

CUBE



Installation And Operating Manual



Introduction

Thank you for purchasing this Cube controller.

Whilst the Cube has been designed to be as simple as possible to install and operate, please take your time to read this manual before using the unit for the first time.

As well as this manual and the Cube controller, the package should also include the mating plugs for connection to the application (unless we are supplying cables). This manual will cover the CUBE1, CUBE2 and high current version of the CUBE2.

Wiring Detail - Standard Model—For 15AX2 (Up-rated) Version, See Page 3

The wiring detail on this page is for the standard models rated at an overall maximum current of 15A. **NOTE: ALL TOOL END CONNECTORS MUST BE EARTHED**

The power cable fitted to the Cube controller is to be wired as shown in the diagram opposite.

We recommend wiring the cable to a plug with a maximum rating of 16A at 200Vac–250Vac.

The details for the wiring of the output connector is shown in the diagram opposite. Other connectors may be fitted to the rear of the controller at the customers request. These would be wired to the customers specification.

We recommend that the cable is also earthed using the earth terminal on the connector.

The wiring details for these connectors are also printed on the rear connector plate of the controller. **PLEASE ENSURE THAT THE CORRECT COMPENSATING CABLE IS USED FOR ALL THERMOCOUPLE CONNECTIONS.**

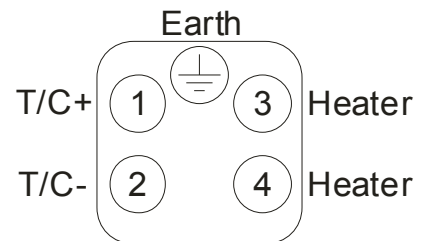
Earth: Green/Yellow



Blue: Neutral



Brown: Live



Rear Panel Detail

1 Power Cable Entry

Must be fitted to a fused supply of 15 Amps maximum.

2 Power Isolation Switch

Rated At 15 Amp Maximum

3 Input Protection Fuse/s

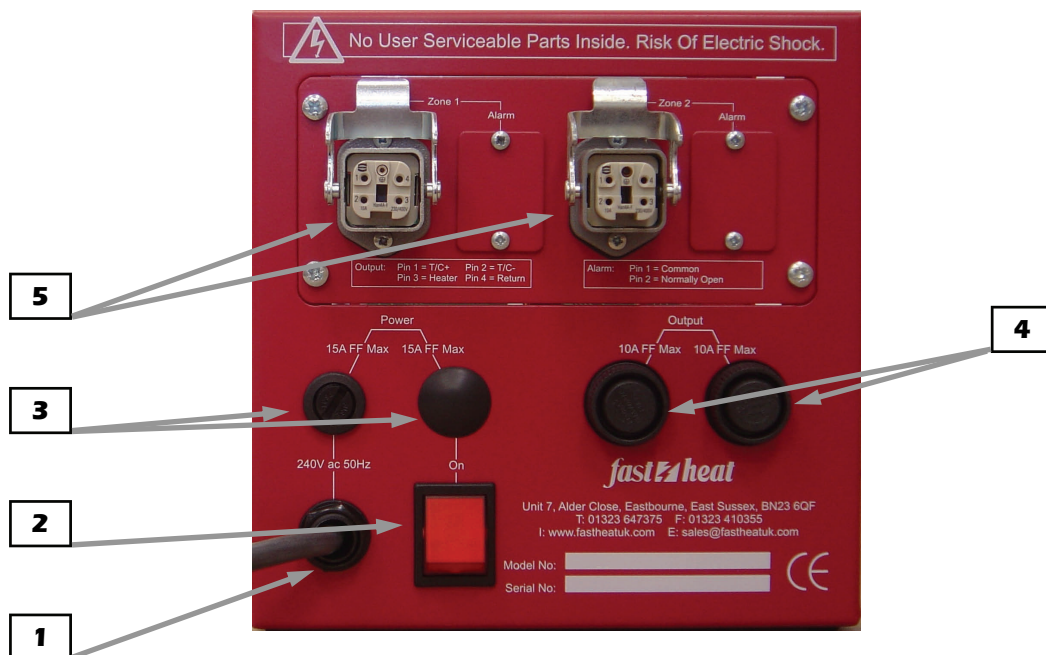
15 Amp Very Fast Blow (1 1/4"X1") type. (Single fusing on UK models)

