INSTRUCTIONS FOR:-
ESP2-36 MULTI HEATER CONTROL BOX
Model:- PC5-A

Thank you for purchasing a BN Thermic product. Manufactured to a high standard, this product will, if used according to these instructions and properly maintained, give you years of trouble free performance.

REGISTER: PLEASE REGISTER THIS PRODUCT ONLINE TO ACTIVATE YOUR GUARANTEE AT www.bnthermic.co.uk

IMPORTANT: PLEASE READ THESE INSTRUCTIONS, NOTE THE SAFE OPERATIONAL REQUIREMENTS, WARNINGS, AND CAUTIONS. USE THIS PRODUCT CORRECTLY, AND WITH CARE FOR THE PURPOSE FOR WHICH IT IS INTENDED. FAILURE TO DO SO MAY CAUSE DAMAGE AND/OR PERSONAL INJURY AND WILL INVALIDATE THE WARRANTY.

1. SAFETY INSTRUCTIONS

1.1 ELECTRICAL SAFETY

WARNING! It is the responsibility of the owner and the operator to read, understand and comply with the following:-

An electrician experienced and qualified in wiring appliances to 3 Phase power supplies MUST be used to connect this control box.

You must check all electrical products, before use, to ensure that they are safe. You must inspect power cables, plugs, sockets and any other connectors for wear or damage. You must ensure that the risk of electric shock is minimised by the installation of appropriate safety devices. A Residual Current Circuit Breaker (RCCB) should be incorporated in the main distribution board.

You must also read and understand the following instructions concerning electrical safety.

- The Health & Safety at Work Act 1974 makes owners of electrical appliances responsible for the safe condition of those appliances and the safety of the appliance operators. If in any doubt about electrical safety, contact a qualified electrician.
- Installation should always be carried out by a qualified electrician in accordance with current electrical regulation.
- Ensure that the cables are always protected against short circuit and overload.
- Regularly inspect the power supply cables for wear or damage and check all connections to ensure that none are loose.
- Important: Ensure that the voltage marked on the appliance matches the power supply to be used.
- DO NOT use worn or damaged cables or connectors. Immediately have any faulty item repaired or replaced by a qualified electrician.
- The unit should be protected by a suitably rated isolator and MCB's.
- This control box is only suitable for indoor use.

1.2 GENERAL SAFETY INSTRUCTIONS

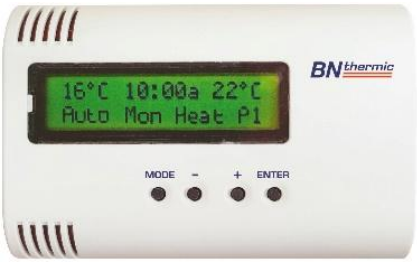
✓ Remove all packaging and store it away from children.

✓ Familiarise yourself with the applications and limitations of the controller.

X **DO NOT** use in areas where hazardous gasses or dusts may be present.

X **DO NOT** disassemble the control box for any reason. It must be checked by qualified personnel only.

X **DO NOT** use this control box to perform a task for which it has not been designed.



Control Switch– PC-C1
(1 required per system)

Remote Sensor – CXS
(Optional extra)

2. INTRODUCTION & SPECIFICATION

Each PC5-A control box provides output control for ESP2-36 radiant cassette heaters from a single point. This approach allows the heating of the building to be adjusted by means of a simple wall-mounted controller, enhancing comfort and improving economy. It incorporates “soft start” which reduces shock loads on the power supply. Each control box can operate a maximum of 6 heaters but by using additional PC5-A control boxes, linked together, the number of heaters controlled from a single point is almost endless. All control connections are made by Cat5 cable for super-quick and error-free installation. Frost thermostats can easily be added to make this controller fully compatible with your exact requirements. Each system requires one controller, stock code: - PC-C1.

Applications

Typical applications include Community halls, Showrooms, Sports halls, Food halls and Squash courts.

Model No	PC5-A
Input Supply	380-415V 50Hz AC 3 Phase + Neutral & Earth
Maximum Power (using 6 x ESP2-36 Heaters)	@400V 21.6kW 94A (7.2kW 32A per Phase) @415V 23.5kW 98A (7.84kW 32.7A per Phase)
Dimensions (W x H x D)	310 x 350 x 80mm
Max Mains Terminal Capacity	6.0mm²
Max Heater Terminal Capacity	4.0mm²
Fuse (each heater)	20A
Weight	3.9kg
Case Knockouts	1 x 32mm, 4 x 25mm, 24 x 20mm
Optional Frost Thermostat Code	FST-RS (Can be set between -12°C and +26°C) or RST3-IN (Can be set as low as 5°C)
Cat5 Cables	Available from BN Thermic, stock codes:- 5M – DX05, 10M – DX10 and 20M – DX20

3. INSTALLATION

Mechanical Fixing

Please note the following when positioning your control box.

a) To allow a good airflow a gap of 25mm MUST be left between the left or right side and any object e.g. a wall or other electrical enclosure.

b) If mounting two or more control boxes side by side leave a minimum air gap of 50mm between them

Do NOT use power tools to undo or do up electrical terminal screws or the front cover screws.

