

## Dear Customer Purchaser,

The following booklet is set out specifically to assist you in becoming familiar with your new controller.

If you follow the steps and examples you should have little difficulty in understanding the unit.

However should a problem arise do not hesitate in contacting your local agent for assistance.

The unit has been carefully designed for ease of use and maximum reliability and should give you years of trouble free running.

Although each unit is carefully assembled and factory tested it is possible that a defective component may slip through, therefore in the event of a fault occurring you are protected during the initial period by the warranty set out in the booklet.

As an Australian manufacturer I personally feel that a good reputation is only acquired by producing quality products, which leads to satisfied customers.

**Manager,  
HARCO ELECTRONICS**

### WARNING

Please READ CAREFULLY the information in the manual prior to USING the controller so that you UNDERSTAND how to SET the unit CORRECTLY.

Failure to do so may result in DAMAGE to the KILN or it's CONTENTS.

**THE CONTROLLER SHOULD NOT BE LEFT UNATTENDED.**

## OPERATING INSTRUCTIONS FOR 5 STAGE ELECTRIC CONTROLLER

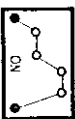
### SELECTING THE REQUIRED PROGRAM

There are 8 user settable PROGRAMS in the controller, which remain set even when the power is OFF (months).

Each PROGRAM contains 5 STAGES. (these are detailed below).

- Denotes ON or blinking
- Denotes OFF

Turn ON the power, then push and release **RESET**.



#### NOTE

During this section you may check the kiln temperature at any time by pushing and holding **TEMP**.

The PROGRAM NUMBER that was LAST SET [001] to [008] will be displayed.

To CHANGE the program number push **UP** or **DOWN**.

Push **ENTER** when the desired PROGRAM is selected.

The kiln temperature will appear in the display.

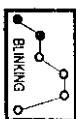
When ready push **CYCLE** to move on to STAGE 1.

### SETTING UP THE SELECTED PROGRAM (Stages 1 to 5)

#### STAGE 1. UP STAGE ONLY

Push and hold **TEMP** to read the TEMPERATURE setting.

On release of **TEMP** you may now change the setting by pushing **UP** or **DOWN**.



Enter the TEMPERATURE setting by pushing **ENTER** until the kiln temperature appears.

Push and hold **RATE/TIME** to read RATE setting.

On release of **RATE/TIME** you may now set the RATE by pushing **UP** or **DOWN**.

Enter the RATE setting by pushing **ENTER** until the kiln temperature appears.

**YOU MAY REPEAT THIS SECTION AS MANY TIMES AS YOU WISH**

Push **CYCLE** to go to stage 2.

**STAGE 2: SOAK/HOLD or UP STAGE ONLY**



Push and hold **[TEMP]** to read the TEMPERATURE setting.  
IF YOU HAVE JUST SET STAGE 1 TEMPERATURE THE SETTING OF STAGE 2 WILL HAVE BEEN SET TO THE SAME READING AS STAGE 1. THE TEMPERATURE SETTING MUST BE THE SAME AS STAGE 1 IF YOU WANT A SOAK/HOLD STAGE.

On release of **[TEMP]** you may now set the TEMPERATURE by pushing **[UP]** or **[DOWN]**.

(TEMPERATURE MUST BE THE SAME OR GREATER THAN STAGE 1.)

Enter the TEMPERATURE setting by pushing **[ENTER]** until the kiln temperature appears.

Push and hold **[RATE/TIME]** to read RATE or TIME setting.

If you have set temperature of this stage GREATER than STAGE 1 you are setting an UP STAGE = RATE. (degrees per hour)

If you have set the temperature of this stage the SAME as STAGE 1 you are setting a SOAK/HOLD STAGE = TIME. (minutes).

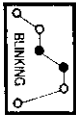
On release of **[RATE/TIME]** you may now set the RATE (UP STAGE) or TIME (SOAK/HOLD STAGE) by pushing **[UP]** or **[DOWN]**.

Enter the RATE or TIME setting by pushing **[ENTER]** until the kiln temperature appears.

YOU MAY REPEAT THIS SECTION AS MANY TIMES AS YOU WISH

Push **[CYCLE]** to go to STAGE 3.

**STAGE 3. UP STAGE ONLY**



Push and hold **[TEMP]** to read the TEMPERATURE setting.

On release of **[TEMP]** you may now change the setting by pushing **[UP]** or **[DOWN]**. (MUST BE GREATER THAN STAGE 2).

Enter the TEMPERATURE setting by pushing **[ENTER]** until the kiln temperature appears.

Push and hold **[RATE/TIME]** to read RATE setting.

