HEM Heat Exchange Modules

Industrial & Commercial Heating Systems.

powrmatic

www.powrmatic.co.uk

HEM-NVx

HEM-SL

CE

HEM Product Overview

The compact design and flexible configuration of Powrmatic HEM gas fired heat exchange modules combine to provide designers with efficient and cost effective solutions for a wide variety of air heating and drying applications including new and re-furbished air handling units, duct heaters and dryers.

The HEM range is available in two differing configurations -

HEM-NVx	10 - 200 kW Heat Outputs
HEM-SL	30 - 200 kW Heat Outputs

Where higher duties are required modules may be installed in either parallel or in series. Depending on model and size such multiple modules may be supplied factory pre-assembled.

Fuel usage and emissions are a key consideration within the HEM design with all modules offering an efficiency of 90% at nominal airflow rates.

Controllability is a key benefit of HEM modules. Each individual module can be specified in on/off, high/low or modulating burner format. High/low and modulating burners provide a turn-down ratio of between 2:1 and 4:1 depending upon model selection. The application of multiple modules further enhances the ability to increase turn-down rates and control heat output to close tolerance.

A feature of HEM tubular heat exchangers is their ability to provide efficient heat transfer with minimal pressure loss across the tube bank, thereby allowing designers to optimise fan selections. For applications with high airflows it is possible to provide bypass facilities.

Typically modules are arranged for internal installation, often fitted within the confines of the air handling unit. External units can be supplied with fully weatherproofed burner enclosures. Room sealed enclosures are also available allowing the connection of ducted combustion air as well as access to the flue spigot.

HEM-NVx modules utilise proven tube technology four pass heat exchangers with each tube being fired by a dedicated, matched and efficient in-shot burner.

HEM-NVx Range

HEM-SL modules are of similar configuration but are of two-pass design to minimise the majority of module widths to an impressive 400 mm.

HEM-SL Range

Air Flow Direction

Product Specification

Casing & Heat Exchanger
Formed from folded galvanised steel sheet to a rigid structure with inlet and outlet flanges for easy connection.

A two pass (HEM-SL) and four pass (HEM-NVx) tubular assembly manufactured from aluminised steel formed, swaged and expanded without recourse to stress inducing welding. *(AISI 409 grade stainless steel option available)*

Burner Enclosures
are available for weatherproofed external (as shown) and internal plant room applications. Fully galvanized steel construction in either self finish or durable epoxy powder coated paint finish to BS 10-A-05 as standard Other colours are available priced upon application.

Stainless Steel Flue Header Box & Flue Connector
All modules have AISI 409 grade stainless steel flue collector boxes complete with condensate drain point.

Burners
In-shot burners carefully matched to each tube assembly and manifolded to a common gas valve and multi-start ignition system, itself complete with flame monitoring and safety controls and supplied ready for use with natural gas (G20).

Alternative LPG propane (G31) firing available to order.

Flue
Both the HEM-NVx and HEM-SL modules have the benefit of fan-assisted flues. Onward flue systems can be the addition of close-coupled flue terminals or, if application requires, an extended system flue. In the event that an extended flue is required then please consult Powrmatic.

Temperature
HEM modules are rated at a maximum temperature rise of 35°C for the HEM-NVx and 25°C for the HEM-SL and both with a maximum air off temperature of 70°C.

Safety Controls
In addition to the gas burner flame monitoring and safety controls all HEM modules are provided with a high temperature limit thermostat and flue fan proving device.

Environmental Controls
Generally provided by others. On/off and high/low units require 230v heat enable signals. Modulating modules are supplied complete with modulating control interface and require a 0-10v DC signal to effect modulation.

Step controls for multiple modules available, details on request.

Airflow
To assist designers the attached duty tables confirm the minimum airflow necessary for safe and efficient operation as well as providing guidance on maximum airflows and pressure loss.

Approvals
All Powrmatic heaters are type tested to meet the stringent requirements of both the Gas Directive and CE accreditation.

