

OPERATING INSTRUCTIONS FOR 8 STAGE ELECTRIC CONTROLLERS

SELECTING THE REQUIRED PROGRAM

There are 8 user settable PROGRAMS in the controller, which remain set even when the power is OFF.
Each PROGRAM contains 8 STAGES. (these are detailed below).

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

NOTE The program light will be ON.

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 Harco number will appear in the display.



SELECTING A HARCO NUMBER

IF YOU DO NOT REQUIRE A NUMBER SET TO **[000]**.

Push **[UP]** or **[DOWN]** to select the number required.

(refer to HARCO NUMBER TABLES)

Push **[ENTER]** to go to stage 1.

SETTING UP THE SELECTED PROGRAM (Stages 1 to 8)

NOTE: Stage 1 is always an UP stage.

The STAGE NUMBER will appear **[1]** to **[8]**.

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.

The type of stage set will be indicated.

IF THE TEMPERATURE THAT HAS BEEN SET IS:

HIGHER than previous stage = UP STAGE SET

SAME as previous stage = SOAK/HOLD STAGE SET

LOWER than previous stage = DOWN STAGE SET

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

UP or DOWN stage = RATE (degrees per hour)

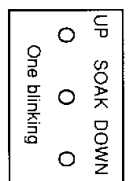
SOAK/HOLD stage = TIME (minutes)

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

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

Push and release **[CYCLE]**.

(The NEXT stage number will be displayed).
REPEAT THIS SECTION UNTIL YOU HAVE SET ALL THE STAGES THAT YOU REQUIRE.



WARNING: READ THIS

IF YOU HAVE SET ALL OF THE 8 STAGES, THE DELAY TIMER LIGHT WILL BE ON AND THE KILN TEMPERATURE WILL BE DISPLAYED.

IF YES — GO TO DELAY START TIME. IF NO — CONTINUE

Push and hold **[CYCLE]** until:

THE GREEN CYCLE OVER LIGHT APPEARS

or

THE RED DELAY TIMER LIGHT APPEARS

Push and hold **[ENTER]** until the TIMER light appears.

(not necessary if the TIMER LIGHT is already ON)

You may now set the DELAY START TIME if required.

If not required push and release **[CYCLE]** to start.

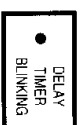
The DELAY START TIME allows the user to set a time that must elapse before the controller will start.

EXAMPLE

If it is now 7.00pm and you want the controller to start at 9.00pm, set the DELAY START TIME to the difference between the two times.

120 minutes. (For minute set mode)

2 hours. (For hour set mode)



DELAY START TIME

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 release **[CYCLE]** to start.

START UP

The DELAY START TIME will appear in the display.

The CONTROL light will be OFF.

The DELAY TIMER light will be ON.

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

During the CYCLE you may check:

CURRENT STAGE NUMBER — Push **[UP]**

TEMPERATURE SETTING — Push **TEMP**

RATE/TIME SETTING — Push **[RATE/TIME]**

AUTOSTART
IF THE PROGRAM YOU HAVE SELECTED HAS ALREADY BEEN SET UP, YOU MAY USE THE AUTOSTART PROCEDURE.

- (1) PUSH and release **RESET**.
- (2) Push **UP** or **DOWN** to select the desired program number [01] to [08].
- (3) Push and HOLD **ENTER** until the HARCO NUMBER appears and the BEEPER SOUNDS.

The controller will now AUTOMATICALLY run through the start up sequence and start.

IMPORTANT

THE SETTINGS WILL BE DISPLAYED WITH A BEEP TO ALLOW YOU TO CHECK THAT YOUR SETTINGS ARE CORRECT AS FOLLOWS.

- CHANGE TO STAGE 1 BEEP 11 RATE SETTING
- BEEP TEMPERATURE SETTING
- CHANGE TO STAGE 2 BEEP 12 RATE SETTING
- BEEP TEMPERATURE SETTING
- CHANGE TO STAGE 3 BEEP 13 RATE/TIME SETTING
- BEEP TEMPERATURE SETTING
- CHANGE TO STAGE 4 BEEP 14 RATE/TIME SETTING
- BEEP TEMPERATURE SETTING
- CHANGE TO STAGE 5 BEEP 15 RATE/TIME SETTING
- BEEP TEMPERATURE SETTING
- CHANGE TO STAGE 6 BEEP 16 RATE/TIME SETTING
- BEEP TEMPERATURE SETTING
- CHANGE TO STAGE 7 BEEP 17 RATE/TIME SETTING
- BEEP TEMPERATURE SETTING
- CHANGE TO STAGE 8 BEEP 18 RATE/TIME SETTING
- BEEP TEMPERATURE SETTING
- BEEP DELAY TIME [000] BEEP 19 RATE SETTING

THE CONTROLLER WILL NOW START.

