

Ney

*Vulcan 3-400HTA*


## Owner & Operator's Manual

<b>Model No</b>	<b>Voltage</b>
94-94-225	230V 50/60Hz

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## SAFETY



- Never operate furnace in close proximity to combustible materials or place materials on top of the furnace.
- Caution: To provide continued protection against risk of electric shock, connect to properly grounded outlet only.
- The furnace must be electrically grounded to a three wire electrical outlet or receptacle. The electrical service provided must be a dedicated line of the proper size according to local electrical codes.
- Disconnect the line cord before attempting to service the furnace.
- Do not attempt to service the furnace until you read and understand the service manual. (See Service Manual under Accessories on page 15)
- Do not operate the furnace controls with tongs or other tools; the tongs will damage the control switches.
- Do not use solvents or liquid cleaners on the control panel; they will enter the panel and damage it.
- Do not place firing trays or other hot objects directly in front of the furnace; they will melt the graphic overlay.
- Always verify that the power switch light is off before attempting to load or reach into the furnace chamber with any tools or instruments.
- As a routine working precaution, always wear safety glasses and protective gloves when operating, loading, and unloading the furnace.
-  If the furnace is not used in the manner as specified in this manual, the protection provided by the furnace may be impaired.

### OSHA AND CALIFORNIA PROPOSITION 65:

#### MUFFLE DUST EXPOSURE

In keeping with the policy of DENTSPLY Neytech to build safe products, comply with all National and State statutes and keep you, the valued customer informed; the services of a Certified Industrial Hygienist firm were employed to test and evaluate the lab operator's exposure to respirable refractory ceramic fiber (RCF) and cristobalite (a form of crystalline silica) present in the furnace muffle.

The findings of this test revealed that levels of exposure during the normal operation of this equipment, as outlined in the operator's manual, were far less than the Permissible Exposure Limit set by the Federal Government.

When it becomes necessary to replace the muffle, the person doing this work is recommended to wear a HEPA filter respirator and protective gloves as a precautionary matter.







Seal used muffle in a plastic bag and dispose of in accordance with local, state and Federal regulations.

Because this product and many similar products on the market today contain crystalline silica and ceramic fibers, it is necessary under the statutes of California Proposition 65 that Ney Dental International include the following statement:

*"This product contains substance(s) known to the State of California to cause cancer."*

Material Safety Data Sheets for RCF materials supplied upon request.

#### SYMBOL TABLE

 - Alternating current	Courant alternatif
 - On (Supply)	Marche (alimentation)
 - Off (Supply)	Arrêt (alimentation)
 - Caution, Hot Surface	Attention, surface chaude
 - Protective Conductor Terminal	Borne de masse, châssis
 - Caution	Attention

## FEATURES

- High Performance Quartz Tube heating elements
  - Longer life and more durable than fiber
  - Faster heating and faster cooling than firebrick
- Type R Platinum Thermocouple protected by quartz sheath
- Wide operating temperature range
  - 50°C (122°F) --- 1225°C (2237°F)
- Smooth, low force vertical lift door, with roll back action
  - Gives maximum access with minimum vertical space
- Programmable air exchange using preheated makeup air and Venturi exhaust (ASTM D3174).
- Programmable controller with 9 three stage programs (6 segments each) and 1 program with a single temperature hold
- Heavy duty construction with stainless steel front panel
- Delay Start operation that enables the user to program the cycle completion time rather than calculating the start time
- Easy to operate and program with user friendly graphic interface
- Programs linkable for 6 stage operation
- Integrated door safety switch breaks both sides of the power line to muffle
- Wide programmable linear temperature rates both positive and negative (0.1 to 40°C/minute)
- Easy / Lower Cost Muffle Service
  - Individual heating tube replacement
- Communication port (RS232) for program down loading and data logging.

## APPLICATIONS

- MATERIAL ASHING
- MATERIAL TESTING
- SINTERING MATERIALS
- MATERIAL OXIDIZING
- MATERIAL HEAT TREATING

## INSTALLATION INSTRUCTIONS

### UNPACKING CAUTIONS:

Carefully unpack and remove the furnace from its shipping carton. Save the carton and other packing material for future use in transporting the furnace.

The furnace shipping carton contains the following:

- One furnace complete w/ power cord
- Owner's & Operator's Manual
- Floor tray (shipped in the muffle)
- Software; Special Programming (CD-ROM)

**Shipping damage should be reported to the carrier as soon as detected.**

### LIFTING AND CARRYING:

1. Get a firm footing. Keep your feet, shoulder width apart for a stable base.
2. Bend your knees. Don't bend at the waist.
3. Grip the base of the furnace and lift with your legs.
4. Keep the load close to your body and carry the unit to the destination. Keep your back upright during lifting.