Duties - HEM-NVx

Model HEM-NVx				10-3	15-4	18-5	25-5	30-6	40-8	50-6	60-7	75-9	100-12	110-13	125-15	150-18	175-21	200-24
Output	On/Off	Max	kW	10.0	15.0	18.0	25.0	30.0	40.0	50.0	60.0	75.0	100.0	110.0	125.0	150.0	175.0	200.0
		Min	kW	n/a														
	High/Low	Max	kW	10.0	15.0	18.0	25.0	30.0	40.0	50.0	60.0	75.0	100.0	110.0	125.0	150.0	175.0	200.0
		Min	kW	4.50	6.75	8.10	11.25	13.50	18.00	22.50	27.00	33.75	45.00	49.50	56.25	67.50	78.75	90.00
	Modulating	Max	KW	10.0	15.0	18.0	25.0	30.0	40.0	50.0	60.0	75.0	100.0	110.0	125.0	150.0	175.0	200.0
		Min	kW	4.50	6.75	8.10	11.25	13.50	18.00	22.50	27.00	33.75	45.00	49.50	56.25	67.50	78.75	90.00
Temp	Rise	Max	Δt °C	35														
	Air Off	Max	°C	70														
Airflow	Volume	Min. Volume for max Δt	m³/s	0.23	0.35	0.41	0.58	0.69	0.92	1.15	1.38	1.73	2.30	2.54	2.88	3.46	4.03	4.61
	Pressure Drop	At above Airflow	Pa	20	17	23	21	31	26	32	35	36	37	31	31	33	34	35
Electrics			V/ph/Hz	230/1/50														
Fuel	Connection		BSP/Rc	¾										1¼				
	Minimum Inlet Pressure	Natural Gas	mbar	17.5														
		LPG	mbar	37.0														
	Rate	Natural Gas	m³/h	1.13	1.70	2.03	2.83	3.39	4.52	5.65	6.78	8.48	11.30	12.43	14.13	16.95	19.78	22.60
		LPG	m³/h	0.44	0.65	0.78	1.09	1.31	1.74	2.18	2.61	3.26	4.35	4.79	5.44	6.53	7.61	8.70
Flue	Diameter		mm ø	80			100				130							
	Max Length		m	12														
Nett Weight (single units)			kg	20	24	30	46	52	69	91	102	118	145	196	221	246	275	298
Two Modules in Series Δt = 70°C	Heat Output		kW	20	30	36	50	60	80	100	120	150	200	220	250	300	350	400
	Minimum Airflow @ 0°C air inlet		m³/s	0.23	0.35	0.41	0.58	0.69	0.92	1.15	1.38	1.73	2.30	2.54	2.88	3.46	4.03	4.61
	Pressure Drop At Minimum Airflow		Pa	40	34	46	42	62	52	64	70	72	74	62	62	66	68	70

