

PHANTOM72

THYRISTOR CONTROL FOR BMS HEATER



The Phantom72 is designed to control a thyristor via a 0-10v demand signal from a bms system. The controller includes a two minute run on timer for the supply fan when the system is disabled. Individual volt free contacts for heater over heat trip and airflow fail can be used to monitor for faults, these can be commended up by moving a jumper bar on the pcb. A fire alarm can be connected to the controller, these contacts override the run on timer for immediate shutdown, if the fire alarm contacts are not being used they can be overridden using a jumper bar on the pcb. The controller includes enable contacts and speed control contacts for the ec fan with a fused permanent 230v output for the fan supply rated up to 8amps. The controller is designed to be connected to an external thyristor module via a 24v enable output, this output with switch off if either the heater over heats, the air flow fails or the system is disabled. The controller also includes a filter pressure switch input, if the contacts make on the pressure switch the LCD screen will indicate "FILTER DIRTY", this does not have a volt free contact output. The LCD screen will display the current status of the system, with Fan Run or Fan Off, Heater Run or Off, Air Fail and Over Heat displayed.

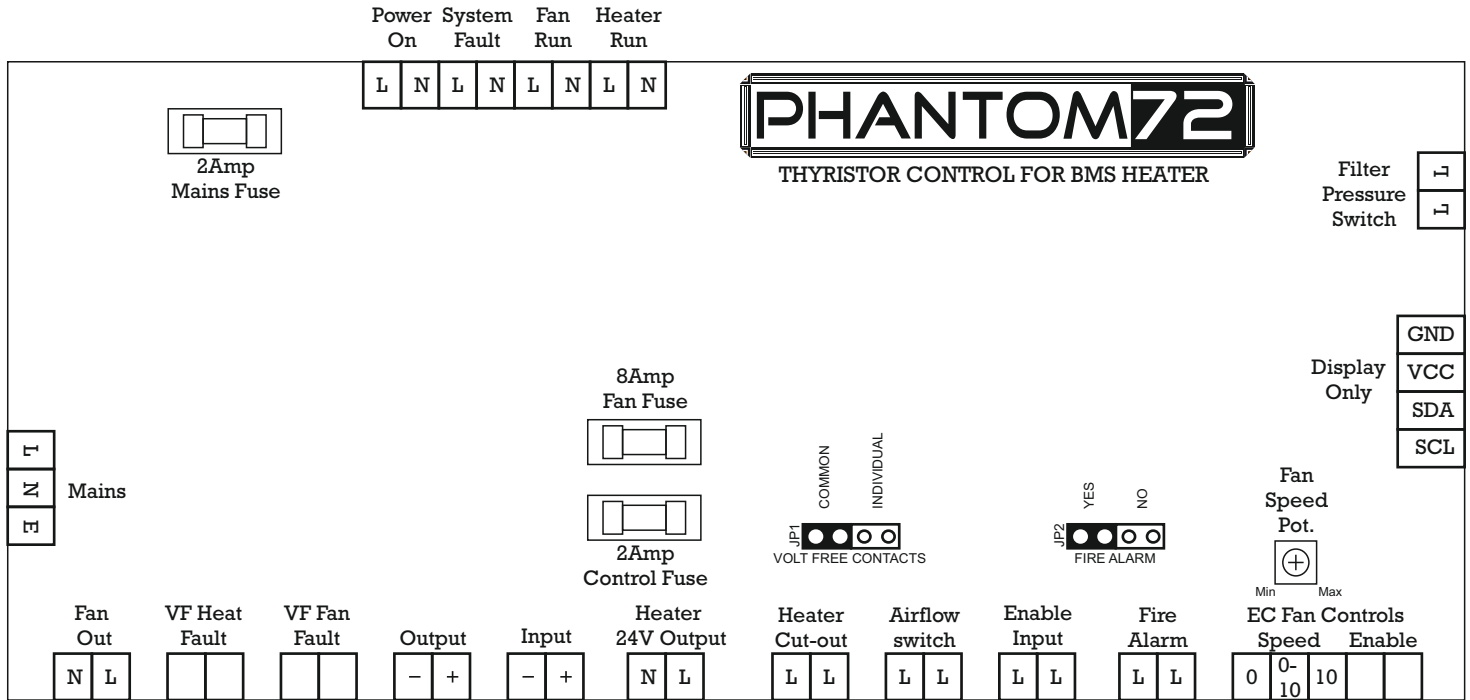


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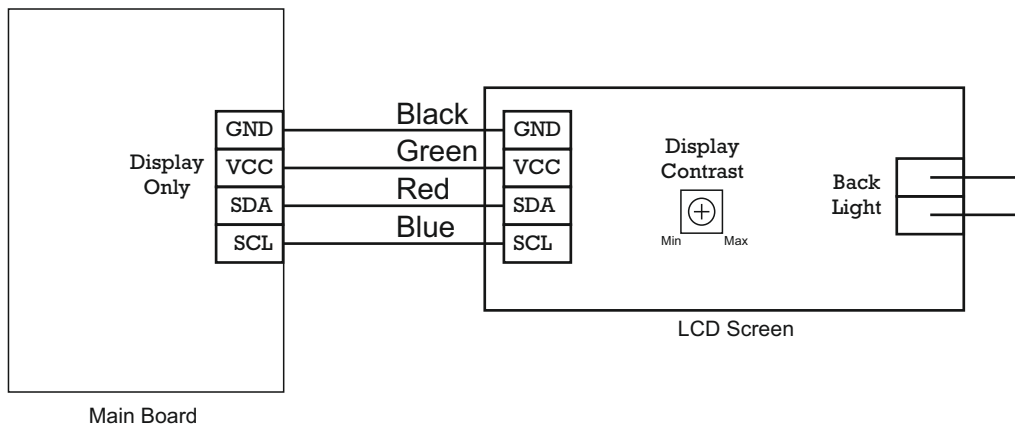


THYRISTOR CONTROL FOR BMS HEATER

BOARD LAYOUT



SCREEN CONNECTIONS



Ensure the screen is plugged in the correct way around with the black wire connected to the top pin. If it is connected the wrong way around you may damage the screen and you will need to reset the Nano board. There is a white button in the middle of the Nano board press this for 3 seconds. To adjust the display contrast gently rotate the pot on the board fitted to the display, this should be adjusted so the grid is just about invisible. The back light link can be switched with an enable switch, with the contacts open the display will be barely visible.