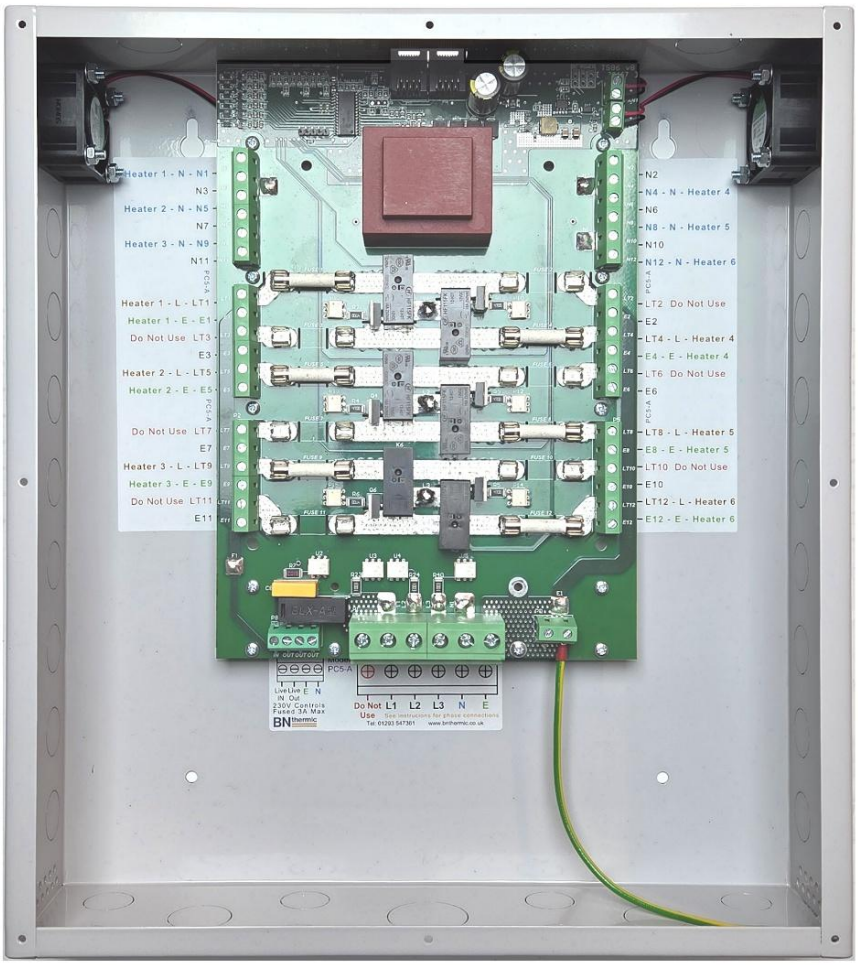
1) Remove the front cover, taking care to disconnect the earth wire connected to the inside.

