

Benson VN/VD Cabinet Air Heaters

Gas and Oil Fired



High Performance
Low Cost Heating
for Industrial and
Commercial
Premises



BENSON



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VNO 100



VDO 500

Introduction

Benson Heating's 'VN/VD' heaters are technically advanced and are designed and produced using computer integrated manufacturing technology.

The extensive range of VN/VD heaters offer a low cost and energy efficient solution for a wide variety of commercial and industrial heating applications. Benson Heating is registered to ISO 9001.

Suitable for either nozzled free discharge, or ducted air distribution. Each heater is supplied ready assembled for quick on-site installation and only requires the connection of a flue system, electrical supply and the provision of fuel for immediate operation.

Vertical cabinets (VN/VD)-suitable for floor mounting applications, oil or gas firing, with outputs from 100,000 to 1,000,000 Btu/h (29-293 kW).

All Benson 'VN/VD' heaters are fully inspected and test fired in our factory prior to despatch and carry a comprehensive two year parts and one year labour guarantee together with a sliding scale 10 year warranty on the heat exchanger in accordance with our conditions of business.

Specification

Cabinet Construction

Robustly constructed from electro zinc coated mild steel to form a monocoque panel construction. Each cabinet is fitted with radiant heat shield, and finished with durable stove enamelled paint.

Each heater has an externally mounted flue spigot which allows for simple flue connection and removable access to the heat exchanger surfaces for maintenance purposes.

Heat Exchanger

The heat transfer unit has been designed to give an efficient and extended working life, each model, comprises of a combustion chamber and a tubular design heat exchanger. The complete gas tight assembly is formed and welded from 43A steel and grade 304/316 stainless steel.

Burner

All blown gas or pressure jet oil fired heaters are fitted with a burner carefully selected from the modern Riello range of fully automatic burners. The appropriate burner is matched to each heater taking due consideration of combustion chamber configuration, flame length and heat transfer rates. Each burner is supplied with an approved electronic controller which incorporates full flame failure monitoring.

Warm Air Distribution

Each heater is fitted with a forward curved blade centrifugal fan, complete with double inlet rotors, generally constructed from galvanised sheet. Each fan assembly is dynamically balanced. Fans on models 100-300 are driven by an integral direct drive motor. All other models are driven via a V-belt system. Nozzled heaters are supplied with independent discharge heads which can be fully rotated, and are fitted with horizontal louvres for lateral air direction.

Heaters for ducted applications are supplied with a duct spigot.

Control System

Each heater is supplied ready for automatic operation. Standard controls include seven day time switch, room thermostat, frost protection and a resettable safety overheat thermostat designed to prohibit burner operation should airflow be diminished or interrupted.

All heaters are supplied with controls prewired and fitted as standard.

Fuel Supply

Oil fired Cabinet heaters are designed to operate firing light distillate oils having a maximum viscosity of 4.5 c.St (1.3oE) at 20°C (Class D) (35 sec Redwood No.1 at 100°F). Gas fired heaters are designed to operate with natural gas.

Method of Operation

A heater will operate with the time switch or frost thermostat in the 'on' position. When either of these conditions are satisfied, the operational sequence will commence when the room thermostat calls for heat. This completes the control loop for the burner and commences its start sequence under the direction of the flame monitoring system.

When a flame is established and the chamber is warmed to a predetermined level the main air fan is activated by the fan thermostat. The heater will continue to operate until either the room thermostat, the time switch or the frost thermostat switches to the 'off' position, at which point the burner will shut down. The heat exchanger assembly is cooled to the correct level according to the settings of the fan thermostat. The heater will recommence another cycle when the control devices again call for heat.

Testing

Prior to despatch from our works, every heater is fully inspected and test fired together with an operational check of all safety features.

Installation

The location chosen for a Cabinet heater must allow the provision of an adequate and satisfactory flue system and an air supply for both combustion and recirculation purposes. The location must also provide suitable access for servicing, operation of user controls, air circulation around the heater and be capable of supporting the weight of the cabinet and all ancillary equipment. The heater must be installed in accordance with the relevant requirements of regulations and codes of practice applicable to the type and location.

The heater must not be installed in an area for which it is not designed, such as where the atmosphere may be corrosive or flammable, or in an environment where a negative air pressure exists. To do so may well invalidate all guarantees. If the heater is to be installed in a position where it may be subject to mechanical damage it must be suitably protected and this protection must not inhibit service or functional access.