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.

APPROXIMATE COMPARISONS FOR STARTING POINT.
HARCO NUMBERS TO CONES

As there is no reference that can use except temperatures for my table I have set up below an approximation to cone numbers.

This may be used as a starting point for trial runs to arrive at the correct number to use in your application.

HARCO NUMBER	CONE NUMBER	HARCO NUMBER	CONE NUMBER
30	022	66	04
32	021	68	03
34	020	70	02
36	019	72	01
38	018	74	1
40	017	76	2
42	016	78	3
44	015	80	4
46	014	82	5
48	013	84	6
50	012	86	7*
52	011	88	8
54	010	90	9
56	009	92	10
58	008	94	11
60	007	96	12
62	006	98	13
64	005	100	14

IMPORTANT
DO NOT ASSUME THAT THIS TABLE IS A DIRECT EQUIVALENT TO CONES.

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.
 - (4) checks for kiln reaching temperature.
 - (5) for contactor circuit failure eg. - jammed contactor (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. MAY RESULT IN BURNOUT - ALWAYS ATTEND KILN.

USING THE HARCO NUMBERS

IF YOU SET A HARCO NUMBER

Look up the approximate cone number in the HARCO tables and refer to the CONE TEMPERATURE in the cone suppliers table closest to the rate you are using.

ENTER A SOAK IN YOUR LAST STAGE at this temperature to be longer than the cut off by the HARCO number.

YOU MAY HAVE TO TRY A FEW TIMES TO GET IT RIGHT.

- (1) If the controller is CUT OFF by the HARCO number the CONE light will be BLINKING and the CYCLE OVER light will be OFF.
 - (2) If the controller is CUT OFF by the PROGRAM ENDING the CYCLE OVER light ONLY will be ON.
- In case (2) LENGTHEN YOUR SOAK TIME.

POWER FAILURE

On return of power the controller will:

- (1) Remain in the reset state if off for more than approx. 5 minutes.
- (2) Power to the kiln off. (To protect kiln from possible BURNOUT).
Otherwise the cycle will resume.

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.

ALARM STATE

When the controller goes into an ALARM STATE:

- (a) The alarm light 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.**

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THERMOCOUPLE

THE CONTROLLER IS MARKED AS BELOW:

	K	R	N	CHROMEL/ALUMEL	PLATINUM/RHODIUM	NISIL/NICROSIL	TYPE K	TYPE R	TYPE N
	Use only	Use only	Use only						

THE RED connector in the compensation lead is NEGATIVE.

Check connection by HEATING the end of the THERMOCOUPLE.
IF READING DECREASES reverse the connections.

DIRECT WIRING THE CONTROLLER

(Using the kiln or furnace contactor)

- (1) Mount "CLIPSALE" 410 socket on kiln or furnace.
- (2) Connect ACTIVE (A2), NEUTRAL (N) & EARTH (E) to socket.
(mains supply for controller)
- (3) Disconnect controlled active line which goes to the kiln or furnace contactor coil. (COIL MUST BE 240 VAC)
(Usually has a door switch and simmerstat in series with contactor coil.
Disconnect 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 simmerstat 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.
- (2) NOT COMPLETING CYCLE. (not reaching SET TEMPERATURE.)
CHECK that CONTROL LIGHT IS ON.