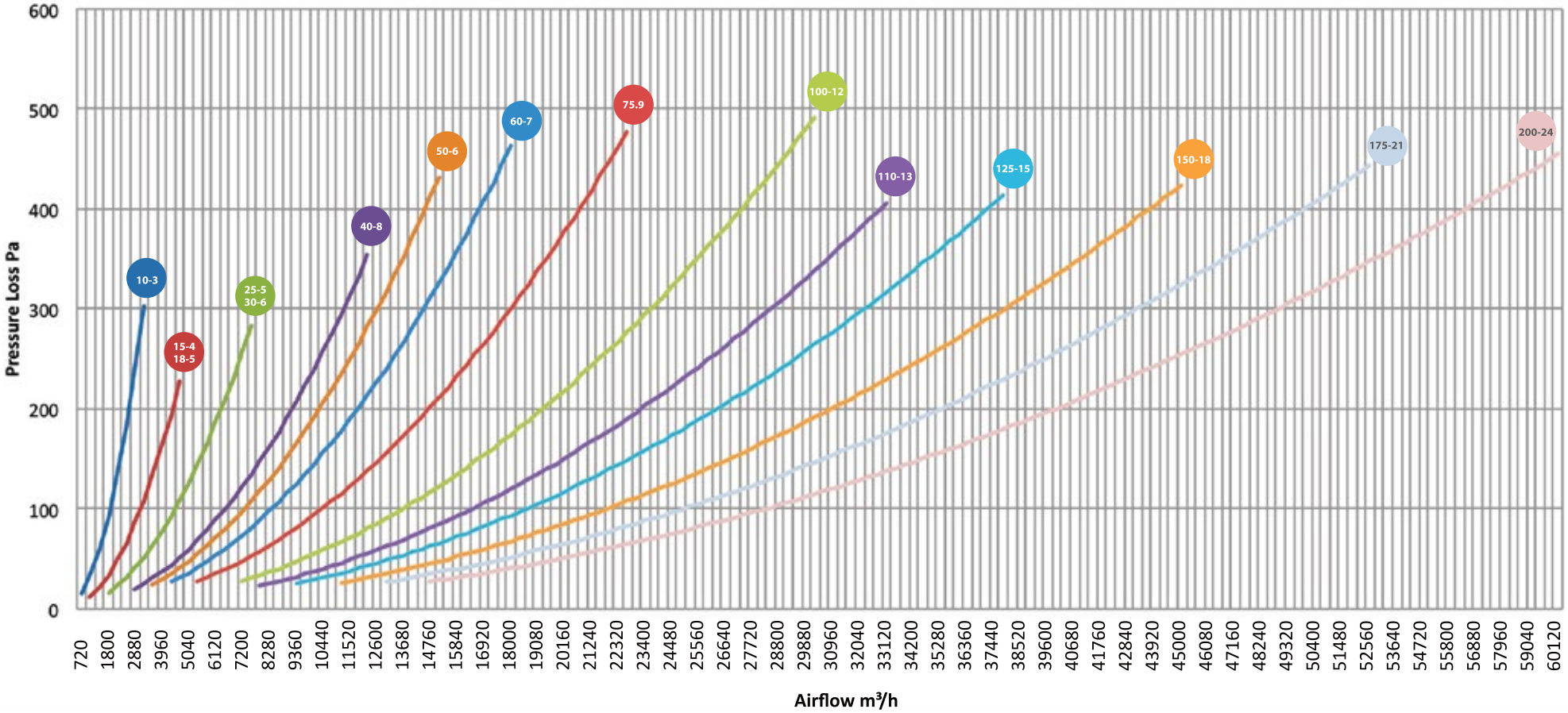
HEM-SL

Model - HEM-SL				30-6	45-9	50-6	60-12	75-9	75-15	90-18	100-12	125-15	150-18	175-21	200-24
Output	On/Off	Max	kW	30.0	45.0	50.0	60.0	75.0	75.0	90.0	100.0	125.0	150.0	175.0	200.0
		Min	kW	n/a											
	High/Low	Max	kW	30.0	45.0	50.0	60.0	75.0	75.0	90.0	100.0	125.0	150.0	175.0	200.0
		Min	kW	13.46	20.20	21.82	26.94	30.46	31.25	40.41	43.00	52.07	63.00	72.91	83.32
	Modulating	Max	KW	30.0	45.0	50.0	60.0	75.0	75.0	90.0	100.0	125.0	150.0	175.0	200.0
		Min	kW	13.46	20.20	21.82	26.94	30.46	31.25	40.41	43.00	52.07	63.00	72.91	83.32
Temp	Rise	Max	Δt °C	25											
	Air Off	Max	°C	70											
Airflow	Volume	Min. Volume for max Δt	m³/s	0.97	1.45	1.61	1.94	2.42	2.42	2.90	3.23	4.03	4.84	5.64	6.45
	Pressure Drop	At above airflow	Pa	16	17	20	18	21	15	19	22	19	19	20	21
Electrics			V/ph/Hz	230/1/50											
Gas	Connection		BSP/Rc	¾								1¼			
	Minimum Inlet Pressure	Nat Gas	mbar	17.5											
		LPG	mbar	37.0											
	Rate	Nat Gas	m³/h	3.53	5.29	5.88	7.05	8.82	8.82	10.58	11.76	14.7	18.04	20.81	23.78