Each heater must be installed, and serviced by a competent person.

Guarantee

The Benson Heating range of 'VN/VD' Cabinet Air Heaters are covered by a comprehensive guarantee. Every Cabinet heater has a full one year Labour and two year Parts guarantee whilst the heat exchanger assembly is protected by a ten year time related warranty. All guarantees and warranties are subject to correct installation, application, use and regular servicing in accordance with our conditions of business.

Atmospheric Gas Heaters

For details of full range see separate leaflet.

Technical Data

100/150/200/300/400/500/600 Series

	VN/VD 100 Series			VN/VD 150 Series		VN/VD 200 Series	
	Type	Metric	Imperial	Metric	Imperial	Metric	Imperial
Nominal Heat Output	Oil/Gas	29kW	100,000 Btu/hr	44kW	150,000 Btu/hr	60kW	205,400 Btu/hr
Air Delivery	Oil/Gas	1,911m ³ /hr	1,125ft ³ /min	2,548m ³ /hr	1,500ft ³ /min	3,694m ³ /hr	2175ft ³ /min
Available outlet pressure	Oil/Gas	63pa	0.25ins wg	63pa	0.25ins wg	125pa	0.5ins wg
Nozzle discharge velocity	Oil/Gas	6.5 m/sec	1,281 ft/min	8.67 m/sec	1,704 ft/min	6.57 m/sec	1,294 ft/min
Number of Heads	Oil/Gas	2	2	2	2	2	2
Throw (approx)	Oil/Gas	14m	45ft	18m	60ft	18m	60ft
Temp. Rise through Heater	Oil/Gas	40°C	72°F	50°C	90°F	50°C	90°F
Sound Level Approx (Nozzled)	Oil/Gas	64 dBA	64 dBA	64 dBA	64 dBA	72 dBA	72 dBA

Fuel	Oil	4.5 cSt at 20°C (Class D)	35 sec Redwood No. 1 at 100°F	4.5 cSt at 20°C (Class D)	35 sec Redwood No. 1 at 100°F	4.5 cSt at 20°C (Class D)	35 sec Redwood No. 1 at 100°F
	Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
Fuel Consumption	Oil	3.55 l/hr	0.78 gal/hr	5.33 l/hr	1.17 gal/hr	6.93 l/hr	1.52 gal/hr
	Gas	3.47 m ³ /hr	120 ft ³ /hr	5.2 m ³ /hr	183.2 ft ³ /hr	7.2 m ³ /hr	255.1 ft ³ /hr
Burner Type	Oil	Riello R40 G5	Riello R40 G5	Riello R40 G5	Riello R40 G5	Riello R40 G10	Riello R40 G10
	Gas	Riello R40 GS5	Riello R40 GS5	Riello R40 GS5	Riello R40 GS5	Riello R40 GS10	Riello R40 GS10
Min Gas inlet pressure	Nat Gas	17.5 mbar	7 in Wg	17.5 mbar	7 in Wg	17.5 mbar	7 in Wg
Fuel connection size	Oil	Rc 1/8	1/8 in BSP	Rc 1/8	1/8 in BSP	Rc 1/8	1/8 in BSP
	Gas	Rc 1/2	1/2 in BSP	Rc 1/2	1/2 in BSP	Rc 1/2	1/2 in BSP
Exit gas temp (approx)	Oil	250°C	482°F	290°C	554°F	250°C	482°F
	Gas	230°C	446°F	260°C	500°F	260°C	500°F

Electrical supply	Oil/Gas	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50	230/1/50
STD Main fan motor	Oil/Gas	0.355 kW	0.45 hp	0.355 kW	0.45 hp	0.99 kW	1.3 hp
STD Running current	Oil/Gas	2.5 A	2.5 A	2.5 A	2.5 A	6.0 A	6.0 A

Up-rated fan motor	Oil/Gas	N/A	N/A	N/A	N/A	N/A	N/A
Up-rated running current	Oil/Gas	N/A	N/A	N/A	N/A	N/A	N/A

Minimum free ventilation area for combustion	Oil/Gas	181 cm ²	28 in ²	271 cm ²	42 in ²	368 cm ²	57 in ²
Weight	Oil/Gas	208 kg	458 lbs	208 kg	458 lbs	407 kg	897 lbs