4 Output Protection Fuses

2 X 10 Amp Ultra Rapid (10.3X38) type. (16A Maximum on 1 Zone Versions)

5 Output Connectors

Standard 5 Pin Haring Connectors (Various Connector Types Available)



Wiring Detail

The wiring detail on this page is for the up-rated models rated at an overall 30A or 15A per zone.

The power cable fitted to the Cube controller is to be wired as shown in the diagram opposite.

We recommend wiring the cable to a plug with a maximum rating of 32A at 200Vac–250Vac.

The details for the wiring of the load connector is shown in the diagram opposite.

We recommend that the load cable is also earthed using the earth terminal on the connector.

The power cable braid is earthed within the cable gland.

The wiring details for these connectors are also printed on the rear of the controller. **PLEASE ENSURE THAT THE CORRECT COMPENSATING CABLE IS USED FOR ALL THERMOCOUPLE CONNECTIONS.**

Earth: Green\Yellow



Neutral (2)



Live (1)



Rear Connector Wiring Detail

HBE 10 2Lever Panel Mount Base

HBE 10 Way Female Insert (16A)

1	HTR Zone 1	6
2(+)	TC Zone 1	(-)/7
3	HTR Zone 2	8
4(+)	TC Zone 2	(-)/9
5	NOT USED	10

Rear Panel Detail

1 Power Cable Entry

30A Braided 3 Core/Single Phase (Live-Neutral-Earth). Braid is earthed within gland.

2 Power Isolation Switch

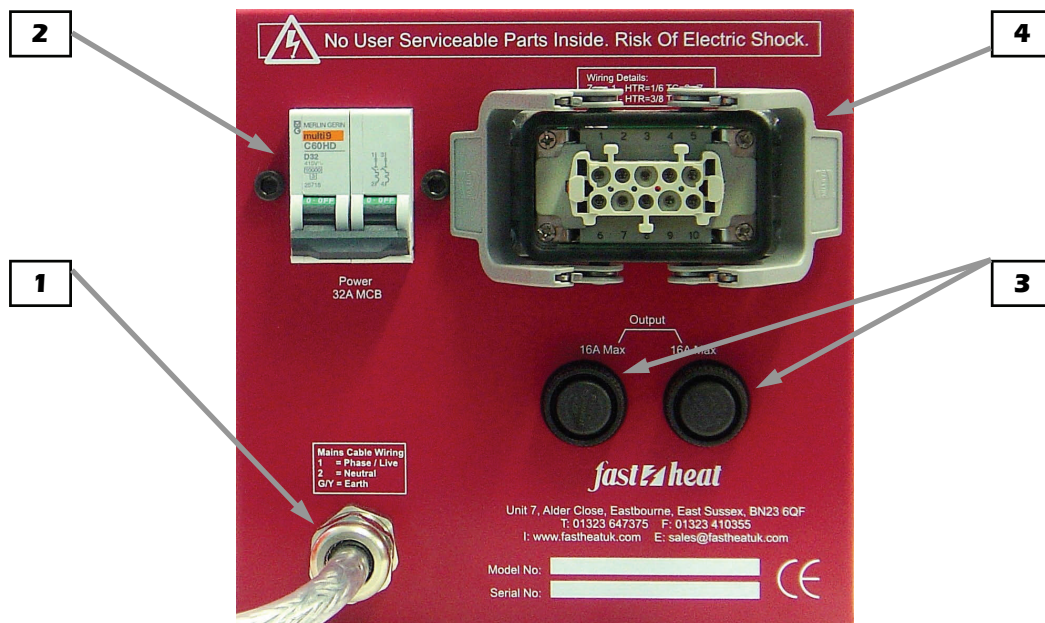
32 Amp 2 Pole MCB For Input Protection.