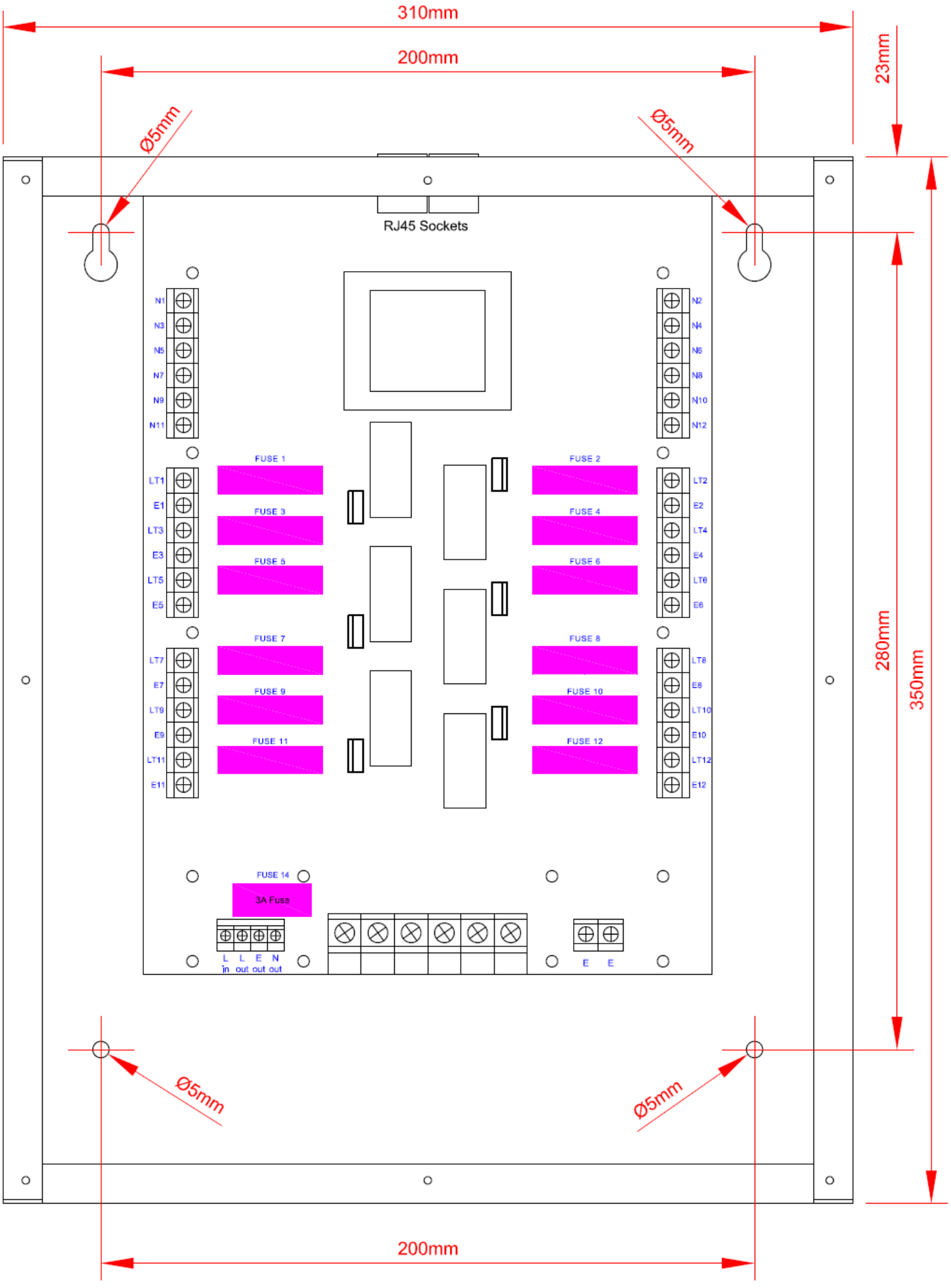
2) Carefully remove any knockouts where you require holes. Knockouts are either 20mm, 25mm or 32mm dia.

3) Mount the control box using the 4 holes shown, away from any direct source of heat but ideally in the centre of the group of heaters being controlled by this box. By mounting in the centre, you can keep installation costs down by reducing the cable length required to each heater.

4) Once all the heaters are connected to the box, replace the front cover making sure the earth cable is first attached.

5) Secure the cover using all 8 screws.




310mm
200mm
23mm
Ø5mm
Ø5mm
RJ45 Sockets
N1
N3
N5
N7
N9
N11
N2
N4
N6
N8
N10
N12
FUSE 1
FUSE 2
FUSE 3
FUSE 4
FUSE 5
FUSE 6
FUSE 7
FUSE 8
FUSE 9
FUSE 10
FUSE 11
FUSE 12
LT1
E1
LT3
E3
LT5
E5
LT2
E2
LT4
E4
LT6
E6
LT7
E7
LT9
E9
LT11
E11
LT8
E8
LT10
E10
LT12
E12
FUSE 14
3A Fuse
L L E N
in out out out
E E
280mm
350mm
Ø5mm
Ø5mm
200mm

4. ELECTRICAL CONNECTIONS

ISOLATE MAINS SUPPLY BEFORE COMMENCING ANY INSTALLATION WORK.

Please make sure you have read the safety instructions and that you are a suitably qualified electrician familiar with 3 phase wiring before continuing.
Drawings opposite show the connection of each heater to the PC5 control box and the mains cable connection.

ESP2-36 Heater Wiring

This Control box is only suitable for connecting ESP2-36 heaters to it. Each heater should be wired using a minimum of 2.5mm² 3 core cable as per "**Section 4"** and wired 230V Single phase using the heater instruction leaflet (Instruction leaflets are supplied with each individual heater). If you require very long lengths of cable between heater and control box, check cable size using voltage loss calculations.