VN/VD 300 SERIES		VN/VD 400 SERIES		VN/VD 500 SERIES		VN/VD 600 SERIES	
Metric	Imperial	Metric	Imperial	Metric	Imperial	Metric	Imperial
88kW	300,000 Btu/hr	119kW	407,000 Btu/hr	148kW	505,000 Btu/hr	175kW	600,000 Btu/hr
5,096m ³ /hr	3,000 ft ³ /min	7,644m ³ /hr	4,500ft ³ /min	10,701m ³ /hr	6,300ft ³ /min	12,740m ³ /hr	7,500ft ³ /min
75pa	0.3 ins wg	150pa	0.6 ins wg	175pa	0.7 ins wg	200pa	0.8 ins wg
6.04 m/sec	1,190 ft/min	7.62 m/sec	1,500 ft/min	8.0 m/sec	1,575 ft/min	9.52 m/sec	1,875 ft/min
3	3	3	3	4	4	4	4
16m	52ft	21m	70ft	23m	75ft	27m	90ft
50°C	90°F	50°C	90°F	50°C	90°F	50°C	90°F
72 dBA	72 dBA	74 dBA	74 dBA	76 dBA	76 dBA	78 dBA	78 dBA

4.5 cSt at 20°C (Class D)	35 sec Redwood No.1 at 100°F	4.5 cSt at 20°C (Class D)	35 sec Redwood No. 1 at 100°F	4.5 cSt at 20°C (Class D)	35 sec Redwood No. 1 at 100°F	4.5 cSt at 20°C (Class D)	35 sec Redwood No. 1 at 100°F
Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
10.39 l/hr	2.29 gal/hr	13.86 l/hr	3.05 gal/hr	17.321 l/hr	3.81 gal/hr	20.79 l/hr	4.57 gal/hr
10.3 m ³ /hr	364 ft ³ /hr	14.3 m ³ /hr	503.4 ft ³ /hr	18.0 m ³ /hr	636 ft ³ /hr	20.7 m ³ /hr	730 ft ³ /hr
Riello R40 G10	Riello R40 G10	Riello R40 G20	Riello R40 G20	Riello R40 G20	Riello R40 G20	Riello R40 G20S	Riello R40 G20S
Riello R40 GS10	Riello R40 GS10	Riello R40 GS20	Riello R40 GS20	Riello R40 GS20	Riello R40 GS20	Riello R40 GS20	Riello R40 GS20
17.5 mbar	7 in Wg	17.5 mbar	7 in Wg	17.5 mbar	7 in Wg	17.5 mbar	7 in Wg
Rc 1/8	1/8 in BSP	Rc 1/8	1/8 in BSP	Rc 1/8	1/8 in BSP	Rc 1/8	1/8 in BSP
Rc 1/2	1/2 in BSP	Rc 1/8	1/8 in BSP	Rc 1/8	1/8 in BSP	Rc 1	1 in BSP
290°C	554°F	260°C	500°F	330°C	626°F	280°C	536°F
295°C	563°F	270°C	518°F	305°C	581°F	275°C	527°F

230/1/50	230/1/50	415/3/50	415/3/50	415/3/50	415/3/50	415/3/50	415/3/50
0.99 kW	1.3 hp	1.5 kW	2 hp	2.4 kW	2.9 hp	2.98 kW	4 hp
7.2 A	7.2 A	3.9 A	3.9 A	4.9 A	4.9 A	7.6 A	7.6 A

N/A	N/A	2.2 kW	2.9 hp	3 kW	4 hp	4 kW	5.3 hp
N/A	N/A	5.4 A	5.4 A	6.9 A	6.9 A	8.4 A	8.4 A

516 cm ²	80 in ²	690 cm ²	107 in ²	865 cm ²	134 in ²	1,032 cm ²	160 in ²
407 kg	897 lbs	496 kg	1,093 lbs	511 kg	1,126 lbs	550 kg	1,212 lbs