3 Output Protection Fuses

16 Amp Ultra Rapid (10.3X38) type. (Maximum Total Output Of 30A)

4 Output Connector

HBE 10, 2 Lever Panel Mount Base with HBE 10, 16A Female Insert.



Front Panel Details

ZONE 1

- | | | |
|----------|------------------------------------|---|
| 1 | Setpoint button | Press to select Automatic operation of Zone 1.
Red LED will be on to indicate Automatic mode of Zone 1.
Red LED will flash for 5 seconds to enable changes to parameter value. |
| 2 | Manual Power button | Press to select Manual operation of Zone 1.
Red LED will be on to indicate Manual mode of Zone 1.
Red LED will flash for 5 seconds to enable change to parameter value. |
| 3 | Temperature deviation meter | Green LED will illuminate when measured value is same as setpoint +/- 5 degrees.
Upper Red LED will illuminate when measured value is above setpoint by 6–15 degrees and will flash when the error is +15 degrees or more.
Lower Red LED will illuminate when measured value is below setpoint. By 6–15 degrees and will flash when the error is -15 degrees or more. |
| 4 | Thermocouple failure LED | LED will flash when thermocouple is open or reversed |
| 5 | Heater fuse failure LED | LED will extinguish when fuse has failed. |
| 6 | Output Power LED | Red LED will flash in proportion to amount of output power. |

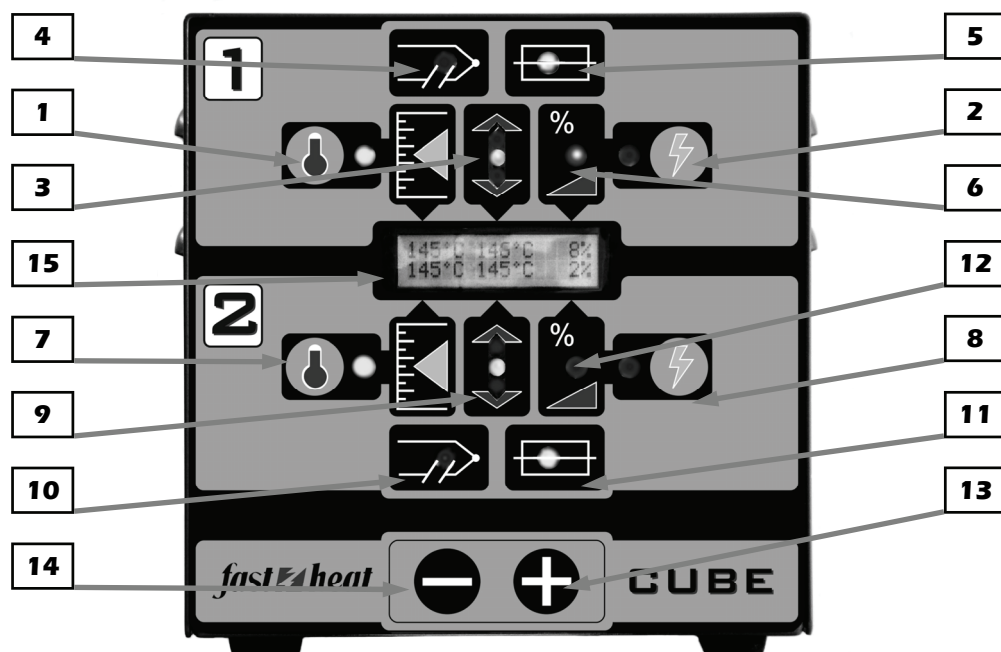
ZONE 2

NOT APPLICABLE TO CUBE 1 (SINGLE ZONE CUBE)