Connect Heater 1 terminal L – LT1, N – N1 and E – E1

Connect Heater 2 terminal L – LT5, N – N5 and E – E5

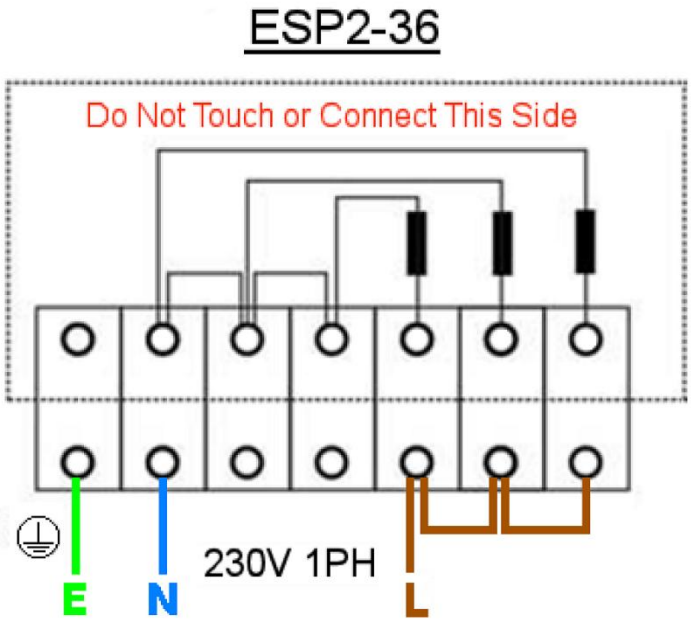
Connect Heater 3 terminal L – LT9, N – N9 and E – E9

Connect Heater 4 terminal L – LT4, N – N4 and E – E4

Connect Heater 5 terminal L – LT8, N – N8 and E – E8

Connect Heater 6 terminal L – LT12, N – N12 and E – E12

If you use fewer than 6 heaters connect in order 1,2,3 etc



ESP2-36 Heater Terminal Connection

Mains Cable Wiring

Total load of 6 x 3.6Kw ESP2-36 Heaters @ 400V is 21.6KW = 7.2kW per phase or 32A per phase.
Total load of 6 x 3.6Kw ESP2-36 Heaters @ 415V is 23.5kW =7.84kW per Phase or 32.7A per phase.

If using 3 x 3.6Kw ESP2-36 Heaters - Total load @ 415V is 11.75kW =3.92kW per Phase or 16.4A per phase.

Note: If using 4 or more ESP2-36 we recommend a 40A 3 Phase Breaker. If using 3 or less, we recommend a 20A 3 phase Breaker.

A) Using one or the first control box

Ensure you are using a suitable mains cable for the total load required.
Connect Phase 1 – L1
Connect Phase 2 – L2
Connect Phase 3 – L3
Connect Neutral – N
Connect Earth – E