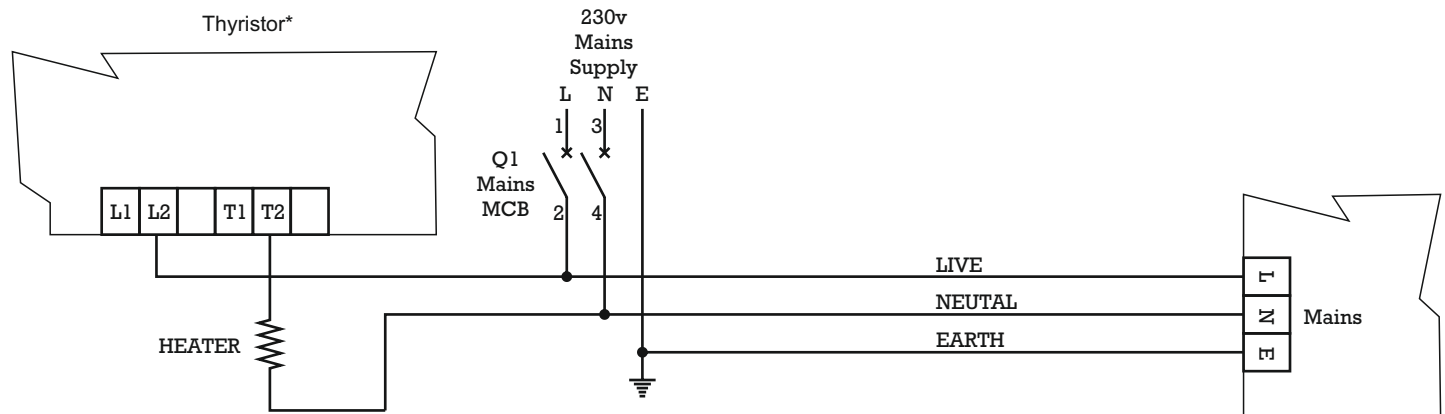
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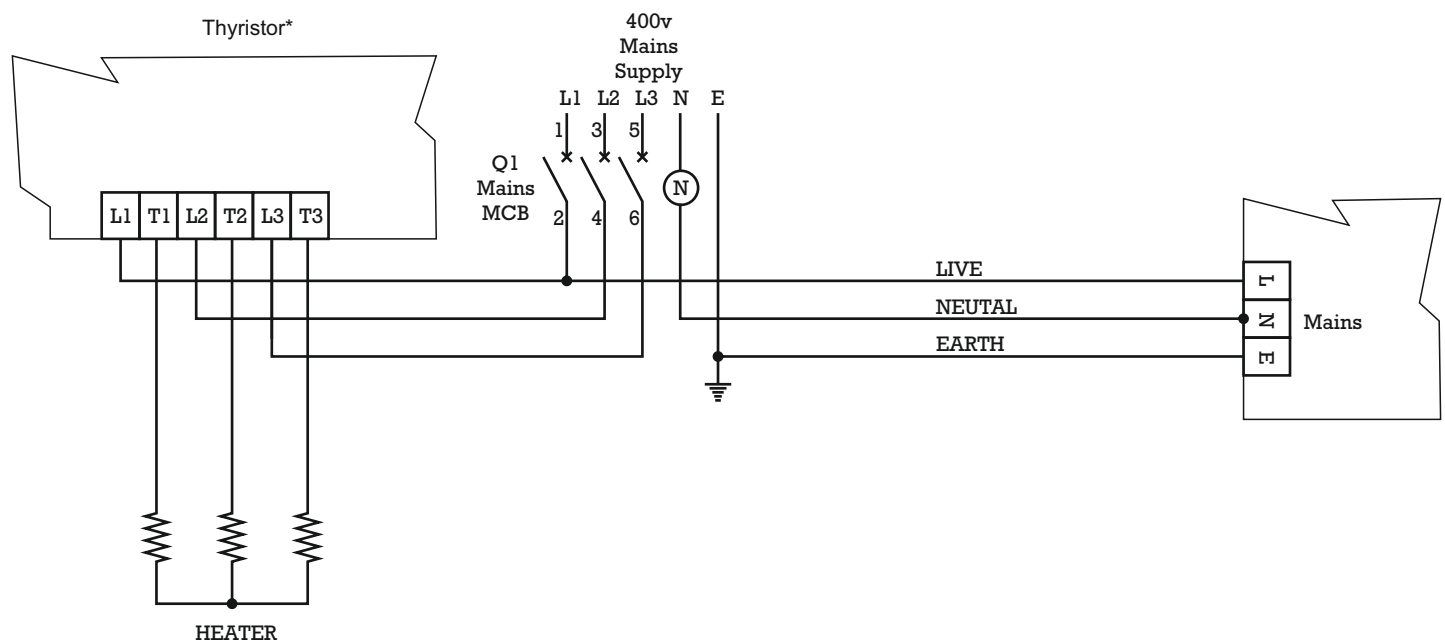
THYRISTOR CONTROL FOR BMS HEATER