### INSTALLATION:

1. Remove all packing material from in and around the furnace. The furnace should be located at least 15cm (6") away from walls, shelves, and heat sensitive materials. Open the furnace door and remove the packing material from inside the furnace. NOTE: The furnace front panel may show some discoloration around the muffle due to the calibration and "burn-in cycles" performed at the factory.
2. The furnace should **not** be located directly under shelves and other airflow restrictions.
3. Connect the power cord to the socket in rear of furnace.
4. Positioning the furnace:
  - a) (Combustion, Burnout or Reaction Processes) Position the furnace under a vent hood or connect the exhaust vent to a ventilation system to prevent exposure to the exhaust fumes.
  - b) (Heat Treating or Non-Reaction Processes) Position the furnace under a vent hood. The ventilation system should accept a minimal of 25 CFM.
5. Connect the furnace to a power circuit or receptacle with an overcurrent protection (circuit breaker or fuse) rating of 15 Amps. This circuit should only supply the furnace.
6. Turn on the green power switch (right-hand side of the control panel) and the LCD display will come on. The light in the green power switch lights when the door is closed and the start key is pressed.
7. At this time, your new furnace should be ready to operate. Please review the OPERATIONS and SETUP & MAINTENANCE sections of the manual before proceeding to select special options.


## OPERATIONS

### RUNNING A PROGRAM:

The furnace has 9 three stage programs and one single temperature hold program. The furnace is sold with the program parameters set to the factory defaults which can be used for testing. First time operation will require the user to enter their desired parameters into one of these programs.

1. Turn on green power switch (right-hand side of control panel) after a short delay for internal testing, the furnace will display approximate room temperature, program time (hours:minutes), and program number. All red LEDs are off. (If any of the LEDs are on, the furnace was already running a program when it was last turned off.)
2. Select or change the program to the desired number by pressing the digit key (1-9) for the desired program followed by the ENTER  key. The display will be updated to show the new program number and its approximate run time.
3. Pressing the green Start  key will start this program. The red LEDs will come on and the time will start to count down. The green power switch will light when the door is closed. The LEDs will turn off as each segment of each stage of the program is completed.
  - During program operation, the total program cycle time is counting down as indicated by the flashing colon.
  - If a program is started when the muffle is already heated, the furnace will heat or cool at the first ramp rate to reach the first temperature segment. The total cycle time will be updated once the start key has been pressed.
  - The program will end by maintaining the last muffle temperature, displaying "Hold", beeping every 3 seconds and flashing the last Temp LED. See information on End Of Program options (point 1) in the "Setup & Maintenance" section if other end of cycle operations are preferred.
4. Pressing the  key will change the temperature display from °C to °F and back. This key is not active during parameter programming.
5. A short power outage during the operation of a program will not terminate or abort the program unless the muffle temperature drops more than 32°C (58°F). If the power outage occurs when the muffle temperature is close to, or at room temperature (e.g. during Delay Start operation) the furnace will continue the program when power is restored regardless of the temperature drop or the amount of time that has expired.
6. Pressing the Escape  key cancels beeping at the end of a program. It also will return the furnace to a display of the current conditions during programming operations.
7. Opening the door during a cycle interrupts power to the heating elements.

### STOPPING A PROGRAM:





1. Pressing the red Stop  key will stop the program that is currently running. The red LEDs will go out and the display will show the current program number, approximate cycle time, and the current muffle temperature.

## PROGRAMMING:





The furnace increases productivity and reliability for the operator because cycles or programs can be preprogrammed and operated automatically. Once programmed, the parameters are retained in memory even with the loss of power. Parameters are not retained in memory if while program is operating.

Each program is made up of 3 stages which contain 3 parameters each. The parameters are grouped into ramp rates (**R1, R2, R3**), temperatures (**T1, T2, T3**), and dwell or hold times (**H1, H2, H3**). The 1,2,3 indicates the stage number or sequence. The temperatures can be programmed in either °C or °F; the ramp rates in °C per minute or °F per minute; and the hold times in hours and minutes (hh:mm).