		LPG	m³/h	1.36	2.04	2.27	2.73	3.41	3.41	4.09	4.54	5.68	6.97	8.07	9.19
Flue	Diameter		mm ø	100			130								
	Maximum Length		m	18											
Nett Weight (single units)			Kg	59	85	79	118	106	139	165	130	185	204	235	265
Two Modules in Series Max Δt = 50°C	Heat Output		kW	60	90	100	120	150	150	180	200	250	300	350	400
	Minimum Airflow @ 0°C air inlet		m³/s	0.97	1.45	1.61	1.94	2.42	2.42	2.90	3.23	4.03	4.84	5.64	6.45
	Pressure Drop At Above Airflow		Pa	27	29	33	30	35	35	30	37	31	32	34	35
Three Modules in Series Max Δt = 75°C	Heat Output		kW	90	135	150	180	225	225	270	300	375	450	525	600
	Minimum Airflow @ 0°C air inlet		m3/s	1.04	1.56	1.73	2.08	2.59	2.59	3.11	3.46	4.32	5.18	6.05	6.91
	Pressure Drop At Above Airflow		Pa	46	49	54	50	59	43	52	63	52	54	57	58

Notes -

- 'Air off' temperature should not exceed 70°C. If higher air off temperatures are required refer to Powrmatic Limited
- The air flow stated above for three HEM-SL modules in series at an air on temperature of 0°C gives a temperature rise of 70°C otherwise the 'Air off' temperature limit would be exceeded.

