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# Instruction Manual

## Temperature Controller

### H3-3 Ramp

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### H3-3 Ramp Controller.

This controller has nine programs, each program has a delay start feature, first heating ramp time which is fully adjustable, first temperature which is fully settable, second heating ramp time which is fully adjustable, second temperature which is fully settable, third heating ramp which is automatically full power, soak, fully adjustable, automatic shut off.

## 1.Introduction

The H3 controls the whole firing cycle from delay start to soak and automatic shut down. There are nine programs, which can be individually adjusted.

Program data and values can be checked and altered if required every time and set into the program memory.

For easy handling the control unit is delivered with a mounting pocket. For programming, you can remove the controller from the pocket and replace it when programming is completed. The mounting pocket can be fixed to the side of the kiln or alternatively it can be wall mounted.

**IMPORTANT: Do not put the control unit on the top of the kiln at any time especially during firing.**

Every control unit H3 is thoroughly tested to ensure conformity to quality standards.

Our control units are also fitted with an over-temperature safety device which shuts off the power if the temperature exceeds the desired temperature by 20°C. Personal supervision of firing is preferable especially for the first few times of use.

If you have any problems please refer to the error list at the end of this manual.

If you are not able to solve the problem by yourself, please call CROMARTIE customer support – 01782 313947

## 2.First Firing

The control unit has a Harting plug for connection to the kiln. This plug is safe against wrong connection and it fits only in one position, ensure this is in place before attempting to fire.

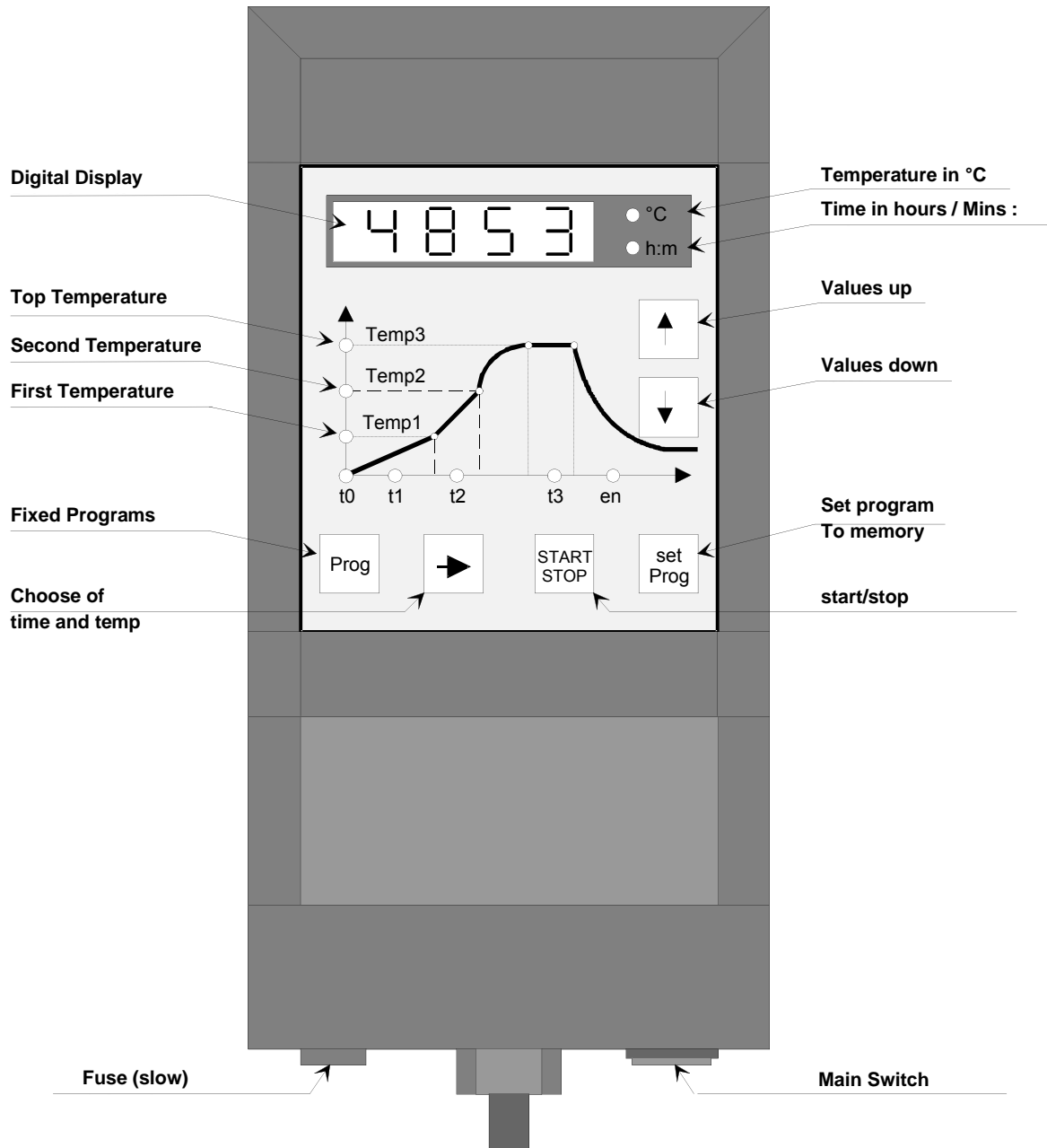
At the bottom side of the H3 you find the main switch, please switch control unit on and wait for the display, approximately 3 seconds. Now you can read the kiln temperature on the display and you are able to program the control unit.