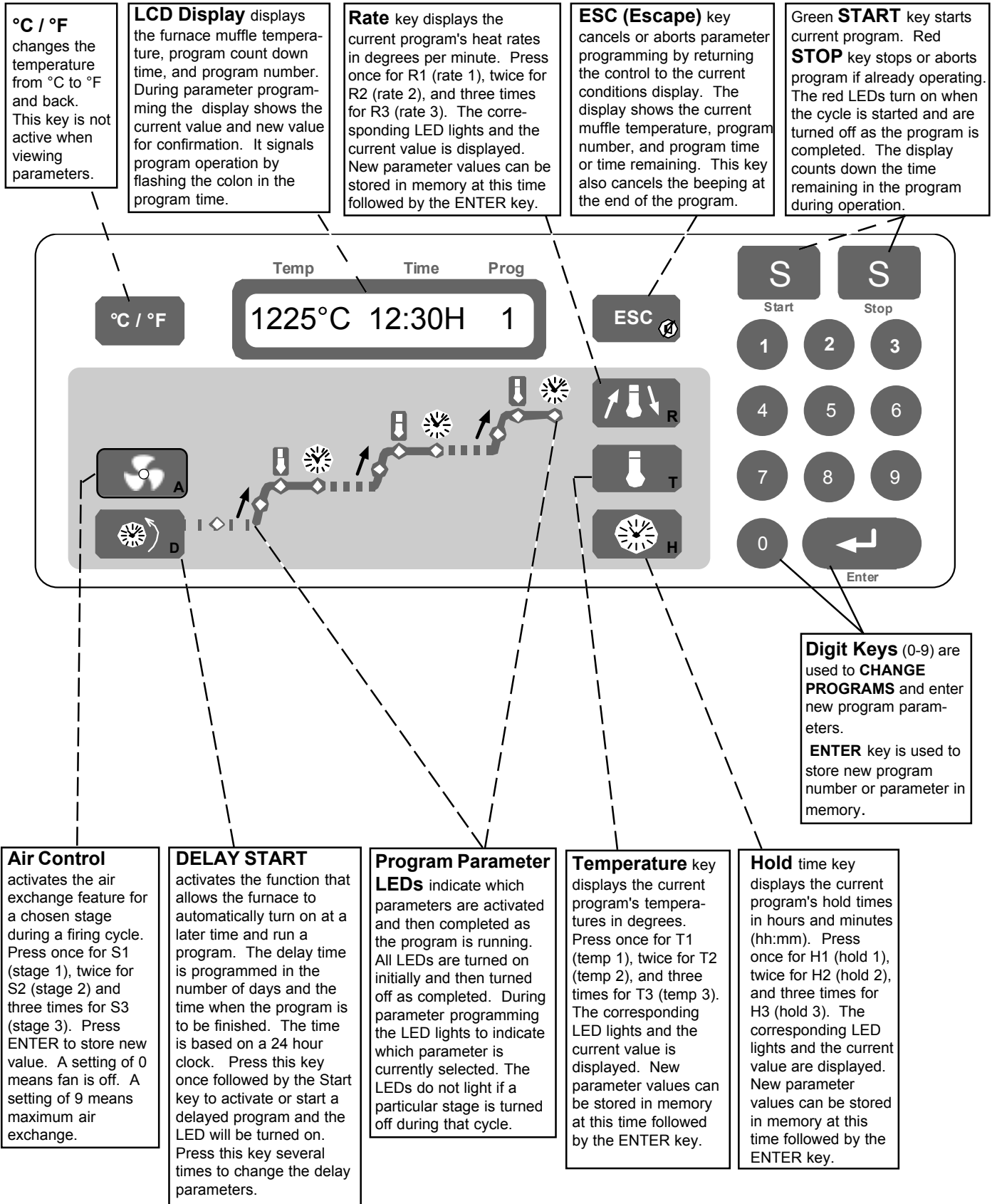
### RAMP RATES (R) (0 - 40°C/minute)

1. Pressing the Rate  key display's the current value of the R1 parameter followed by 3 blanks for a new value.
  - For example: R1 8.0°C/M -> \_ \_ \_
  - The corresponding LED will also light to indicate the selected stage and parameter.
2. Use the digit keys (**0,1,2,...,9**) to enter the desired parameter value followed by the ENTER  key. The new parameter is now stored in memory.
  - If a value is entered that is out of the acceptable range, the furnace will beep and display the acceptable range.
  - Programming a Rate to 0 will cause the furnace to terminate the remainder of the program stages. For example, if R2 is set to 0 then at the end of the first hold time (H1) the furnace will end the program, making the program a single stage.
3. Pressing the Rate  key additional times gives access to the Rate parameters for the other two stages. The 4th time the key is pressed the display circulates back to the beginning and the R1 parameter will be displayed again.
  - The Rate  key operates the same if pressed during the operation of a program with the following exception. The new Rate entered is used only for that one program or cycle and not stored in memory.
  - Negative ramp rates are also possible if slower than natural cooling.