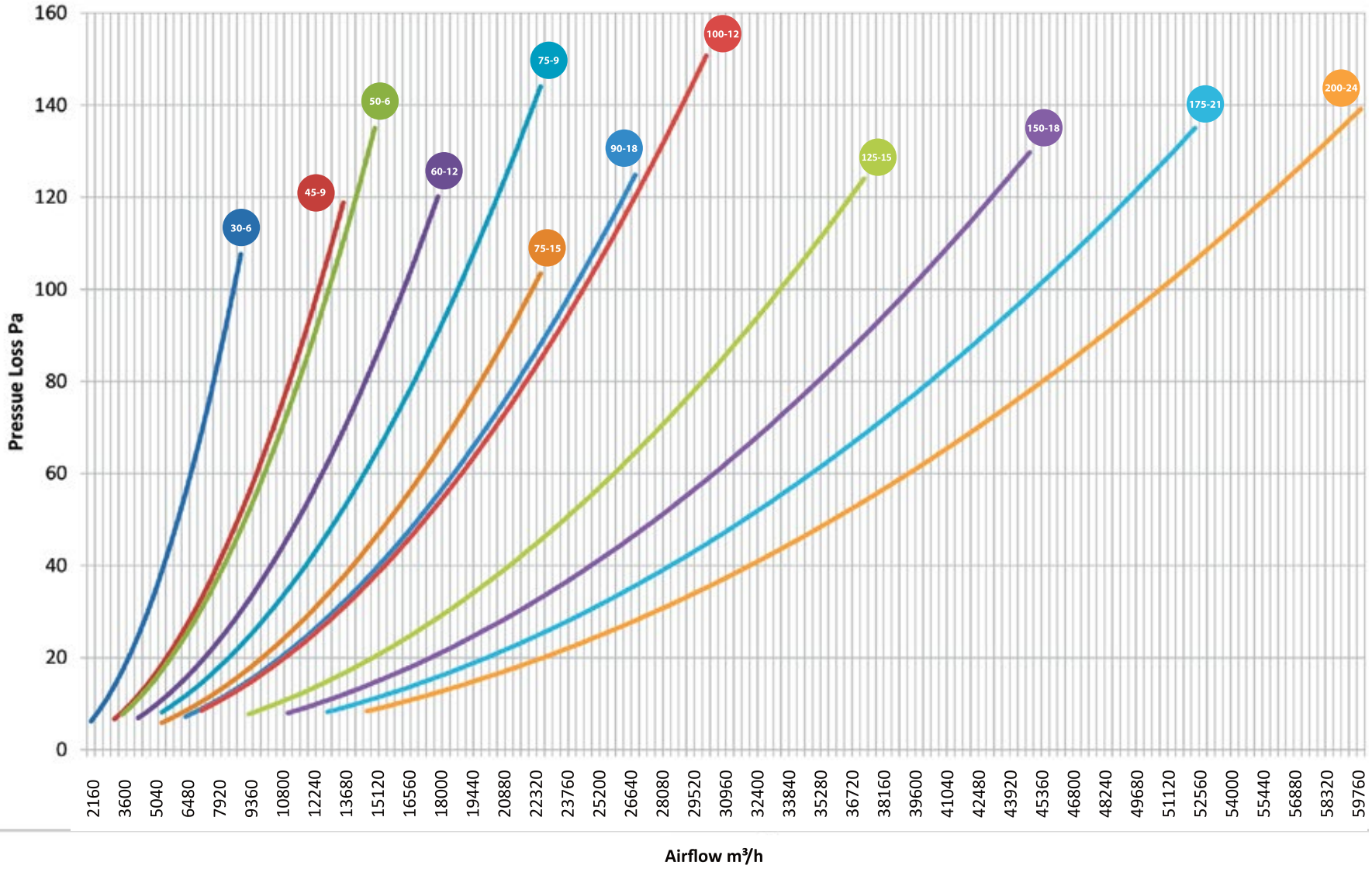
HEM-NVx Pressure Drop Graph



Note:

HEM NVx
The above data refers to a single module pressure drop. For twin models, refer to manufacturer.

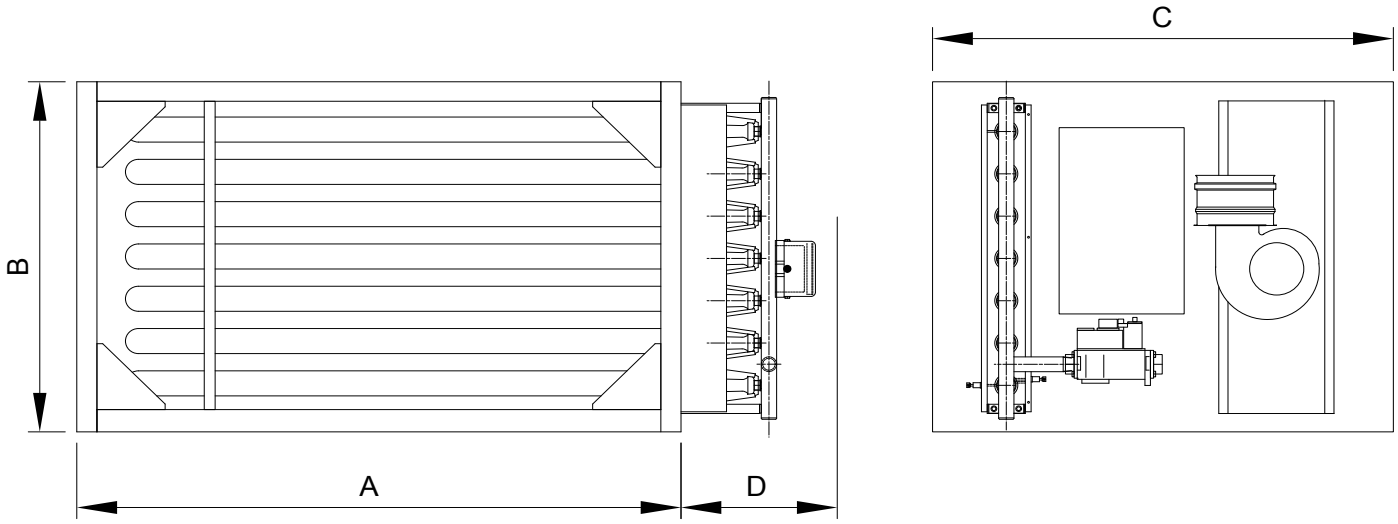
HEM-SL Pressure Drop Graph



Note:

HEM-SL
The above data refers to a single module pressure drop. For twin & triple models, refer to manufacturer.

