VH1 to VH5
Electric Heater Product Manual



Product types covered

VH1	VAM 150-200	1kW	100mm diameter
VH2	VAM 250-350	1kW	150mm diameter
VH3	VAM 500-650	1kW	200mm diameter
VH4	VAM 800-1000	1.5kW	250mm diameter
VH4/A	VAM 800-1000(S)	2.5kW	250mm diameter
VH5	VAM 1500-2000	2.5kW	350mm diameter

INTRODUCTION

Thank you for your purchase of a Neatafan electric duct heater. Every heater is optimised for maximum thermal efficiency through the use of digital thyristor control techniques and is designed to conform to all the relevant safety standards. Each heater is fitted with inbuilt safety overheat temperature cut-outs which automatically disconnect the heater from the electrical supply in the event of a problem occurring.

UNIT OPERATION

All units accept a control signal from the temperature controller and switch the entire load on and off in time proportioning bursts. These bursts are proportional to the controllers output signal and produce a very accurate control of the heater thus saving energy. This switching takes place at or near the zero crossing point of the AC sine wave, resulting in minimal interference with the supply.
Temperature set-point can be adjusted by means of the rotary potentiometer located on the front panel of the TC controller
(see picture). Normal operation is indicated by the “HEATER ON” flashing in a rhythmic manner. Should the air temperature drop from the set point the controller will respond and turn the heater on for longer periods. Conversely should the air temperature rise from the set point the controller will respond by turning the heater off for longer periods.
Note:- When setting up the temperature set-point allow the heater output to stabilize for a minimum of 2 minutes before making any further adjustments.

Each heater unit consists of a circular metal duct ranging in size from 100mm up to 350mm diameter which houses the heater element, overheat safety cutouts (2) and TC thyristor temperature controller. The dual temperature and airflow sensor (DTFS) is connected via an umbilical lead to the heater through a multi-cored cable. External power connections are made via one of the knockout discs in the terminal box housing to the multiway connector block marks P,N,Earth. Control connections are made via the terminals 1 and 2.

INSTALLATION INSTRUCTIONS

The heater can be installed into an ISO standard spiral duct run, with either horizontal or vertical flow in either direction. With vertical ducts consideration must be given to items in the run above the heater which could be damaged by heat rising when the fan is switched off. All heaters should be kept away from plastic conduits or materials easily damaged by heat. Allow for a casing temperature of up to 70°C (ideal minimum air velocity = 1.5m/s). These heaters must not be installed outside unprotected or in areas that are washed down!

Warning:- When used in VAM installations keep a minimum of 2 metres of duct from the heater to the VAM unit.
To install the heater, measure between the swaged rings and cut the spiral to suit. Use high temperature sealant and pop rivets to fix. Do not use flexible connectors directly onto the heater. The best position for the terminal box is on the side of a horizontal duct. Ensure access to the terminal box is possible! Make sure lagging etc. does not cover the terminal box.
DTFS sensor - the combined temperature and airflow sensor will be found attached to a coiled lead. This should be mounted in the duct a minimum of 1.5 metres downstream from the heater or in a downstream position where the sensor cannot be damaged by heat. A 25mm hole saw will be required. Mount the sensor in the duct using 2 x PK self tapping screws ensuring correct orientation for the direction of airflow as indicated by the airflow arrow on the sensor.
The sensor thermistor detects duct air temperature which is then compared to the set point temperature on the TC controller front panel which in turn controls the amount of power supplied to the heater elements. The MEMS airflow sensor is mounted on the tip of the probe tube and this senses the airflow. This feeds a control signal back into the TC controller to allow the heater to turn ON when an airflow is detected.

VAM REMOTE CONTROLLER SETTINGS

18 – 3 – 02 Must be activated to enable X15 output.
19 – 8 – 03 Must be activated to enable fan delay.

WIRING

All wiring must be carried out by a qualified electrician in compliance with the latest regulations.
These units are internally pre-wired and require only a suitable supply feed connection to operate (see rating label).
Care must be taken to ensure that incoming mains rated wiring entering into the heater terminal box must be routed away from any potential hotspots by using cable supports and cleats where needed. An appropriately sized cable gland should be used to protect the incoming power cables at the point of entry into the terminal housing.