### TEMPERATURES (T) (50 - 1225°C or Tmax)

1. Pressing the Temp  key makes the display show the current value of the T1 parameter followed by 4 blanks for a new value.
  - For example: T1 160°C -> \_ \_ \_ \_
  - The corresponding LED will also light to indicate the selected stage and parameter.
2. Use the digit keys (**0,1,2,...,9**) to enter the desired parameter value followed by the ENTER  key. The new parameter is now stored in memory.
  - If a value is entered that is out of the acceptable range the furnace will beep and display the acceptable range.
3. Pressing the Temp  key additional times will display and give access to the Temp parameters for the other two stages. The 4th time the key is pressed the display circulates back to the beginning and the T1 parameter will be displayed again.
  - The Temp  key operates the same if pressed during the operation of a program with the following exception. Any new parameter entered is used only for that one program or cycle and not stored in memory.


## CONTROL PANEL DESCRIPTION



## HOLD TIMES (H) (0 - 99:59 mm:ss)

1. Pressing the Hold  key display's the current value of the H1 parameter followed by 4 blanks for a new value.
  - For example: H1 1:00H -> \_\_ : \_\_ (1 hours and 00 minutes)
  - The corresponding LED will also light to indicate the selected stage and parameter.
2. Use the digit keys (0,1,2,...,9) to enter the desired parameter value up to 99 minutes and 59 seconds followed by the ENTER  key. The new parameter is now stored in memory.
3. Pressing the Hold  key additional times gives access to the Hold parameters for the other two stages. The 4th time the key is pressed the display circulates back to the beginning and the H1 parameter will be displayed again.
  - The Hold  key operates the same if pressed during the operation of a program with the following exception. Any new parameter entered is used only for that one program or cycle and not stored in memory.

## AIR EXCHANGE OPERATION



1. The air exchange operation is accomplished by using the Venturi principle to draw air out of the muffle and into an exhaust air flow. The hot muffle air does not pass through the fan. Make up air for the muffle is introduced between the muffle heating tubes. This indirect air path causes the make up air to preheat before it reaches the muffle cavity to assure temperature uniformity.
2. The air exchange fan produces about 20CFM of flow when operated at full speed. The vent hood or system being used for the furnace should have sufficient capacity to accommodate this airflow.
3. The air exchange operation may be controlled for 10 different settings, ranging from 0 to 9 (off to full on). The maximum setting of 9 on the control performs approximate 5 air exchanges per minute. The curves shown on page 10 show heat up and cool down at different fan settings.  
Example: Stage 1 of program 5 can be programmed to a fan setting of 9 while stage 2 of program 5 can be programmed to a fan setting of 3 and stage 3 of program 5 to a fan setting of 0 (off).
4. The air control settings are retained in memory for each program even when the power is removed.
5. The air control settings are programmed into memory the same way as other parameters. Change to the program number of interest, press the  key: once for stage 1, twice for stage 2 and three times for stage 3. The display shows the current fan level and a new level may be programmed.

A fan speed setting is changed and stored by pressing a digit key (0-9) followed by the ENTER key. A fan setting change made while a program is operating (running) is only used during that cycle and is not saved in permanent memory.

The higher the air control setting the slower the furnace will heat. High air control settings with low line voltages may prevent the furnace from reaching the maximum temperature.

## PROGRAM 0

Program 0 is a single temperature hold program. The furnace will heat to this temperature and maintain it as long as power is applied.








1. Press the 0 key. The display shows the current programmed temperature and the 0 program number.
2. For example: T0 100°C -> \_ \_ \_ \_
3. Use the digit keys (0,1,2,...,9) to enter the desired temperature followed by the ENTER  key. The new parameter is now stored in memory. The display shows: 100°C \*\*\*\*\* 0 where 100 is the current muffle temperature, 0 the program number, and \*\*\*\*\* indicates that the program is not running.
4. Pressing the Start  key causes the furnace to heat at full power to the programmed temperature. The display shows "xxxx°C \*Hold\* 0" "xxxx" is the current muffle temperature, the word "Hold" indicates single stage operation and 0 indicates the program number. The T1 LED will also be on.