CONNECTIONS

MAINS SUPPLY SINGLE PHASE



MAINS SUPPLY THREE PHASE



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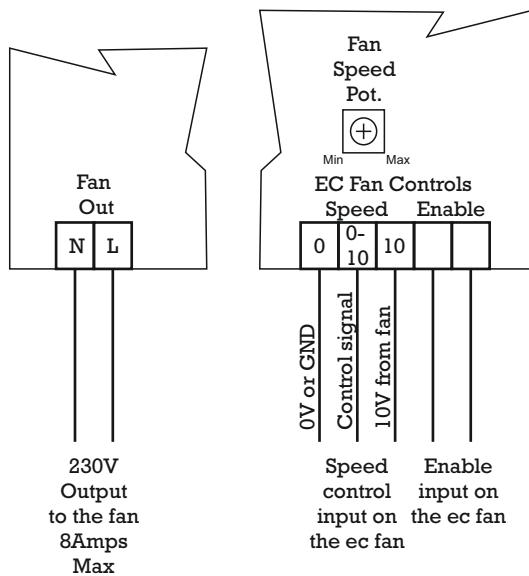


THYRISTOR CONTROL FOR BMS HEATER

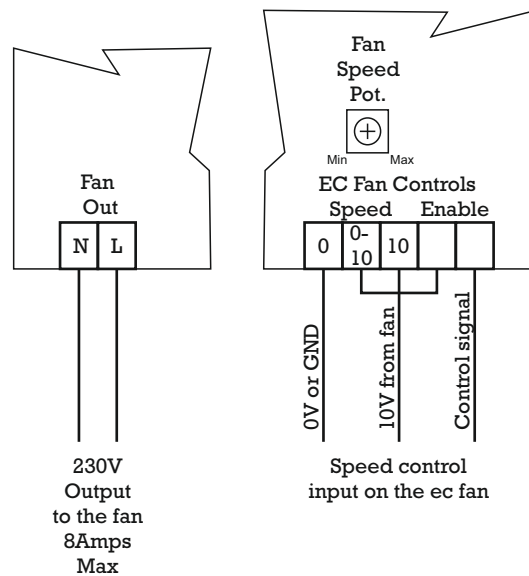
CONNECTIONS

FAN CONNECTIONS

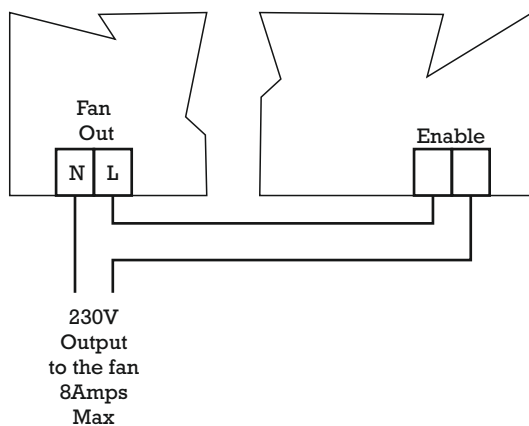
FIVE WIRE EC CONTROL



THREE WIRE EC CONTROL



NON EC CONTROL



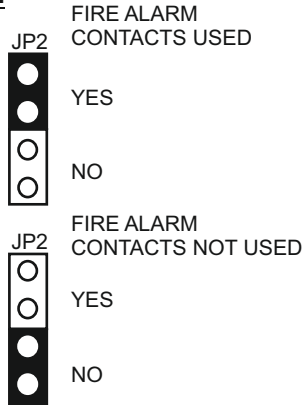
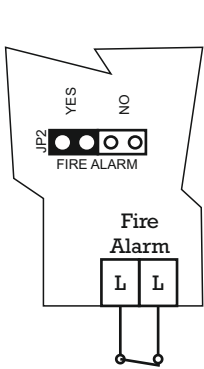
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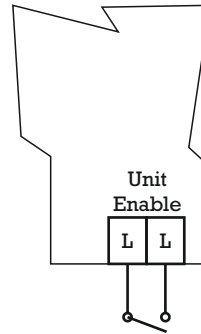
CONNECTIONS

FIRE ALARM



Normally closed fire alarm contacts can be connected to the controller for immediate shutdown of the system. If a fire alarm is not being fitted move jumper JP2 to NO position to override the fire alarm contacts.