SAFETY

Every electrical system should have an isolator switch which can be locked in the “off” position to prevent accidental reconnection during maintenance. A suitably rated MCB should be included in the mains supply circuit to the heater as follows:
1kW and 1.5kW rated output – 10 Amp MCB
2.5kW rated output – 16 Amp MCB
Every heater is fitted with a manual reset (T13) and an automatic reset (T14) thermal cutout switch which are connected in series with element heater (max. 3kW) and control circuit. The object of these switches is to disconnect the heater in the event of airflow failure and prevent a dangerous build-up of heat.
Note:- When resetting the manual reset thermal cutout, the heater may suddenly switch on and element terminals etc. will become live. Ensure the heater is correctly earth bonded. Terminal covers must be secured after inspection and should be labeled “**DISCONNECT SUPPLY BEFORE REMOVING THIS COVER**”. It is the installer’s responsibility to ensure the installation meets all current Health & Safety Regulations.
The heater must not be used by children or persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.

EMC & LVD COMPLIANCE

All Neatafan heaters and controls have been designed and tested to ensure conformance with the EMC Directive 2004/108/EC and LVD directive 2006/95/EC

WARRANTY

Neatafan heaters are warranted against faulty or bad workmanship. This offer is conditional upon the heater being operated within the designed safe working limits.

WEEE DIRECTIVE

Neatafan Limited does not supply a “complete” product, only components that are incorporated into a fixed installation, therefore falls outside the scope of the directive.
At the end of its useful life the product should be disposed of via a suitable recycling centre.
Do not dispose of with normal household waste.

TC7 TEMPERATURE CONTROLLER

The TC7 unit acts as a thyristor temperature control panel to control a 220/250V single phase heater up to 19A (4.5kW) and has 5A fused outputs for single phase supply and extract fans up to a maximum of 4.5A each.



FIG.1

REAR(PCB)



FIG.2

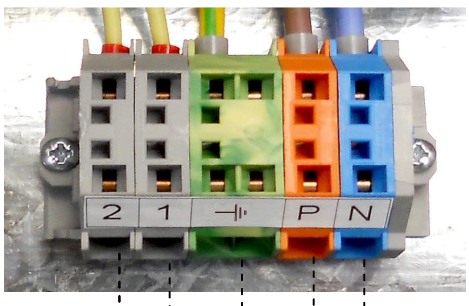
FRONT

SPECIFICATION

Supply voltage	220/250Vac 50/60Hz. +/-10%		
Output current (maximum)	19A @ 40ºC (Ambient)		
Temperature sensor	5k ohms @ 25ºC (Table 502 IT)		
Temperature control range	0 to 40ºC / (0-10V 0-100%)		
Supply Fan outputs (5A fused)	4.5A max FLC.		
Extract Fan outputs (5A fused)	4.5A max FLC.		
Run on timer	adjustable from 1 to 2 minutes (factory set at 1.5 minutes)		
Control fuse	20 x 5mm 250mA		
LED Indicators	Power On	–	Yellow
	Supply Fan On	–	Green
	Extract Fan On	–	Green
	Heater On	–	Red (solid or flashing, indicating pulsed control)
	Airflow Fault	–	Red
Dimensions	Front Panel		114mm x 197mm x 2mm thick aluminium
	Heat Sink		55mm x 100mm x 20mm thick aluminium
	PCB		85mm x 165mm
Mounting holes	98mm x 181mm centres 5mmØ holes		
Maximum ambient adjacent to terminal box	35ºC (during operation)		
Auto High Temp Cutout	100ºC Pre-set		
Man. Reset High Temp Cutout	125ºC Pre-set		
Run Rly	1A 120V AC or 1A 24V DC		
ALT SP	0-10V DC		

Power Terminals

Fig.3



To " X15 "

To connect the power supply 220/250Vac 50/60Hz to Earth, P and N

Control Input Terminals

These are a pair of 220/250V input connections normally used to switch the heater unit ON. These contacts are used to connect to the VAM X15A Board, via the terminal block (1-2 in Fig.3)

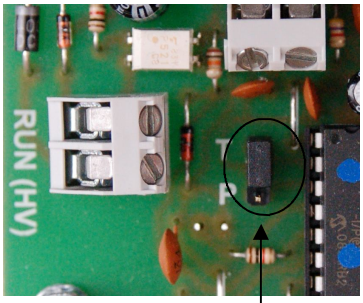
BMS

Run Rly
This is a volt free switched relay output which closes to indicate if the unit is healthy when the temperature sensor is connected and airflow has been established.