- | | | |
|-----------|------------------------------------|--|
| 7 | Setpoint button | Press to select Automatic operation of Zone 2.
Red LED will be on to indicate Automatic mode of Zone 2.
Red LED will flash for 5 seconds to enable changes to parameter value. |
| 8 | Manual Power button | Press to select Manual operation of Zone 2.
Red LED will be on to indicate Manual mode of Zone 2.
Red LED will flash for 5 seconds to enable change to parameter value. |
| 9 | Temperature deviation meter | Green LED will illuminate when the measured value is same as setpoint +/- 5 degrees.
The Upper Red LED will illuminate when measured value is above setpoint by 6–15 degrees and will flash when the error is +15 degrees or more.
Lower Red LED will illuminate when measured value is below setpoint by 6–15 degrees and will flash when the error is -15 degrees or more. |
| 10 | Thermocouple failure LED | LED will flash when thermocouple is open or reversed. |
| 11 | Heater fuse failure LED | LED will extinguish when fuse has failed. |
| 12 | Output Power LED | Red LED will flash in proportion to amount of output power. |

GENERAL OPERATION

- | | | |
|-----------|------------------------------|---|
| 13 | Increase value button | Will increase value of parameter indicated by flashing Red LED. This will also allow you to step through the configuration screens. |
| 14 | Decrease value button | Will decrease value of parameter indicated by flashing Red LED. |
| 15 | Parameter display | See pages 4 and 5 for further details. |