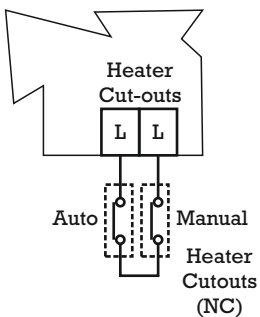
ENABLE



The enable contacts are closed to enable the system, these can be switched by a time clock, bms system or remote switch. These contacts 6vdc and cannot be used to power a remote time clock. If the unit is to run 24/7 these can be linked out.

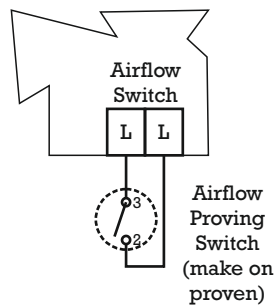
FAULT CONNECTIONS

HEATER CUT-OUTS



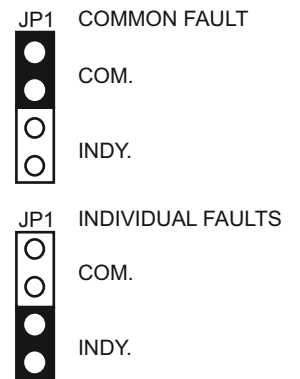
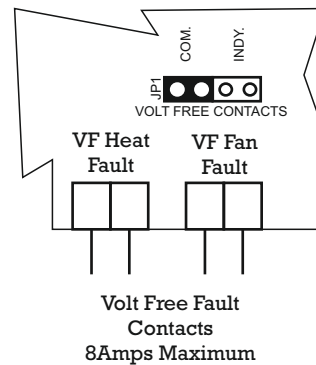
These contacts are to be connected to the two heater cut-outs in the heater terminal box, the two cut-outs to be wired in series. When either cut-out opens the heater is disabled and over heat will appear on the display. The volt free heater fault contacts will make.

AIRFLOW



These contacts are to be connected to the airflow proving switch, terminals 2 and 3. These contacts will make on airflow proven and allow the heater to run. If these contacts open the heater will shut off and Air Fail will be appear on the display. The volt free fan fault contacts will make.

VOLT FREE CONTACTS



Two sets of volt free contacts are available, these can be used for individual monitoring of faults or for a common fault. When the jumper is set to INDY the VF Heat Fault contacts will make when there is an over heat fault present, the VF Fan Fault contacts will make when the Air flow switch contacts are open. When the jumper is set to COM both sets of fault contacts will make in both fault conditions.



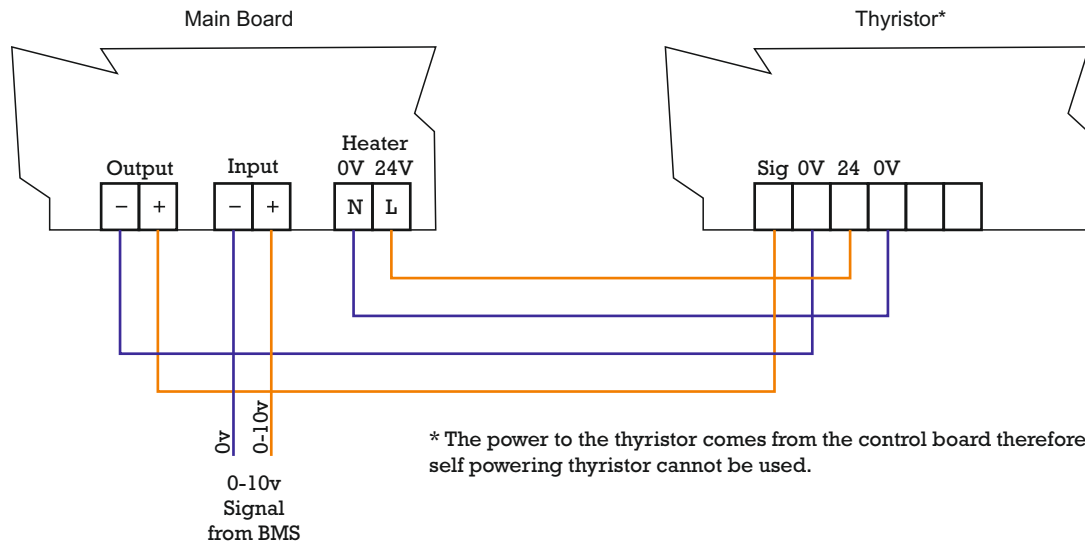
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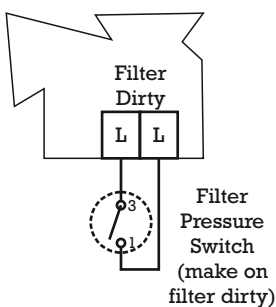
THYRISTOR CONTROL FOR BMS HEATER