**Note!**

**H3i Controllers as supplied with H45 Kilns are supplied “Hard Wired” to the kiln and therefore do not have a Harting plug.**

### 3.Description of the facia H3 Controller



#### 3.1 Using the programs

The control unit H3 has 9 programs selections. All these programs can be adjusted by the customer. On delivery, ONLY the Test Program on P9 remains in order for you to test fire the kiln (Note! program 9 is not intended for firing ware). P9 can also be altered to suit your requirements. We advise that you only input data for programs that you actually use, this will reduce the risk of over fire where a higher than required program is selected in error e.g. Stoneware for Earthenware.

The following buttons should be pressed to start a program.

button: **“Prog”**

button: **“↑ or ↓”**

press this switch until the required program number is displayed.

button: **“start/stop”**

press with a firm quick movement, a long, slow press could result in the program being turned on then put into pause mode with the same press.

Program will start.

Table of the programs: (here you can write in the data for your programs).

Program No.	1	2	3	4	5	6	7	8	9
TITLE									Test
Delay									0 Hr
Ramp									30 Mins
Temp 1									150°C
Ramp									30 Mins
Temp 2									300°C
Temp 3									1000°C
Soak									20 mins

### Description:

#### Note!

All time values are in hours and minutes.

Time 1: Delay time	(In Hours & Minutes).
Time 2: Ramp time	(In Hours & Minutes).
Temp 1: First set point	(In Degrees Centigrade - °C).
Time 3: Ramp time	(In Hours & Minutes).
Temp 2: First set point	(In Degrees Centigrade - °C).
Temp 3: Top temperature	(In Degrees Centigrade - °C).
Time 4: Soak time	(In Hours & Minutes).

### 3.2 In-putting or Altering a Program.

To put a new program in the controller or to change a program first turn on the power to the kiln and controller. The controller should light up and display the ambient temperature in the kiln.

Choosing the program number.

button “**Prog**” button. (All the LED’s flash) The controller will now display the program number.

Example “P= 1” will appear on the controller display.

button “↑ or ↓” buttons to change program number.

#### **Delay Start**

button “⇒” The controller is now asking you if you wish to set a delayed start. (The delay LED will flash)

Example “0” for no delay. “1.15” for a 1 hour 15 minute delay.

button “↑ or ↓” buttons to change delay time.

#### **1<sup>st</sup> Heating Ramp**

button “⇒” The controller is now asking you for the speed of the first heating ramp in hours and minutes. (The ramp LED will flash)

Example “4.30” (hours) for first heating ramp would equal 100°C / hour climb speed to the 1<sup>st</sup> Setpoint. (if this was 450°C)

button “↑ or ↓” buttons to change 1<sup>st</sup> Heating Ramp.

#### **1<sup>st</sup> Temperature Setpoint (Temp 1)**

button “⇒” The controller is now asking you for the first Setpoint Temperature. (The Temp 1 LED will flash)

Example “450” (First Setpoint Temperature in °C) The 1<sup>st</sup> Heating Ramp will apply up to the first Temperature setpoint.

#### **2<sup>nd</sup> Heating Ramp**

button “⇒” The controller is now asking you for the speed of the second heating ramp in hours and minutes. (The ramp LED will flash)

Example “4.30” (hours) for second heating ramp would equal 100°C / hour climb speed to the 2<sup>nd</sup> Setpoint. (if this was 900°C)

button “↑ or ↓” buttons to change 2<sup>nd</sup> Heating Ramp.

#### **2<sup>nd</sup> Temperature Setpoint (Temp 2)**

button “⇒” The controller is now asking you for the second Setpoint Temperature. (The Temp 2 LED will flash)

Example “900” (Second Setpoint Temperature in °C) The 2<sup>nd</sup> Heating Ramp will apply up to the second Temperature setpoint.

button “↑ or ↓” buttons to adjust Top Temperature Setpoint.

**(3rd<sup>nd</sup> Heating Ramp automatically is set to FULL power).**

#### **Top Temperature (Temp 3)**

- button “⇒” The controller is now asking you for the Kilns Top Temperature. (The Temp 2 LED will flash)  
Example “1010” (Top Temperature in °C).
- button “↑ or ↓” buttons to change Top Temperature Setpoint.  
**Hold Time (Soak)**
- button “⇒” The controller is now asking you if you wish to set a Soak time. (The soak LED will flash)  
Example “0” for no Soak. “.15” for a 15 minute Soak.
- button “↑ or ↓” buttons to change Soak time.  
**To store the above program into memory.**
- button “ **set Prog** ” button. SP=x (program number is displayed on controller for approximately 1 second). The above program has now been stored in the controllers memory.
- To Start the above program.
- button “ **start/stop** ” button.