On release of **[RATE/TIME]** you may now set the RATE by pushing **[UP]** or **[DOWN]**. Enter the RATE setting by pushing **[ENTER]** until the kiln temperature appears.

YOU MAY REPEAT THIS SECTION AS MANY TIMES AS YOU WISH

Push **[CYCLE]** to go to STAGE 4.

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**STAGE 4. SOAK/HOLD or UP STAGE ONLY**



Push and hold **[TEMP]** to read the TEMPERATURE setting.  
IF YOU HAVE JUST SET STAGE 3 THE TEMPERATURE SETTING OF THIS STAGE WILL HAVE BEEN SET TO THE SAME READING AS STAGE 3. THE TEMPERATURE SETTING MUST BE THE SAME AS STAGE 3 IF YOU WANT A SOAK/HOLD STAGE.

On release of **[TEMP]** you may now set the TEMPERATURE by pushing **[UP]** or **[DOWN]**.

(MUST BE THE SAME OR GREATER THAN STAGE 3.)

Enter the TEMPERATURE setting by pushing **[ENTER]** until the kiln temperature appears.

Push and hold **[RATE/TIME]** to read RATE or TIME setting.

If you have set temperature of this stage GREATER than stage 3 you are setting an UP STAGE = RATE. (degrees per hour).

If you have set the temperature of this STAGE the SAME as stage 3 you are setting a SOAK/HOLD stage = TIME. (minutes).

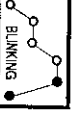
On release of **[RATE/TIME]** you may now set the RATE or TIME by pushing **[UP]** or **[DOWN]**.

Enter the RATE or TIME setting by pushing **[ENTER]** until the kiln temperature appears.

YOU MAY REPEAT THIS SECTION AS MANY TIMES AS YOU WISH

Push **[CYCLE]** to go to STAGE 5.

**STAGE 5. DOWN STAGE ONLY**



Push and hold **[TEMP]** to read the TEMPERATURE setting.

On release of **[TEMP]** you may now change the setting by pushing **[UP]** or **[DOWN]**. (must be LESS than STAGE 4).

Enter the TEMPERATURE setting by pushing **[ENTER]** until the kiln temperature appears.

Push and hold **[RATE/TIME]** to read the RATE setting.

On release of **[RATE/TIME]** you may now set the RATE by pushing **[UP]** or **[DOWN]**. Enter the RATE setting by pushing **[ENTER]** until the kiln temperature appears.

YOU MAY REPEAT THIS SECTION AS MANY TIMES AS YOU WISH

Push **[CYCLE]** to go to DELAY START TIME.

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The DELAY START TIME allows the user to set a time that must elapse before the controller will start.

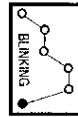
**EXAMPLE**

If it is now 7:00pm and you want the controller to start at 9:30pm, set the DELAY START TIME to the difference between the two times which is 150 minutes.

**DELAY START TIME (Minutes)**

Push and hold **RATE/TIME** to read TIME.

Will read **[000]** before being set.



On release of **RATE/TIME** you may now set the DELAY START TIME by pushing **UP** or **DOWN** (leave at **[000]** if not required.)

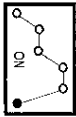
WHEN YOU HAVE SET THE TIME YOU REQUIRE YOU MAY GO ON.

Push and hold **CYCLE** for approximately 1 second.

**START UP**

The DELAY START TIME will appear in the display.

The CONTROL light will be OFF.



The controller will start the cycle when the TIME = **[000]**.

**ALARM STATE**

When the controller goes into an ALARM STATE:

- (a) All the stage lights will blink.
- (b) An audible BEEPER will sound.
- (c) The CONTROL POWER from the controller will be OFF.

**IMPORTANT**

THE ALARM STATE SIGNIFIES THAT SOMETHING IS WRONG WITH THE SYSTEM, NOT SOMETHING WRONG WITH THE CONTROLLER.

**WHEN CONTROLLER IS RUNNING**

You may check the settings of the stage you are on simply by pushing the required button. The stage lights will blink until button released. The controller is not interrupted.

You may CHECK or CHANGE all settings with controller running by pushing and releasing CYCLE and going to **SETTING UP THE SELECTED PROGRAM**.

The controller is not interrupted.

If the controller is in a SOAK STAGE pressing the RATE/TIME button will give you the TIME SET and then the reading will change to give you TIME GONE since entering the SOAK stage.