## SPECIAL FEATURES



### DELAY START (D)

The Delay Start function automatically starts a program so that it is completed at a selected time up to 7 days later. The delay is programmed in terms of delay days and completion time. A clock is used to keep track of time as long as the power switch is on. If a power outage should occur during a "Delay Start", the completion time will be delayed by the length of time the power was off (the clock stopped running).

Programming The Delay Start:

1. Pressing the Delay Start  key shows the time of day and beep.
  - For example: Now=7:30->\_\_:\_
  - The corresponding LED will also light to indicate the Delay Start is selected.
2. Use the digit keys (0,1,2,...,9) to enter the current time of day followed by the ENTER  key. The new parameter is now stored in memory. The time of day is entered as a 24 hour clock (11:34PM is 23:34), (8:10AM is 08:10).
  - Programming the current clock time "Now = 7:30 -> \_\_:\_" is only displayed and requested if there has been a power outage since the last time the Delay Start was operated. Turning the power switch off stops the clock.
3. Pressing the Delay Start  key again shows the Delay D parameter in days.
  - For example: Day: 1 [1,2,...,7]
  - The corresponding LED will also light to indicate the Delay Start is selected.
4. Use the digit keys (0,1,2,...,7) to enter the desired number of delay days followed by the ENTER  key. The new parameter is now stored in memory.
  - If a value is entered that is greater than 7, the furnace will display and use 7.
5. Pressing the Delay Start  key again displays the desired program completion time. The furnace will calculate the approximate time that the program needs to start so that it is completed at this programmed time.
  - For example: End = 14:30 -> \_\_: \_\_
  - The computer uses a 24 hour clock. Therefore, the completion time will be 2:30 PM.
6. Pressing the Delay Start  key again shows the actual time (Now).
  - Pressing the key additional times will cycle through the other parameters. Press the Escape  key to stop the function.



Running A Delay Start Program:

1. Select the desired program number (See previous section on RUNNING A PROGRAM)
2. Press the Delay Start  key to display the delay days.
3. Press the green start  key to start the delay timer.
  - The corresponding LED will also light to indicate the Delay Start is selected.
  - If the program run time is longer than the specified delay time the furnace will skip the delay and start the program immediately.

### LINKING PROGRAMS

Programs can automatically run in sequence by using the Linking feature. With this method, a 6 stage (12 segment) program can be run automatically. Additional programs can also be linked as each program is completed.

Running Linked Programs:

1. Press the green Start  key with the first program to be run. The furnace will start operation.
2. Use the digit keys (1,2,...,9) to enter the next program number to be run followed by the ENTER  key. The furnace will now run the first program followed automatically by the second. The program cycle time on the display will be the combination of the two programs. The display will alternately show the first program number and then the second program number.

## SPECIFICATIONS

### PARAMETER

- Temperature Range: 50°C (122°F) - 1225°C (2237°F) / 1°C or 1°F Resolution
- Hold Time Range: 0:00 - 99:59 (hours:minutes) / 1 Min Resolution
- Ramp Rate Range: 0 - 40°C / minute (72°F) / 0.1°C Resolution
- Temperature Accuracy: ± 5°C (± 9°F) at steady state
- Muffle Temperature Uniformity: ± 8°C (± 15°F) at steady state

### ELECTRICAL

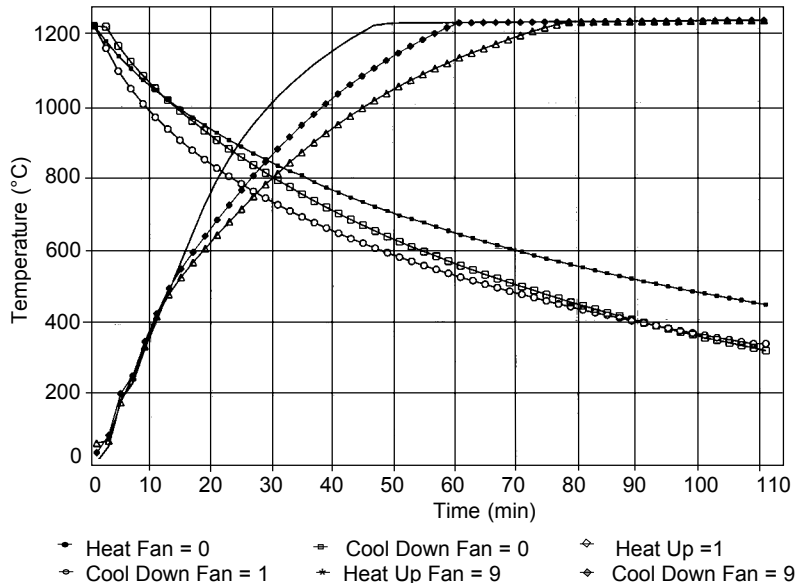
#### 3-400HTA

Voltage Nominal:	230V
Voltage Range:	200-240V
@ 50/60Hz	
Max Current:	9.6A
Amps @ 230V	
Max Power Watts:	2200W (230V)
Watts to Maintain 1225°C:	1825W
(Air Exchange setting @ 0)	

