertical flue/combustion air kits. The drawings above are indicative of typical arrangements. For actual installation details please refer to the Installation and Operating manual.

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