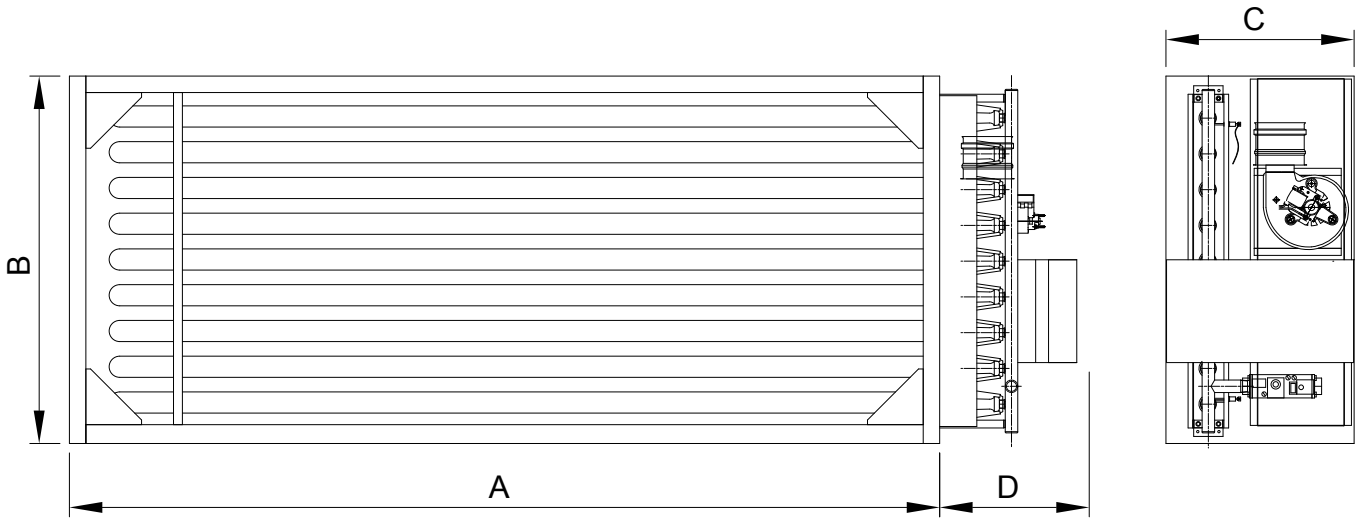
Dimensions - HEM-NVx



HEM-NVx Unit Dimensions

Model	10-3	15-4	18-5	25-5	30-6	40-8	50-6	60-7	75-9	100-12	110-13	125-15	150-18	175-21	200-24
Dimension															
A	550	550	550	680	680	680	1050	1050	1050	1050	1050	1050	1050	1050	1050
B	305	458	458	531	531	741	531	601	741	950	1132	1272	1482	1690	1900
C	590	590	590	648	648	648	800	800	800	800	930	930	930	930	930
D	400	400	380	400	380	380	400	400	400	400	500	500	500	500	550
Flue Diameter	80	80	80	100	100	100	100	130	130	130	130	130	130	130	130

HEM-SL



HEM-SL Unit Dimensions

Model	30-6	45-9	50-6	60-12	75-9	75-15	90-18	100-12	125-15	150-18	175-21	200-24
Dimension												
A	1250	1250	1850	1250	1850	1250	1250	1850	1850	1850	1850	1850
B	531	741	531	950	741	1272	1482	950	1272	1482	1690	1900
C	400	400	400	400	400	400	400	400	400	400	400	530
D	450	450	450	450	450	450	450	450	500	500	500	550
Flue Diameter	100	100	100	130	130	130	130	130	130	130	130	130

General
The following notes are provided as a guide, however installers and operators should fully acquaint themselves with the more detailed guidance provided in the relevant installation manual. For copies of such manuals please consult our technical department or visit our website - www.powrmatic.co.uk

Location
Internal modules should be installed in a manner which protects the burner, controls, flue fan and any other components for the effects of rain, spray or water ingress.