CONNECTIONS

HEATER CONTROL CONNECTIONS

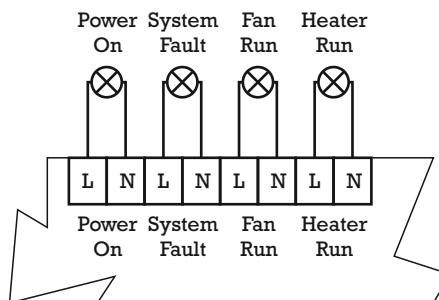


FILTER DIRTY



These contacts are to be connected to the filter pressure switch, terminals 1 and 3. These contacts will make on filter dirty. If these contacts close Filter Dirty will be appear on the display.

INDICATOR LIGHTS



There is an option to fit indicator lights to the unit these are for Power On, System Fault, Fan Run and Heater Run, these are all 230v output and should only be used for indicator lights.

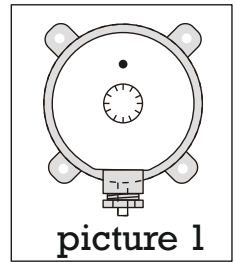
The information provided in the literature is believed to be accurate (subject to change without notice). However, use of the information shall be entirely at the user's own risk



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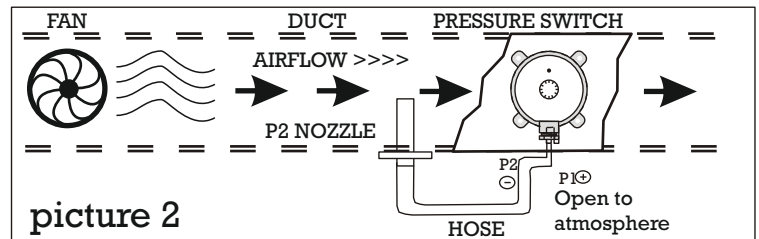
AIRFLOW PRESSURE SWITCH INSTALLATION INSTRUCTIONS

1) The pressure switch should be mounted on a vertical plane with the nozzles pointing down. The surface should be clean, dry and flat (see picture 1).



2) Remove the plastic cover from nozzle P2 of the pressure switch, both nozzles are now uncovered.

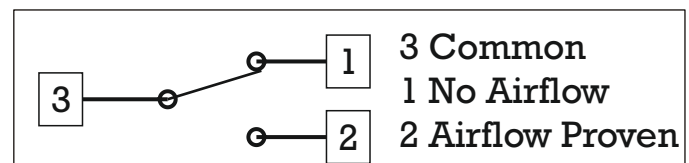
3) Mount the nozzle where the best positive air pressure can be monitored, keep away from the fan to prevent turbulence (see picture 2).



4) Connect the plastic tube between the fitted nozzle and P2 of the pressure switch, ensure tube is free from kinks and if tighten down this is not done too tightly so tube is not distorted.

5) Check continuity between terminals 3 and 1 of the pressure switch using a multi meter when there is no airflow in the system.