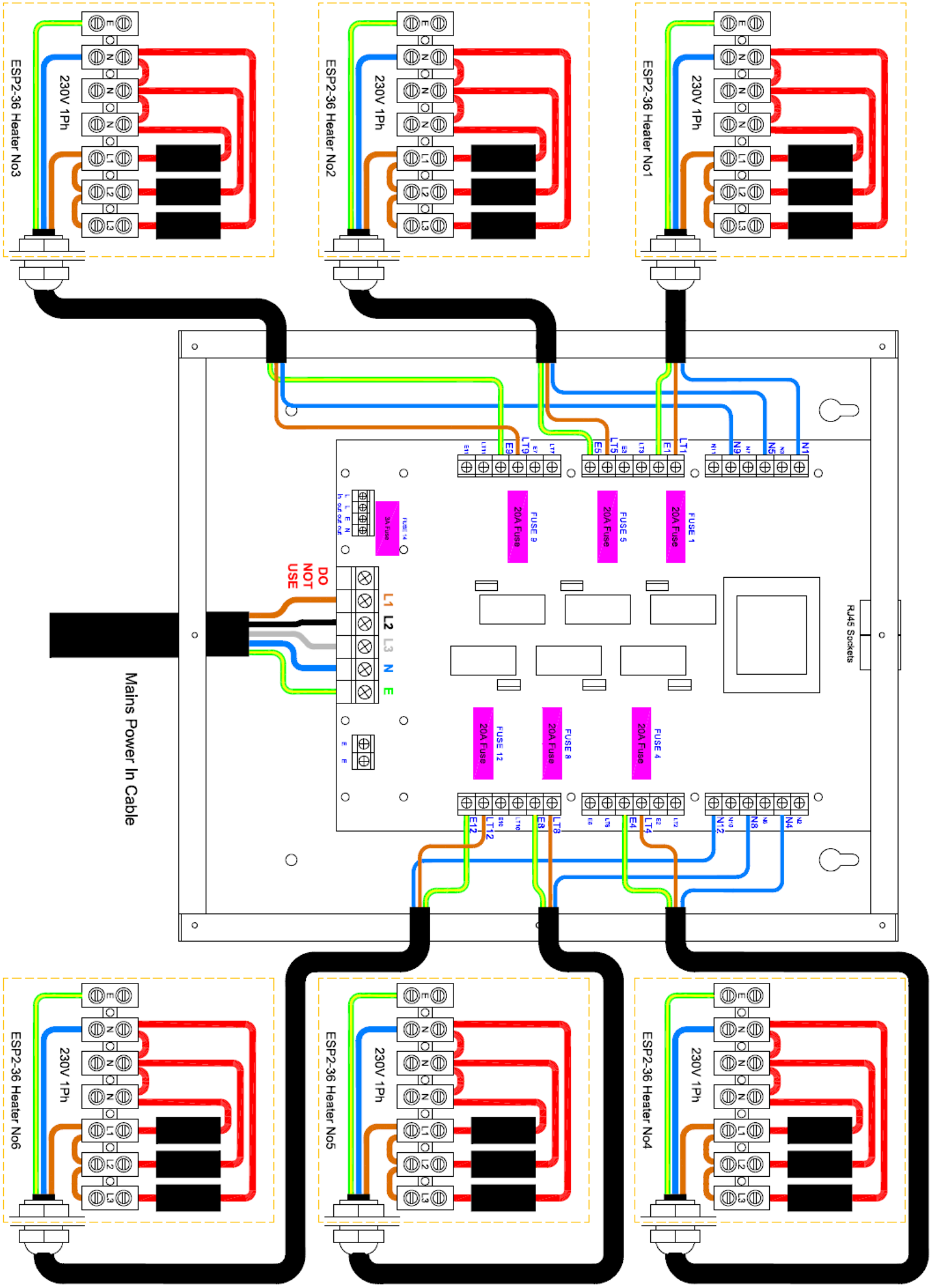
B) Using multi control boxes

Please follow the instructions for wiring multi control boxes on Page 6.
Failure to follow the instructions for multi control boxes will mean your system could be badly balanced across all 3 phases.

Network Cables

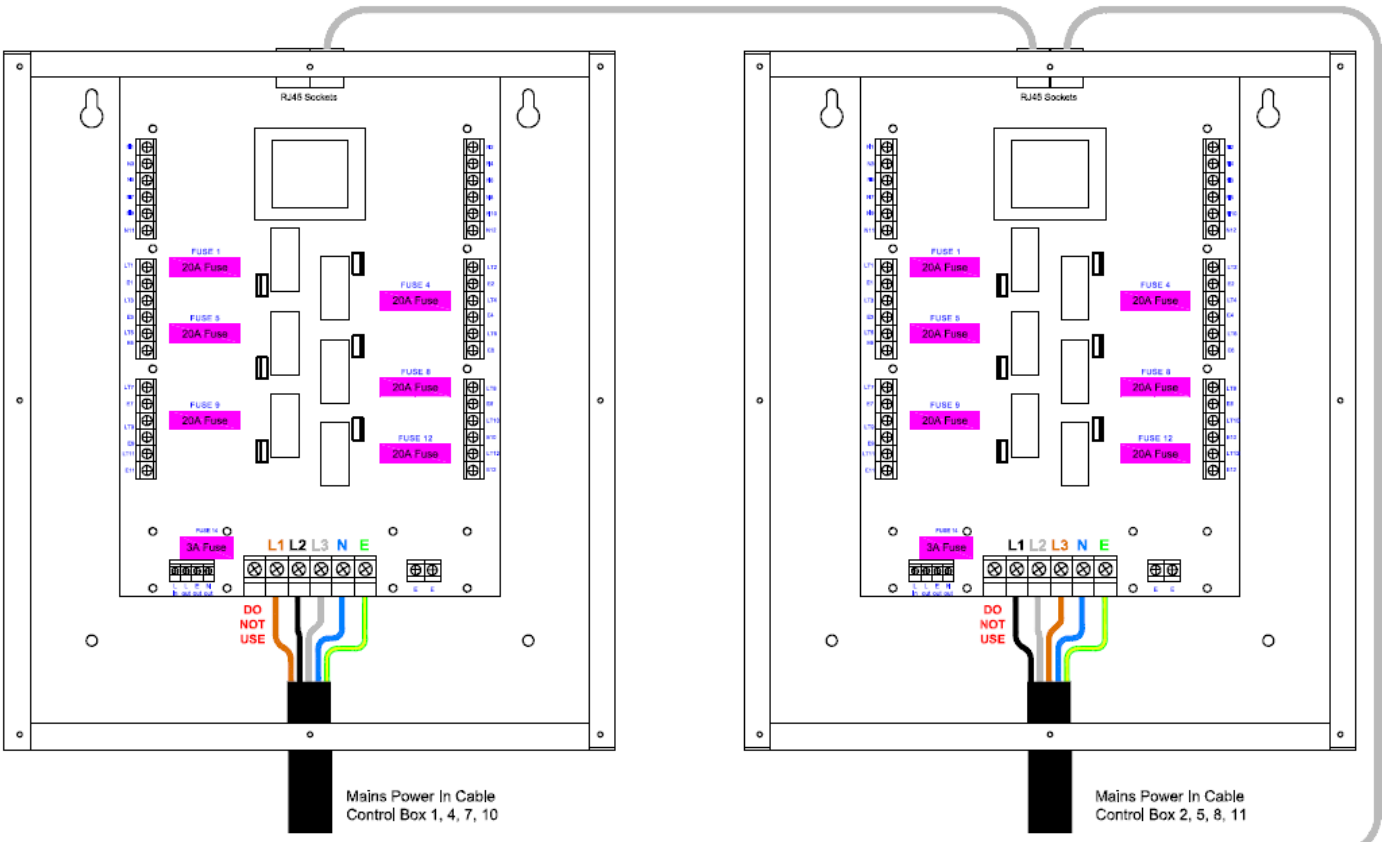
Network sockets on the control boxes are bi-directional. This means that either may be used for in or out. One socket has a plug already in place. This is solely to be used to stop objects falling into the socket if not being used. Remove if you require to use the socket. See section 6 to 9 for more information.