Modules should be firmly fixed within their environment, free from vibration and not installed in hazardous areas or areas where there is a foreseeable risk of flammable or corrosion inducing particles, gases or vapours being drawn into the combustion air circuit or heated air circuit. Areas where special consideration or advice may be required could include but are not limited to

- Where de-greasing solvents are present, even in minute concentrations
- Where paint spraying is carried out
- Where styrenes or other laminating products are used
- Where airborne silicone is present
- Where petrol engined vehicles are stored or maintained
- Where dust is present (i.e wood working or joinery shops)
- Where high levels of extract persist

Installation in such areas may be possible under specific conditions. Please consult our technical department for further information.

Ductwork
Duct connections to and from the module should be such that the airflow across the entirety of the heat exchanger is uniform. Sharp turns and/or restrictions close to the module should be avoided.

Condensing Mode
Care should be taken to ensure that when modules are operated with airflows or heat output rates which will generate the production of condensate then provision should be made with respect to the specification of heat exchanger material and for the removal of condensate.

If in doubt then please consult our technical department.

Fan Over-Run
All HEM modules require the provision of a fan over-run facility, by others, to ensure that the heat exchanger is correctly cooled at the end of each firing cycle.

If in doubt then please consult our technical department.

Temperature
HEM modules are rated at a maximum temperature rise of 35°C for the HEM-NVx and 25°C for the HEM-SL and both with a maximum air off temperature of 70°C.

Airflow
To assist designers the enclosed duty and pressure loss tables confirm the minimum airflow necessary for safe and efficient operation as well as providing guidance on maximum airflows and pressure losses.

Pressure loss graphs are for single modules only, for multiple module applications please consult Powrmatic Technical.

Air handling data is assessed at room ambient conditions.

Gas Connections
Care should be taken when sizing pipework to ensure that minimum gas inlet pressures are not compromised under dynamic load conditions. Isolating valves and service unions should be provided for each module and pipework installed with due regard for relevant standards and Codes of Practice.

Fuel consumption and output figures contained within this brochure are at maximum firing rate and based upon nett calorific values as –
Natural gas (G20) nett CV 34.02 MJ/m^3
LPG Propane (G31) nett CV 88.0 MJ/m^3

Flue
Powrmatic HEM modules requires a separate flue of the appropriate size and type. Systems may be installed in either the horizontal or vertical plane and maximum lengths apply and should be strictly observed. The inclusions of bends and/or provision of combustion air intake ductwork will reduce the permissible length. For further information please consult the Installation, Operation and Maintenance manual or Powrmatic Technical.

Flues must be adequately supported and terminated with the approved terminal assembly, with due regard to the point of exit and its proximity to any windows, doors or ventilation intakes etc.

Guarantee
Powrmatic HEM Heat Modules are provided with a comprehensive guarantee. For United Kingdom sales the heater has the benefit of a **two year** parts and **one year** labour guarantee. All guarantees are subject to terms and conditions.

Powrmatic Limited
Hort Bridge
Ilminster
Somerset
TA19 9PS

tel: +44 (0) 1460 53535
fax: +44 (0) 1460 52341
e-mail: info@powrmatic.co.uk
web: www.powrmatic.co.uk

Powrmatic Ireland
45 Broomhill Close
Tallaght
Dublin 24

tel: +353 (0) 1452 1533
fax: +353 (0) 1452 1764
e-mail: info@powrmatic.ie
web: www.powrmatic.ie

Issue 5.7 September 2014