**SAFETY CHECKS**

During normal operation the controller checks:

- (1) for thermocouple failure.
- (2) that thermocouple is in the kiln or furnace.
- (3) for shorts in thermocouple compensation lead.
- (checks (2) & (3) done over a time depending on rate set;
- (4) checks for kiln reaching temperature.
- (5) for relay circuit failure. (which could cause BURNOUT)

STEPS (1), (2), (3) & (4) SOUND ALARM AND SHUT POWER OFF KILN.  
STEP (5) SOUNDS ALARM BUT IS UNABLE TO SHUT POWER OFF KILN.

**LOSS OF PROGRAMS**

If the unit is OFF for LONG periods of time (months) it is possible that programs may be lost due to low battery voltage.  
When using again replace your programs and leave ON for a couple of days to recharge the battery.

**THERMOCOUPLE**

HE388 K5	Use only	CHROMEL/ALUMEL	TYPE K
HE388 R5	Use only	PLATINUM/RHODIUM	• TYPE R
HE388 N5	Use only	NISIL/NICROSIL	TYPE N

The RED connector in the compensation lead is NEGATIVE.  
Check connection by HEATING the end of the THERMOCOUPLE.  
If READING DECREASES reverse the connections.

**EXAMPLES ONLY**  
*These are not programs to be used*

1. (a) You require the kiln to climb to a temperature of 600 deg C at a rate of 100 deg. per hour.  
 (b) Then climb to 1100 deg.C at a rate of 300 deg. per hour.  
 (c) TURN OFF.

**Procedure:**

Stage 1	Temperature	600	Rate	100
Stage 2	Already set to	600	Time	000
Stage 3	Temperature	1100	Rate	300
Stage 4	Already set to	1100	Time	000
Stage 5	Temperature	000	Rate	000

2. (a) You require the kiln to climb to a temperature of 1000 deg.C at a rate of 120 deg. per hour.  
 (b) Soak or Hold for 15 minutes.  
 (c) TURN OFF.

**Procedure:**

Stage 1	Temperature	1000	Rate	120
Stage 2	Already set to	1000	Time	015
Stage 3	Temperature	000	Rate	000
Stage 4	Already set to	000	Time	000
Stage 5	Temperature	000	Rate	000

3. (a) You require the kiln to go to a temperature of 600 deg.C at a rate of 90 deg. per hour.  
 (b) Then to a temperature of 1000 deg.C at a rate of 120 deg.C per hour.  
 (c) Then climb to 1180 deg.C. at a rate of 150 deg. per hour.  
 (d) Soak or Hold for 30 minutes.  
 (e) Then drop to 500 deg.C. at a rate of 50 deg. per hour.

**Procedure:**

Stage 1	Temperature	600	Rate	090
Stage 2	Temperature	1000	Rate	120
Stage 3	Temperature	1180	Rate	150
Stage 4	Already set to	1180	Time	030
Stage 5	Temperature	500	Rate	050

**POWER FAIL URE**  
 On return of power the controller will:  
 (1) Remain in the reset state.  
 (2) Power to the kiln off. (To protect kiln from possible BURNDOUT).

**DIRECT WIRING THE CONTROLLER**  
*(Using the kiln or furnace relay)*

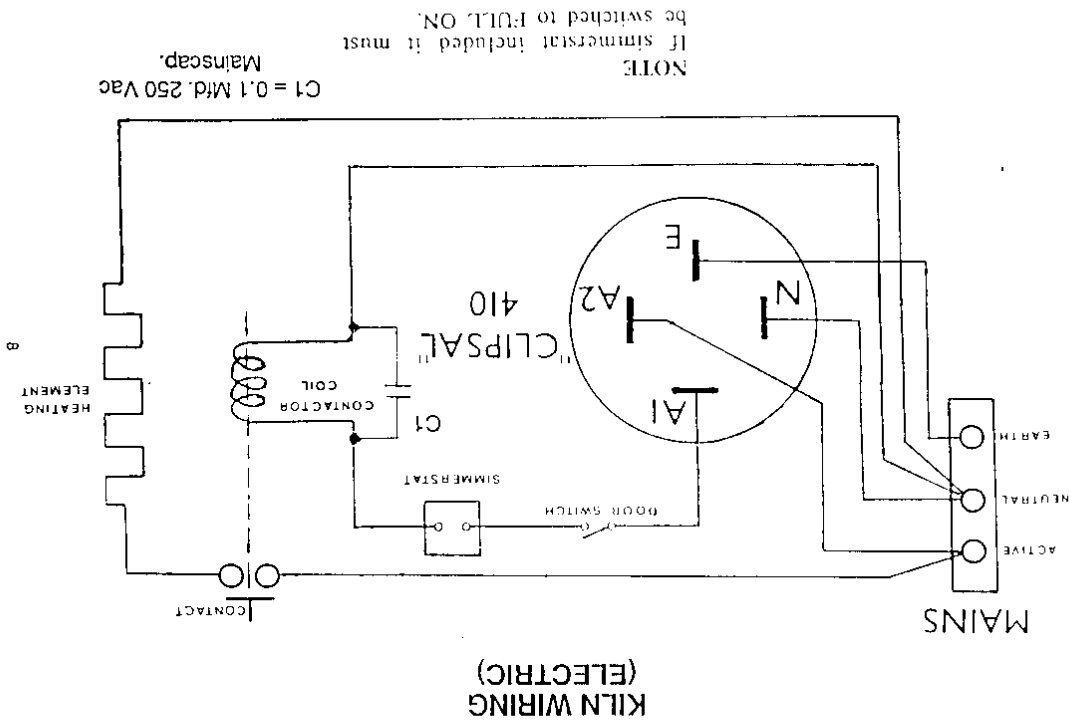
- (1) Mount 'CLIPSAL' 410 socket on kiln or furnace.
- (2) Connect ACTIVE (A2), NEUTRAL (N) & EARTH (E) to socket. (main supply for controller)
- (3) Disconnect controlled active line which goes to the kiln or furnace relay coil. (COIL MUST BE 240 VAC)  
 (Usually has a door switch and simmersat in series with relay coil. Disconnected on active side of these.)
- (4) Connect wire to (A1) (controlled active) on the socket.  
 THE CONTROLLER SHOULD BE READY TO BE PLUGGED IN.  
 The simmersat must be set to MAXIMUM.  
 THE CONTROLLED ACTIVE FROM CONTROLLER IS RATED AT 240 VOLTS A.C. at 5 AMPS MAXIMUM.