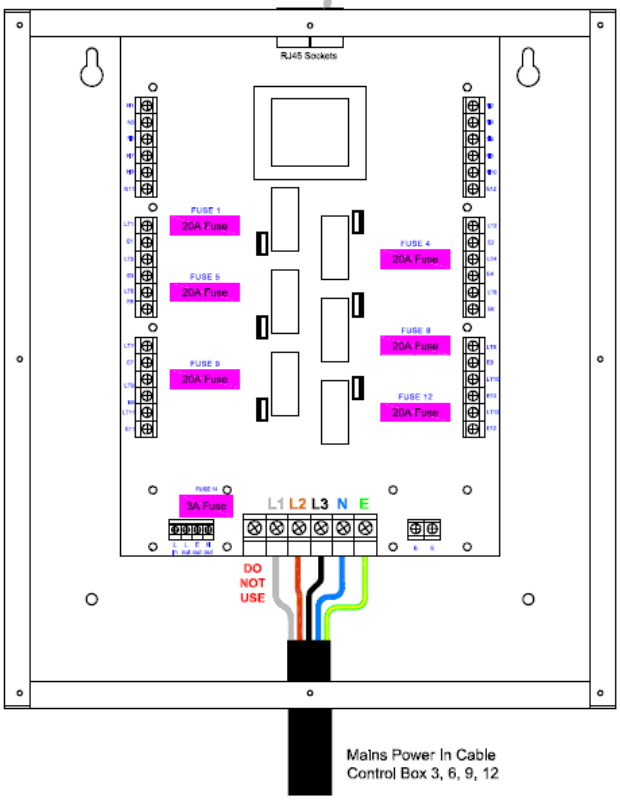
PLEASE CHECK ALL CONNECTIONS BEFORE TURNING ON AS INCORRECT WIRING IS NOT COVERED BY THE GUARANTEE


ESP2-36 Heater No1
ESP2-36 Heater No2
ESP2-36 Heater No3
ESP2-36 Heater No4
ESP2-36 Heater No5
ESP2-36 Heater No6
230V 1Ph
Mains Power In Cable
DO NOT USE
L1 L2 L3 N E
RJ45 Sockets
FUSE 1
FUSE 2
FUSE 3
FUSE 4
FUSE 5
FUSE 8
FUSE 12
20A Fuse
3A Fuse

5. USING MULTI CONTROL BOXES

If you are using more than one control box, please follow the wiring diagram below to help keep a balanced load on all phases.





Mains Power Connections

	Terminal L1	Terminal L2	Terminal L3
1st Control Box	**Phase 1**	**Phase 2**	**Phase 3**
2nd Control Box	**Phase 2**	**Phase 3**	**Phase 1**
3rd Control Box	**Phase 3**	**Phase 1**	**Phase 2**
4th Control Box	**Phase 1**	**Phase 2**	**Phase 3**
5th Control Box	**Phase 2**	**Phase 3**	**Phase 1**
6th Control Box	**Phase 3**	**Phase 1**	**Phase 2**
7th Control Box	**Phase 1**	**Phase 2**	**Phase 3**
8th Control Box	**Phase 2**	**Phase 3**	**Phase 1**
9th Control Box	**Phase 3**	**Phase 1**	**Phase 2**
10th Control Box	**Phase 1**	**Phase 2**	**Phase 3**
11th Control Box	**Phase 2**	**Phase 3**	**Phase 1**
12th Control Box	**Phase 3**	**Phase 1**	**Phase 2**

For each box also connect the following:-
Blue Wire (Neutral) to the N Terminal
Earth Wire (Yellow / Green) to the E Terminal