IF YES:

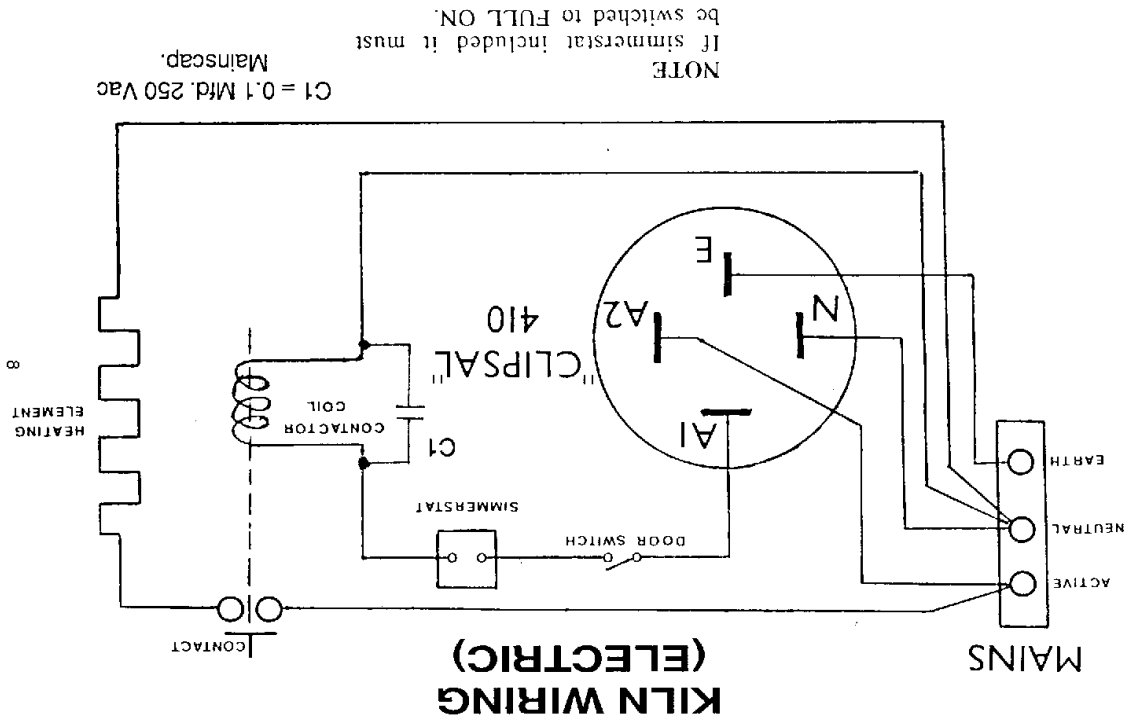
- (a) Possible HEATING ELEMENT FAILURE.
- (b) DOOR SWITCH opening with heat.
- (3) DISPLAY READING OVER 1400°C.
CHECK that lights on controller are ON.

IF YES:

- (a) CHECK THERMOCOUPLE for open circuit.
 - (b) CHECK for bad connections to THERMOCOUPLE or CONTROLLER
- IF DISPLAY BLANK AND NO LIGHTS:**
CHECK POWER TO CONTROLLER.

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NOTE
 If simmerstat included it must be switched to FULL ON.

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 charges will apply 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. 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.

Email: aakilns@gmail.com

Table of Orton pyrometric cones
 (The Edward Orton Jr Ceramic Foundation,
 Columbus, Ohio) *

Large cones; squating temperatures when heated at:				Large cones; squating temperatures when heated at:					
Cone no.	60°C/hr	108°F/hr	150°C/hr	270°F/hr	Cone no.	60°C/hr	108°F/hr	150°C/hr	270°F/hr
022	585	1085	600	1112	04	1050	1922	1060	1940
021	602	1116	614	1137	03	1086	1987	1101	2014
020	625	1157	635	1175	02	1101	2014	1120	2048
019	668	1234	683	1261	01	1117	2043	1137	2079
018	696	1285	717	1323	1	1136	2077	1154	2109
017	727	1341	747	1377	2	1142	2088	1162	2124
016	764	1407	792	1458	3	1152	2106	1168	2134
015	790	1454	804	1479	4	1168	2134	1186	2167
014	834	1533	838	1540	5	1177	2151	1196	2185
013	869	1596	852	1566	6	1201	2194	1222	2232
012	866	1591	884	1623	7	1215	2219	1240	2264
011	886	1627	894	1641	8	1236	2257	1263	2305
010	887	1629	894	1641	9	1260	2300	1280	2336
09	915	1679	923	1693	10	1285	2345	1305	2381
08	945	1733	955	1751	11	1294	2361	1315	2399
07	973	1783	984	1803	12	1306	2383	1326	2419
06	991	1816	999	1830	13	1321	2410	1346	2455
05	1031	1888	1046	1915	14	1388	2530	1366	2491