Technical Data

700/800/1000 Series

	Type	VN/VD 700 SERIES		VN/VD 800 SERIES		VN/VD 1000 SERIES	
		Metric	Imperial	Metric	Imperial	Metric	Imperial
Nominal Heat Output	Oil/Gas	206kW	702,800 Btu/hr	235 kW	801,800 Btu/hr	293 kW	1,000,000 Btu/hr
Air Delivery	Oil/Gas	13,249 m ³ /hr	7,800ft ³ /min	13,589 m ³ /hr	8,000 ft ³ /min	17,411 m ³ /hr	10,250 ft ³ /min
Available outlet pressure	Oil/Gas	200pa	0.8ins wg	125pa	0.5ins wg	150pa	0.6ins wg
Nozzle discharge velocity	Oil/Gas	9.9 m/sec	1,950 ft/min	7.46 m/sec	1,469 ft/min	9.56 m/sec	1,883 ft/min
Number of Heads	Oil/Gas	4	4	4	4	4	4
Throw (approx)	Oil/Gas	27m	90ft	23m	75ft	29m	95ft
Temp. Rise through Heater	Oil/Gas	50°C	90°F	50°C	90°F	50°C	90°F
Sound Level Approx (Nozzled)	Oil/Gas	78 dBA	78 dBA	78 dBA	78 dBA	80 dBA	80 dBA

Fuel	Oil	4.5 cSt at 20°C (Class D)	35 sec Redwood No. 1 at 100°F	4.5 cSt at 20°C (Class D)	35 sec Redwood No. 1 at 100°F	4.5 cSt at 20°C (Class D)	35 sec Redwood No. 1 at 100°F
	Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
Fuel consumption	Oil	24.25 l/hr	5.34 gal/hr	28.43 l/hr	6.25 gal/hr	35.54 l/hr	7.82 gal/hr
	Gas	24.8m ³ /hr	876 ft ³ /hr	28.5 m ³ /hr	1,004 ft ³ /hr	35.5 m ³ /hr	1,252 ft ³ /hr
Burner Type	Oil	Riello RL28/1	Riello RL28/1	Riello RL28	Riello RL28	Riello RL38	Riello RL38
	Gas	Riello RS28/1	Riello RS28/1	Riello RS28/1	Riello RS28/1	Riello RS38/1	Riello RS38/1
Min Gas inlet pressure	Nat Gas	17.5 mbar	7 in Wg	17.5 mbar	7 in Wg	17.5 mbar	7 in Wg
Fuel connection size	Oil	Rc 1/8	1/8 in BSP	Rc 1/8	1/8 in BSP	Rc 1/8	1/8 in BSP
	Gas	Rc 1 1/2	1 1/2 in BSP	Rc 1 1/2	1 1/2 in BSP	Rc 1 1/2	1 1/2 in BSP
Exit gas temp (approx)	Oil	330°C	626°F	330°C	626°F	330°C	626°F
	Gas	320°C	608°F	260°C	500°F	315°C	567°F

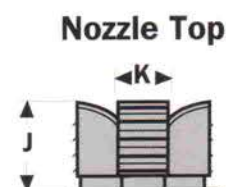
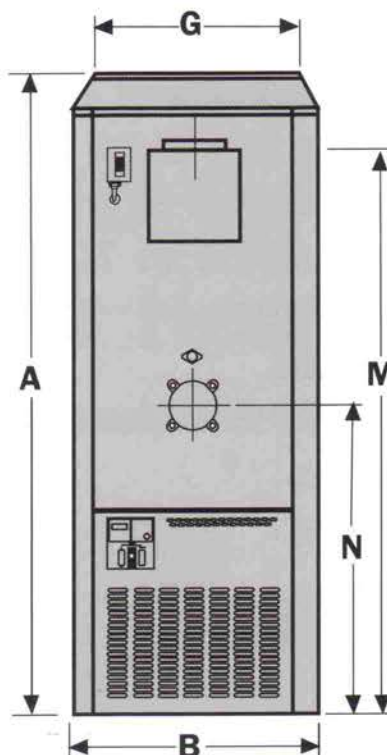
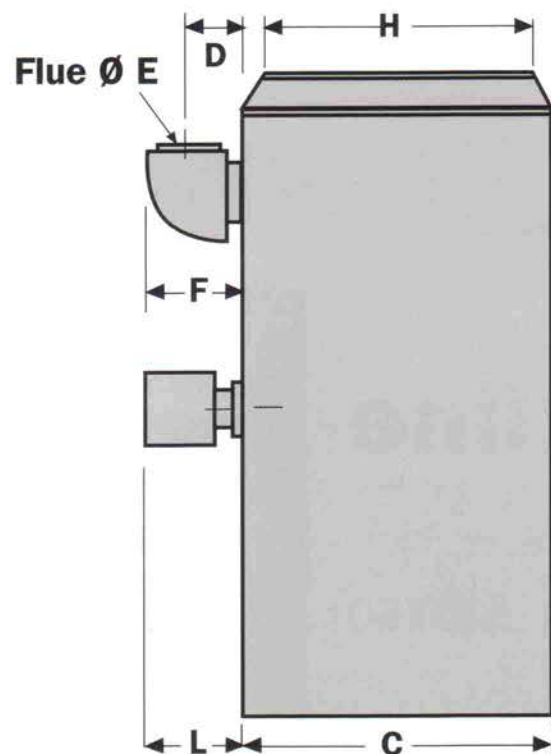
Electrical supply	Oil/Gas	415/3/50	415/3/50	415/3/50	415/3/50	415/3/50	415/3/50
STD Main fan motor	Oil/Gas	3 kW	4 hp	4 kW	5.3 hp	5.5 kW	7.3 hp
STD Running current	Oil/Gas	5.2 A	5.2 A	8.4 A	8.4 A	9.0 A	9.0 A