PLEASE CHECK ALL CONNECTIONS BEFORE TURNING ON AS INCORRECT WIRING IS NOT COVERED BY THE GUARANTEE

6. ADDING THE PC-C1 CONTROLLER

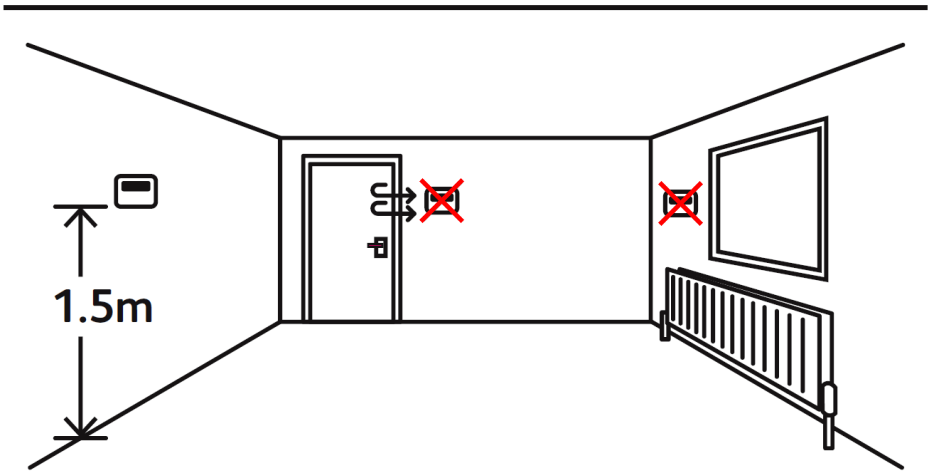
The PC-C1 Thermostat is an easy to install and use 7 Day, or 5/2 Day Programmable Room Thermostat which offers two, four or six time and temperature changes each day, with different programmes available for weekdays and for weekends. It is designed to provide automatic time and temperature control of multi heating control systems. All heaters follow suit. If you are using this wall controller with multi control boxes, you can turn the power off or isolate any control box and the remaining boxes will continue to operate without changing any of the control link cables. This is a design feature of the system.

7. LOCATION OF CONTROLLER

CHOOSING A LOCATION FOR YOUR PC-C1

The PC-C1 controller should be mounted on an internal wall approximately 1.5 meters from floor level and should be in a position away from draughts, direct heat and sunlight.

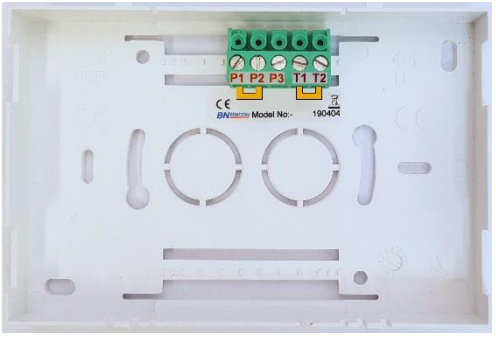
Ensure that there will be enough space on the left hand side of the controller to allow free air movement though the controller so it can detect the room temperature. If you wish to place the controller in a separate area such as an adjacent room or cupboard, a remote sensor will be required to detect the temperature. Remote sensor part number- CXS. Recommended maximum length of network cable between the controller and control box is 50 meters.



8. MOUNTING THE CONTROLLER.

To remove the back plate from the front of the controller gently push the bottom of the back plate whilst gently prising the front panel away. The bottom of the controller must be released from the back plate first before gently unclipping the top.
Screw to the wall ensuring the “UP arrows” are pointing the correct way and the green terminal block is at the top.

The PC-C1 can also be mounted on a single gang flush wiring box using the 2 x semi-circular slotted holes in the back. DO NOT overtighten the fixing screws as you will deform the box and the connection block in the back will not engage with the circuit board correctly.

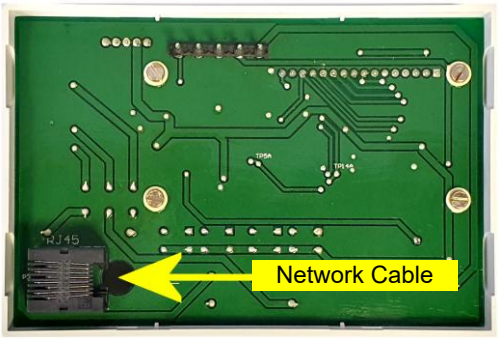


9. ELECTRICAL CONNECTIONS.

A network cable is used to connect the controller to any of the PC control boxes (read notes below regarding cables)

- We recommend you use our network cables as they have been thoroughly tested with all heaters and controllers and are 100% totally compatible.
- Problems arising from using non-standard or inferior network cables are not covered by the guarantee.
- Network cables with “wings” on the boot connections will not fit into the controller socket.

Bring sufficient length of network cable through one of the knockouts in the back plate to allow a lazy loop to be formed before plugging into the back of the circuit board. If you are not fitting additional sensors or linking the controller to a building management system (BMS) leave the links in the back plate in position.