ALT SP - Alternate Setpoint Terminals
These terminals are provided for an external 0-10V DC signal to control the heater output remotely via a BMS or other form of temperature controller.
Use of these terminals overrides the temperature setpoint and controls the thyristor 0-100% / 0-10V DC when the 'P' 'T' Jumper is set to the 'P' position. (see figs 4 & 5) i.e.5V = 50% output.

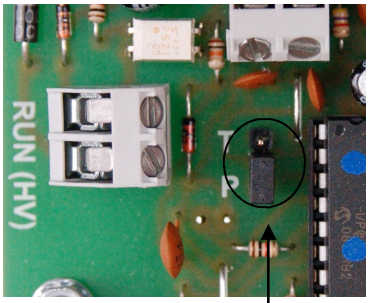
IMPORTANT

With the Jumper in the 'P' position the temperature setpoint must be set to 0ºC on the front panel.



Jumper 'T' Position
(set as standard)

fig.4



Jumper 'P' Position
(set for 0-10V BMS Input

fig.5

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Addendum to - Control Input Terminals - 'X15' 'X24' (See below)
Addendum to - VAM Remote Controller Settings. CODE 18-3-02 becomes 18(28)-3-01 Must be activated to enable X15/X24 output.
CODE 19-8-03 becomes 19(29)-8-03 Must be activated to enable fan delay.



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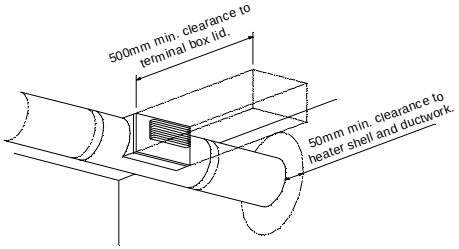


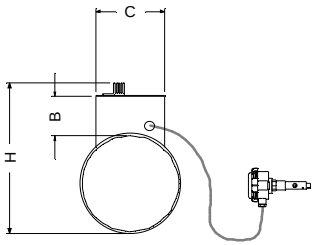
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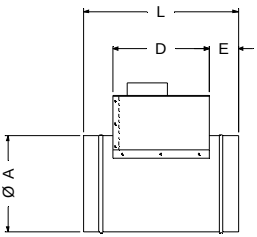


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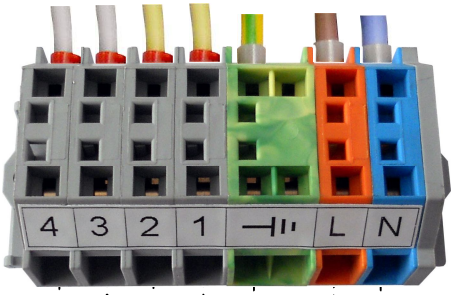
VH1B	VAM150FA	1kW	Ø100mm
VH2B	VAM250FA; VAM350FA/B	1kW	Ø150mm
VH3B	VAM500-650FA/B	1kW	Ø200mm
VH4B	VAM800-1000FA/B	1.5kW	Ø250mm
VH4/AB	VAM800-1000FA/B	2.5kW	Ø250mm
VH5B	VAM1500-2000FA/B	2.5kW	Ø350mm







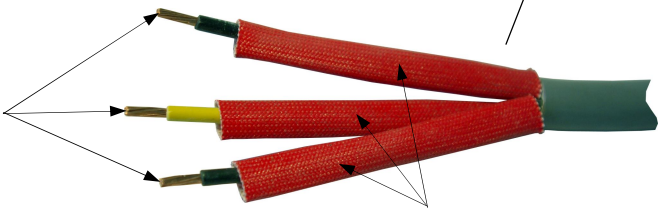
MODEL	kW	DIMENSIONS (mm)						
		A	B	C	D	E	H	L
VH1B	1.0	100	80	115	250	75	207	400
VH2B	1.0	150	80	135	250	75	257	400
VH3B	1.0	200	80	180	250	75	307	400
VH4B	1.5	250	80	180	250	75	357	400
VH4/AB	2.5	250	80	180	250	75	357	400
VH5B	2.5	350	80	180	250	75	457	400



0V " X24 " (VAM...FB)

220/250Vac " X15" " (VAM...FA)

220/250Vac
50/60Hz



≥ 2.5mm²

≥ 105ºC