**Important: The delay time cannot be stored in memory. And needs to be set for each firing.**

Note! If you wish to alter heating ramps and temperatures in a stored program for a one off firing this can be done before the program is started. Once the firing has been completed or the power to the controller has been switched off the program will revert back to the original stored program.

## 4.0 Controller Display

After you have pressed the start button, the controller will start the program.

### Delay

The first point is the delay time. If you have set a delay time the controller will count down to zero. On the display you will see the value of the delay time.

The controller starts the firing program as soon as the delay time reaches zero.

### 1<sup>st</sup> Ramp (The ramp LED is lit)

The firing process begins with the ramp time. The controller calculates the right heating power to bring the kiln slowly to the first set point during the ramp time.

When the ramp time reaches zero the kiln will be fired with full power.

### 2<sup>nd</sup> Ramp (The ramp LED is lit)

The firing process begins with the ramp time. The controller calculates the right heating power to bring the kiln slowly to the second set point during the ramp time. When the ramp time reaches zero the kiln will be fired with full power.

### 3<sup>rd</sup> Ramp (The Temp 2 LED is lit)

When the kiln temperature reaches the top temperature the control unit will start the soak time time.

### Soak (The soak LED is lit)

After the soak time the controller switches the kiln off and the kiln will cool down.

### End (The end LED is lit)

During the cooling down period after the soak the controller will show end.

### ***How to stop a Program Running***

Once a program has been started, it must be completed. If the “Start/Stop” button is pressed during the firing the controller will go into PAUSE mode which is indicated by all the LED’s on the front panel of the controller flashing.

To then stop the program all the program values currently stored must be reset to zero.

i.e. Delay 0

Ramp 0

Top Temperature 0

Soak 0

Press the “Start/Stop” button and the LED will go to end.

If you then switch the power OFF & ON without pressing the set Prog button the program will then go back to the original program that was last being fired prior to you changing the values to zero.

**NOTE! Simply switching off the power will not terminate the program it will resume when power is restored.**

The Kiln temperature will be displayed throughout the first or second ramp. By pressing “⇒” you can check how much time is left on the first ramp.

## 5.0 Error Messages

The control unit has a self-test feature and checks many of its functions by itself. If the control unit finds any mistake, the kiln will be switched off and the display shows a fault number:

### **Display: F1**

During the full power period, the controller checks the rise of the kiln temperature; it must be more than 1°C in 20 Minutes. If the kiln is too slow, the control unit shows F1.

Causes:

- heating element is faulty or wearing out.
- with 3 Phase Systems: one Phase is missing.
- Thermocouple has a short circuit or not protruding fully into the chamber.
- door or lid switch not closed.

### **Display: F2**

If the heating time with full power is longer than 18 hours the kiln will be switched off and the display shows F2.

Causes:

- Heating element is faulty or wearing out.
- with three Phase Systems: one Phase is missing.

### **Display: F3**

If the measurement from the thermocouple is too high, the controller shows F3.

Causes:

- Thermocouple faulty.
- Wire to thermocouple faulty.

### **Display: F4**

If the measurement from the thermocouple is negative the controller shows F4 and the controller will not operate.

Causes:

- Thermocouple wrongly connected.
- Wire to thermocouple wrongly connected.
- Temperature below 0°C (Warm thermocouple)

In cold weather the thermocouple may need to be warmed with a hairdryer or cigarette lighter to bring it to above 0°C

### **Display: F5 or F6**

Internal System Error.

Action –

Return to Cromartie.

### Display: F7

If the kiln temperature is 20°C higher than the top temperature programmed and takes longer than five minutes to correct itself the control unit will switch the kiln off and display F7.

Causes:

- relay / contactor in the kiln is faulty.

Power loss:

In case of a sudden power loss, the controller will store the current temperature. After the power has returned, the controller measures the current temperature, and compares it to the saved temperature. If these two temperatures differ from each other more than 20°C, the controller will abort the firing. If the difference is less than 20°C (In case of just a short loss of power) the firing will be continue as normal.

## 6.0 Technical Data

Power	200 / 250Volt 50 / 60Hz
Fuse	0,04 A T
Power consumption	2 VA
Output	2 Relays n.o. 230 V max. 4 A
Input	Thermocouple Type S (only) Pt10Rh / Pt
Accuracy of Full Scale	1 °C
Display	0,3 % +/- 1 Digit
Dimension	200mm x 100mm x 45 mm
Weight	0,6 kg
Ambient temperature	0 - 50 °C

6.1 Table: Technical Data of the H3 & H3i

wire No.	Harting 7D Pin-No.	Function
+ red	<b>3</b>	Thermocouple Platinum
-white	<b>4</b>	
<b>1</b>	<b>5</b>	Input L1
<b>2</b>	<b>2</b>	Input N
<b>3</b>	<b>6</b>	Output heating
<b>4</b>	<b>1</b>	Output N
<b>7</b>	<b>7</b>	Output safety relay