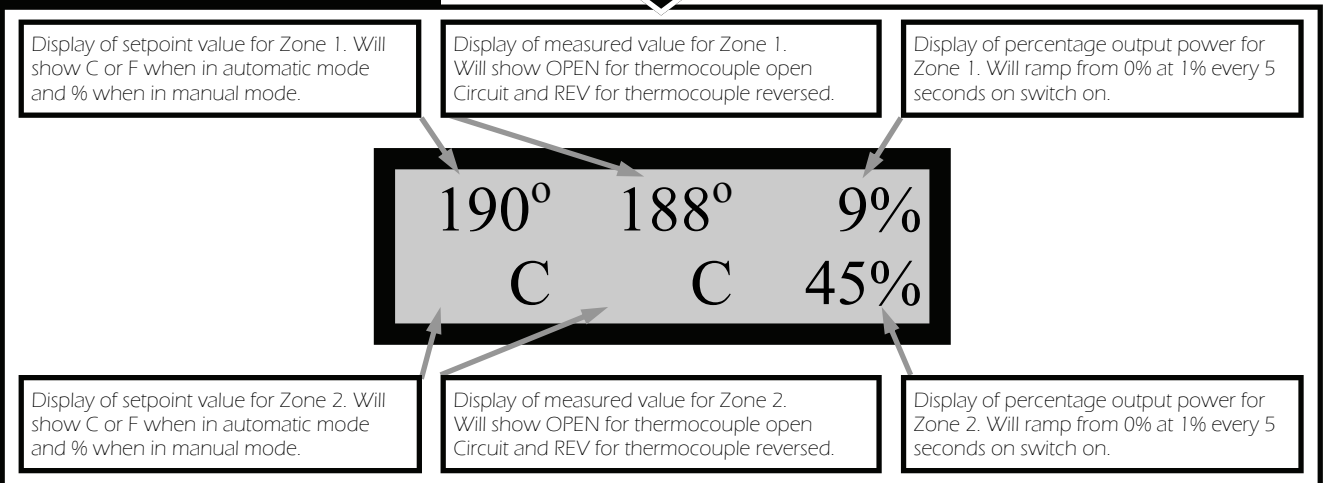


Normal Power On

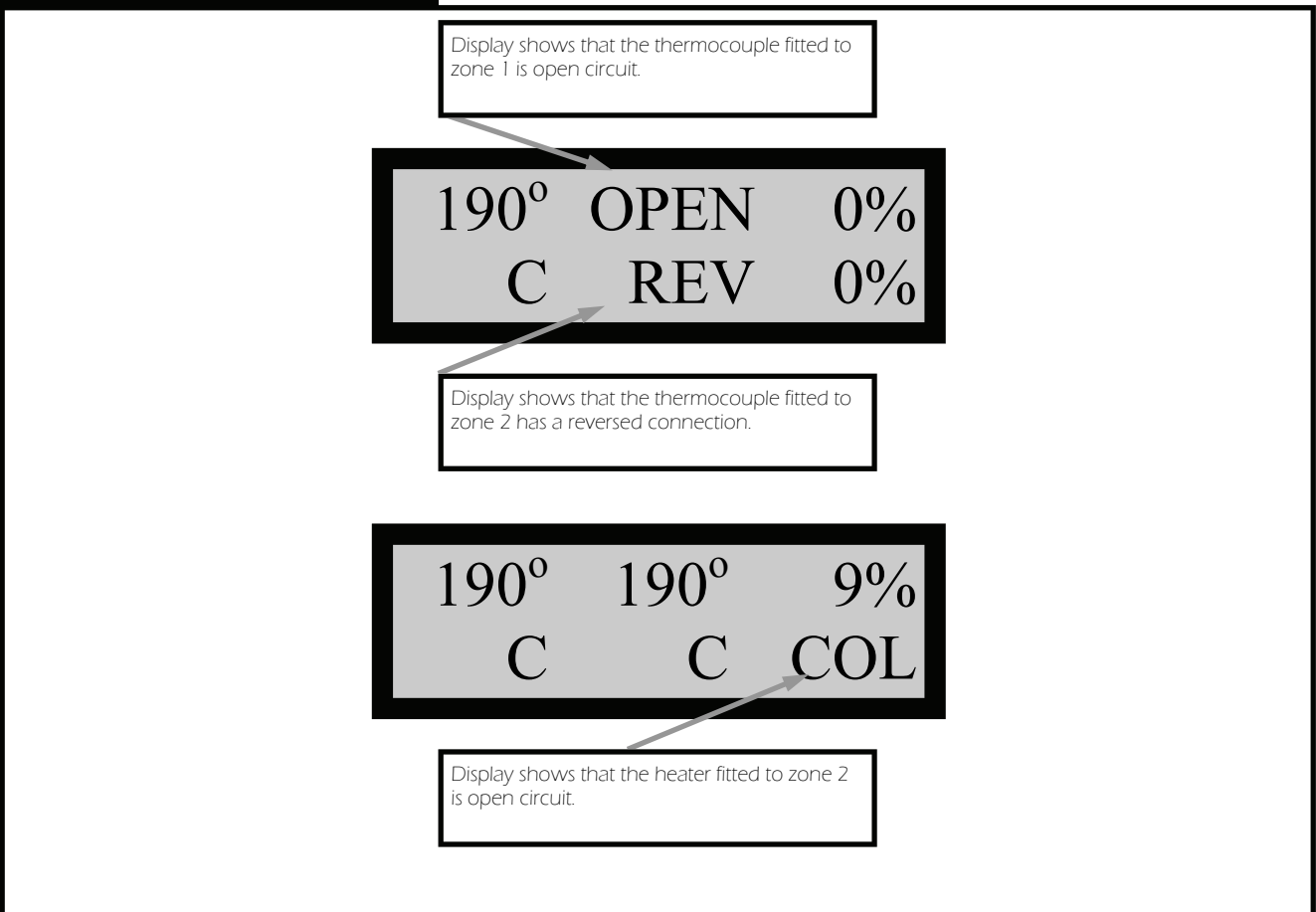
Power On Screen



Main Screen



Error Screen



Configuration

Power On Screen

This screen appears when the controller is switched on. You can also activate this screen by pressing the Zone 1 setpoint and manual buttons together. This will force the controller back to this screen and allow the user to enter the configuration screens without switching the controller off. Please note this will stop controlling until the main screen is selected.

FASTHEAT CUBE
V00.49A 26/10/05

Software version.

Date of release of software.

Configuration Screen 1

Type J thermocouple input currently selected.

Press Manual Power button 2 to select Type K thermocouple.

Press setpoint button 1 to select Type J thermocouple.

J< TC:J K
C< TYPE °F

To activate, press the + key once within 5 seconds of the Power On Screen appearing on the display.

Press setpoint button 7 to select Degrees C.

Degrees C display currently selected.

Press Manual Power button 8 to select degrees F.