<u>To refit the front panel to the back</u>

Locate the 2 holes on the top of the front cover onto the two lugs on the top of the back box. Now gently click the bottom of the front cover onto the back box. No force should be applied if the front cover does not fit easily the network cable is possibly caught, please check before trying again.

If you are not fitting an additional sensor or switches go to section 12.

10. USING A REMOTE SENSOR (CXS) WITH THE CONTROLLER.

1) Remove the existing link between P1 and P2.
2) DO NOT remove the link between T1 and T2.
3) Using any insulated copper wire connect the remote sensor to terminals P2 and P3.

11. USING WITH A BMS SYSTEM

The control system can be used in conjunction with a Zero Volt or 230V building management system (BMS). Please read section 17 and 18 of the PC-C1 Controller instructions where this is explained in more detail.

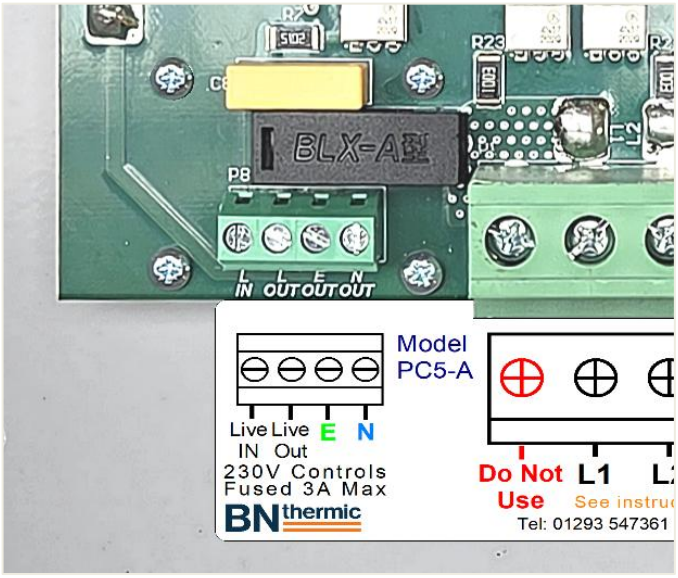
12. USING A FROST PROTECTION THERMOSTAT WITH THE CONTROLL BOX

You can add a frost thermostat to protect your building. This needs to be connected directly to a control box. With linked multi control box systems every control box can have its own frost thermostat connected to cover different areas of the building. Should any thermostat turn on, all control boxes will operate turning on all the heaters. Only when all frost thermostats turn off, will all the heaters turn off. Please note the frost thermostat will always override any other controller connected to the system.

Connecting a frost thermostat

Connect Live Out terminal on the circuit board to the common terminal on the frost thermostat (this is 230V and protected with a 3A fuse).

Connect the Live IN terminal on the circuit board to the terminal on the thermostat that becomes live when the temperature drops to the set point. If required, you can connect a neutral to the N terminal and earth to the E terminal on the circuit board.



13. TROUBLE SHOOTING AND SOLUTIONS

We recommend using a qualified electrician before attempting any fault finding – Please be aware that there is potentially 400V 3 phase supply inside the control box.

No Heaters working but the power is turned on – First check the thermostat is asking for heat, secondly if it is a new installation check the network cable between the thermostat and the control box. 85% of faults are caused by faulty self-assembly of network cables. We always recommend you purchase our factory made and tested network cables rather than making your own.

Single heater not working - Check the corresponding fuse in the control box. If it has failed replace with another 20A fuse.

Control Box is missing fuses – There should only be 6 x 20A fuses and 1 x 3A fuse used in this application. Fuse holder numbers 1, 4, 5, 8, 9 & 12 should be populated with a 20A (6.3 dia x 32mm long) fuse. Fuse holder number 14 populated with a 3A (5 dia x 20mm long) fuse. Fuse holders number 2, 3, 6, 7, 10 & 11 are not used.

NOTE: *It is our policy to continually improve products and as such we reserve the right to alter data, specifications and component parts without prior notice.*

WEEE REGULATIONS:
This appliance bears the symbol of the crossed waste bin. This indicates that, at the end of its useful life, it must not be disposed of as domestic waste but must be taken to a collection centre for waste electrical and electronic equipment. It is the user's responsibility to dispose of this appliance through the appropriate channels. Failure to do so may incur penalties established by laws governing waste disposal.

IMPORTANT: No liability is accepted for incorrect use of this product.

WARRANTY: Your BN Thermic product is guaranteed for one year from date of purchase. We will repair or replace at our discretion any part found to be defective. We cannot assume any consequential liability. This guarantee in no way prejudices your rights under common law and is offered as an addition to consumer liability rights.

REGISTER: Activate your warranty by registering online at www.bnthermic.co.uk and retain this installation data for future reference.

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