**MOST COMMON PROBLEMS**

- (1) ALARM SOUNDS WITHIN MINUTES. (of starting)  
 CHECK that CONTROL LIGHT is coming ON.  
 IF YES:  
 (a) CHECK that DOOR SWITCH is operating.  
 (b) LISTEN for KILN CONTACTOR closing.  
 (c) CHECK THERMOCOUPLE and CONNECTIONS to it.  
 NOT COMPLETING CYCLE. (not reaching SET TEMPERATURE.)  
 CHECK that CONTROL LIGHT IS ON.  
 IF YES:  
 (a) Possible HEATING ELEMENT FAILURE.  
 (b) DOOR SWITCH opening with heat.  
 (c) DISPLAY BLANK.
- (2) CHECK that lights on controller are ON.  
 IF YES:  
 (a) CHECK THERMOCOUPLE for open circuit.  
 (b) CHECK for bad connections to THERMOCOUPLE.  
 IF NO:  
 CHECK POWER TO CONTROLLER.
- (3) DISPLAY BLANK.

**UP or DOWN**

When pushing the UP or DOWN pushbutton, the reading changes slowly at first but increases its speed the longer the button is held. When the change is 100 counts from the original reading it will increment in 100s to allow fast changes. When you are close to the setting required release the pushbutton and press it again to slow down the rate of change.



## WARRANTY

(Applicable only to products marketed and used within the Commonwealth of Australia.) During the first period of ownership, ie. 6 months from the date of purchase as the original purchaser of the equipment, Harco Electronics guarantees that any part which we find defective on materials or workmanship will be repaired or replaced free of charge for the parts and service labour, provided that all service is performed by Harco Electronics or by an Authorised agent. If service is required at place of installation nominal service fee will be charged or the controller returned to Harco Electronics or Authorised agent **AT COST TO PURCHASER**. N.B. This protection is yours for **HOUSEHOLD USE** only. Commercial usage would restrict the warranty to ninety days from the date of purchase. Six months may apply to commercial usage if written approval is given by Harco Electronics. Naturally the warranty does not cover failure due to accidental damage, misuse, negligence, consequential damage, modification, or where the controller is not installed and operated in accordance with any statutory regulations, the appropriate installation code, or with details appearing on the controller rating plate. The warranty is valid wherever you live in Australia even if you move. For ready recognition of your warranty, record the date of purchase hereon and retain this for your record. Also retain proof of purchase as you may be asked to produce same in event of a service claim. This warranty is the sole guarantee by the manufacturers and they are not responsible for any other obligations assumed or expressed by any other person or persons.

No other remedy shall be available to the buyer (except the conditions contained in this warranty) for damage to kilns, ware or property, lost profits, or lost sales or any other consequential or accidental loss.

PURCHASER:.....

ADDRESS:.....

POSTCODE:..... TELEPHONE NUMBER:.....

EQUIPMENT:..... DATE OF PURCHASE:.....

SERIAL No. .... RETAILER:.....

Please look after your warranty. It is reassuring to know that you have its protection, even though you may never need it.