Configuration Screen 2

When selecting Slow, Medium or Fast PID, use the following information for guidance only. Slow = High Wattage Load (Above 1000Watts), Medium Load = Average Wattage Load (600Watts-1000Watts), Fast = Low Wattage Load (Below 500Watts)

Press Manual Power button 2 to select either Manual, Slow Medium or Fast PID.

Press setpoint button 1 to select maximum output power %.

100% Max /U Fast
500° / PID L Man

To activate, press the + key once while the controller is in Configuration Screen 1 mode.

Press setpoint button 7 to select maximum setpoint temperature.

Press Manual Power button 8 to select either Manual, Slow Medium or Fast PID.

Configuration Screen 3

Press setpoint button 1 to change zone 1 control Band Width. (Only while in Manual (MAN) mode)

Upper Zone

Press Manual Power button 2 to change zone 1 PID Time Constant. (Only while in manual (MAN) mode)

16 B (U T 25
16 B MED) T 25

To activate, press the + key once while the controller is in Configuration Screen 2 mode.

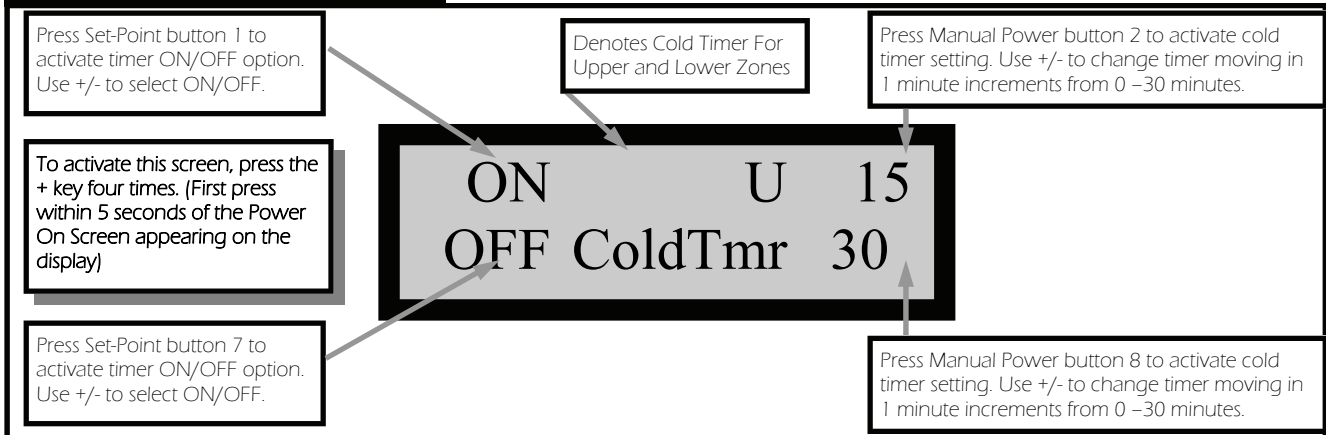
Press setpoint button 7 to change zone 2 control Band Width. (Only while in manual (MAN) mode)

Lower Zone

Press Manual Power button 8 to change zone 2 PID Time Constant. (Only while in manual (MAN) mode)

Configuration

Configuration Screen 4



Cold Timer Function

This function is used to determine whether or not the heater that is connected to the controller is Open Circuit. The term 'COLD' was used to identify a 'Heater Open' as the term 'OPEN' on this controller refers to the thermocouple circuit. This should assist in avoiding confusion.

The 'COLD' function works on a timer basis. When the controller is switched on, it immediately starts in a ramp mode, the temperature increasing at 1 Degree per 5 second intervals, until the controller either reaches 100% power or set-point, whichever is quickest. Once the ramp mode has finished, the 'COLD' timer starts. The timer can be set between 0 minutes and 30 minutes. If the controller does not see a reasonable increase in temperature, it will assume there is a heater open circuit, or 'COLD'.

If the load the Cube is trying to heat up is a large load, that would normally take a while to heat up, set the timer to 30 minutes. This should be enough time for the controller to recognise a sensible increase in temperature.

On smaller loads, the timer can be decreased accordingly.