Upated fan motor	Oil/Gas	4 kW	5.3 hp	5.5 kW	7.3 hp	7.5 kW	10 hp
Upated running current	Oil/Gas	8.4 A	8.4 A	11.2 A	11.2 A	16.1 A	16.1 A

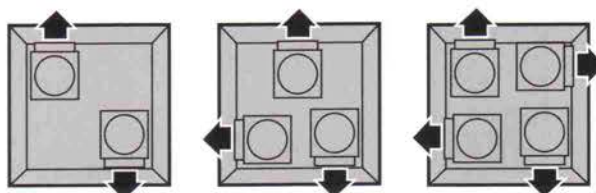
Minimum free ventilation area For Combustion	Oil/Gas	1,226 cm ²	190 in ²	1,413 cm ²	219 in ²	1,806 cm ²	280 in ²
Weight	Oil/Gas	572 kg	1,262 lbs	707 kg	1,558 lbs	780 kg	1,720 lbs

Dimensional Data

100 - 1000 Series

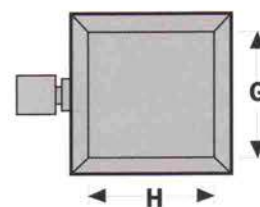


Outlet Head Plans



Model 100-200 Model 300-400 Model 500-1000

Outlet Duct Spigot Plan



Model	Type	A	B	C	D	ø E	F	G	H	J	K	L		M	N
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Oil	Gas	mm	mm
100	Oil/Gas	1750	660	662	95±5	125	280	570	570	332	280	229	349	1500	835
150	Oil/Gas	1750	660	662	95±5	125	280	570	570	332	280	229	349	1500	835
200	Oil/Gas	1941	770	940	197±5	150	330	615	787	332	280	267	362	1740	960
300	Oil/Gas	1941	770	940	197±5	175	330	615	787	332	280	267	362	1740	960
400	Oil/Gas	2235	970	1070	197±5	175	330	762	864	360	305	292	432	1970	1075
500	Oil/Gas	2235	970	1070	197±5	175	330	762	864	360	305	292	432	1970	1075
600	Oil/Gas	2388	970	1300	197±5	175	330	762	1094	360	305	298	432	2110	1230
700	Oil/Gas	2388	970	1300	256±5	225	462	762	1094	360	305	476	580	2230	1230
800	Oil/Gas	2590	1168	1550	256±5	225	462	965	1347	410	355	476	580	2400	1331
1000	Oil/Gas	2590	1168	1550	256±5	225	462	965	1347	410	355	476	580	2400	1331

ASSOCIATED PRODUCTS

- Gas & Oil Fired Cabinet Heaters.
- Also Available Gas & Oil Fired High Performance Heat Exchanger Module. (EM Range 60kW to 700kW).
- Portable Heaters.
- Flue Systems.
- Recoupak Destratification Fans.
- Unit Heaters.

Customer Hotline

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It is the Policy of Benson Heating to pursue a programme of continuous research and development. We therefore reserve the right to change both prices and specification without prior notice. Details are believed to be correct but do not form the basis of any contract or guarantee. All orders are accepted subject to our standard condition of sale available on request.

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