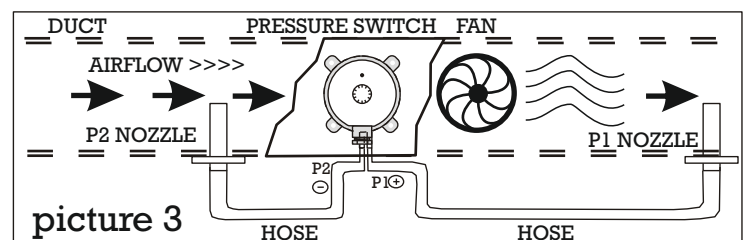
6) Start the fan and check terminals 3 and 1 again, adjust set point of the pressure switch until switch contacts break. If contacts don't break during adjustment reposition nozzle to monitor a greater pressure.



7) With the fan still running and continuity broken between terminals 3 and 1, check for continuity between 3 and 2, these contacts should be made.

8) Switch the fan off and check continuity between terminals 3 and 2, there should be no continuity.

9) In some cases where a proper switch operation can not be obtained it is necessary to fit a nozzle to the negative side of the duct as well as the positive side.



Connect an additional hose to P1 of the pressure switch and fit a second nozzle as shown in picture 3. P2 connected to inlet of the fan and P1 connected to the outlet of the fan.

10) Wiring for airflow proving switch use terminals 3 and 2.

Wiring for filter dirty or airflow fail use terminals 3 and 1.

11) Replace cover to the pressure switch and fitted voltage labels if mains voltage is being switched.

WARNING : SWITCH OFF POWER BEFORE REMOVING PLASTIC COVER



ELECTRIC HEATER ELEMENTS

Controls

A suitable control system should be installed which must include a timer to keep the fan running for a period of 2 minutes after the heater has been switched off. This is incorporated within the control panel.

If a speed controller is being fitted, it **MUST NOT** allow the fan to be turned off independently of the control, nor must it allow the airflow volume to FALL BELOW that stated on the heater nameplate.

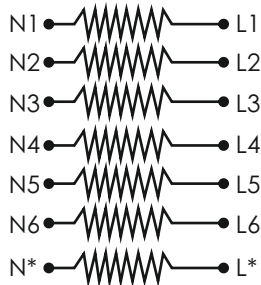
Testing

Elements should be tested prior to connecting.

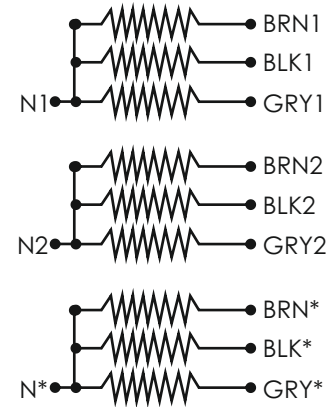
Elements stored in damp conditions may require drying out to achieve the correct insulation levels. Contact the supplier in case of any uncertainty.

Connection details

ELECTRIC HEATERS MUST BE WIRED AND INSTALLED IN ACCORDANCE WITH THE FOLLOWING DIAGRAMS AND INSTRUCTIONS.

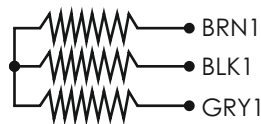


Where * = any number of additional steps



- 1, The electrical supply to the heater should be either 1phase or 3phase (with separate neutral), refer to nameplate for clarification.
- 2, Electrical cables should be of a high temperature, insulated type (i.e. Silicone rubber or fibreglass) and be installed in accordance with current IEE regulations.
- 3, The heater should be fitted with a manual reset, thermal overload which will break the contacts when the duct temperature exceeds 130°, this should be wired in series with an airflow switch and the operating coil of the heater control circuit.
- 4, Ensure a suitable earth connection is made to the terminal provided.
- 5 The element studs are fitted with terminal pillars and care should be taken not to over tighten and cause damage to the elements.
- 6, Always fit an isolator for maintenance of the heater.

IMPORTANT: 3PHASE THYRISTOR CONTROLLED HEATER DOES NOT REQUIRE A NEUTRAL CABLE TO BE FITTED.



IF IN DOUBT ASK ADVICE FROM YOUR HEATER SUPPLIER