The timer function can be set from 0 minutes to 30 minutes and time increases in 1 minute increments. This function can also be turned off.

General Notes and Fault Finding Tips

Erratic control after soft start has finished, or temperature unstable;

1. Ensure the correct *Thermocouple Compensating Cable* is being used. (J or K Type)
2. Ensure the correct thermocouple type is selected on the menu screen of the controller. (J or K Type)
3. Ensure that the thermocouple compensating cable is connected correctly. (Ensure *Positive* and *Negative* are not transposed).
4. Ensure that the thermocouple cable is connected to the terminals. (If accidentally connected to the Heater Output terminals, this will result in serious damage to the thermocouple input circuitry. This will therefore effect the thermocouple reading once the thermocouple is connected correctly). This will also void the warranty and require the unit to be returned to Fast Heat for repair.
5. If points 1 to 4 have been followed, then you may need to adjust the PID settings within the menu screen. The default setting for the automatic PID setting is 'FAST', so you may need to adjust this to either 'MEDIUM' or 'SLOW'. This will adjust the PID parameters and adjust the way the controller reacts to your specific application.

If the above points have been adhered to and you are sure that your tool/heater and/or thermocouple is/are working correctly then the unit may need to be returned Fast Heat for further inspection.

Technical Specification

Size (mm)	190 x 190 x 190	Number Of Zones	1 or 2
Weight (kg)	3.80	Thermocouple Error	Rev, Open (LED)
Power Consumption (VA)	<5	Heater Error	Fuse Failure LED, COLD
Operating voltage	230V	Soft Start Ramp Rate	1 degree C per 5 seconds
Isolation (Standard CUBE) (Up-rated CUBE)	15A 2 Pole Rocker Switch 32A 2 Pole MCB	Loop Update Time	100mS
Protection Input (Std Cube Only) Input (Up-rated Cube) Output (Std Cube Only) Output (Up-rated Cube)	15 A FF Fuses (FF) 32A 2 Pole MCB (Type D) 10A Ultra Rapid Fuses (GR) 16A Ultra Rapid Fuses (GR)	Input Type	J or K Thermocouple
Display	2 x 16 character, backlit LCD	Input Sensor Accuracy	<0.2%
Output Rating Zone 1 Standard Cube Up-rated Cube	230V at 10A 230V at 16A	Display Type	Degrees C or F
Output Rating Zone 2 Standard Cube Up-rated Cube	230V at 10A 230V at 16A	Control Type	Automatic / Manual
Maximum Total Load Standard Cube Up-rated Cube	15A 30A	CJC	< 1 Deg C

Warranty

Fast Heat guarantees its Hot Runner Temperature Control products to be free of defects in materials and workmanship. If a unit should malfunction, it must be returned to the factory for evaluation. Upon examination by Fast Heat, if the unit is found to be defective, it will be repaired or replaced, at our option, at no charge.

However, this warranty is void if the unit shows evidence of having been tampered with or has been abused, contaminated, improperly installed or misapplied. This warranty does not cover abnormal wear and tear on lead wires caused by resins, electrical or non-electrical accessories.

This warranty does not include electrical contact points and fuses.

Specific Warranty Periods: 1 year: Service, Parts and Labour 2 years: Parts Only

Liability

Fast Heat accepts no responsibility or liability for the APPLICATION by the customer of Hot Runner Temperature Controllers. The customer assumes this liability. Upon inspection, if our products meet our warranty requirements, the customer may be subject to a reasonable charge for troubleshooting, including travel.

There are no warranties, expressed or implied, for Hot Runner Temperature Controllers except as stated herein. In no event shall Fast Heat be liable for consequential, incidental, or special damages. The buyer's sole remedy for any breach of this agreement by Fast Heat shall not exceed the purchase price paid by the buyer to Fast Heat.

All product specifications are subject to change without notification.



Unit 7, Alder Close, Eastbourne, East Sussex, BN23 6QF

T: 01323 647375 F: 01323 410355 E: sales@fastheatuk.com I: www.fastheatuk.com

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