### ENVIRONMENTAL

Ambient Operating Temperature: 5 - 40°C  
 Relative Humidity: Maximum 80%, non-condensing

### 3-400HTA PERFORMANCE CURVES










Test Conditions: Nominal line voltage, no load in the muffle only floor tray, full power applied to the muffle for the Heating Curve. The programmable rates are linear and fall below the heating curve and above the cooling curve (door closed) for some selections.

## SETUP & MAINTENANCE

### SETUP:

The Vulcan furnace goes through a self test that lasts approx. 6 seconds each time power is applied. After this test, the display will show the word "Setup?" for approximately 5 seconds. In the Setup mode, several different options are available for the user to select.

The first is the END OF PROGRAM operation which allows the user to select how the furnace should operate at the end of the program. The second is the Tmax parameter, a temperature alarm that can be programmed into the furnace. The last is TEMPERATURE ADJUSTMENT CALIBRATION (Tcal) which allows the user to alter the furnace temperature calibration.

1. Turn on power to the furnace. Press the ENTER  key after the word "Setup?" is displayed and access to the Setup mode is gained.  
The END OF PROGRAM option is now displayed as "Hold = (1), (2),(3)". The **(1)** option is the factory default. It instructs the furnace to control the last programmed temperature, display "Hold" and beep every 3 seconds until the red Stop  key is pressed. Pressing the Escape  key will only stop the beeping.  
The **(2)** option instructs the furnace to control the last programmed temperature, and display "Hold" but without beeping until the red Stop  key is pressed.  
The **(3)** option instructs the furnace to turn the control off and let the muffle cool to room temperature. The display shows "End". The Stop key does not have to be pressed.  
Use the digit keys **(1,2,3)** to change the END OF PROGRAM option.
2. Pressing the ENTER  key when the desired END OF PROGRAM is selected will store the entry into memory and then advance to Tmax the next option. The Tmax value limits the maximum temperatures that the furnace may be programmed to. The factory setting for Tmax is 1225°C. Use the digit keys **(0,1,2,...,9)** to enter the desired Tmax value followed by the ENTER  key. The new Maximum Temperature is now stored in memory and the next option is displayed.
3. The final option is the temperature adjustment calibration displayed as "Tcal 1000°C->\_:\_:\_". The factory setting for Tcal is 1000°C. Use the digit keys **(0,1,2,...,9)** to enter the desired Tcal value followed by the ENTER  key. The new Temperature Calibration is now stored in memory. Entering a 1000 will return the furnace to the factory calibration. See the next section on Temperature Adjustment Calibration for specifics on how to determine a new adjustment number.

### TEMPERATURE ADJUSTMENT CALIBRATION:

Every VULCAN furnace is calibrated in the factory at 1000°C. Under normal use the furnace should not require calibration. The electronics used in the VULCAN furnaces are very stable and will have minimal drifts over the life of the furnace. Thermocouple replacement could be a potential requirement for calibration if high accuracy is required.

This calibration can be altered by entering a new Tcal value in the Setup mode listed previously. The Tcal value has a range of 900 to 1100°C.

#### Example 1:

A program is operating at a steady temperature of 875°C and a separate thermocouple is inserted in the furnace and a digital thermometer is used to measure the muffle temperature. The display shows 875°C (the programmed temperature) but the digital thermometer reads 868°C. A new calibration value is calculated by dividing the displayed temperature (furnace) by the measured temperature (digital thermometer), the result is multiplied by the current Tcal value (factory default is 1000°C). In this case  $(875/868 = 1.008; 1.008 * 1000 = 1008)$ . 1008 is now entered in as the Tcal value. With this method a furnace calibration can be done at any operating temperature.

#### Example 2:

Programmed temperature is 1050°C and the digital thermometer reads 1065°C. The previous Tcal value is 985°C.  
 $(1050/1065 = 0.986 \text{ then } 0.986 * 985 = 971)$   
971 should be entered as the new Tcal value.

### CLEANING:

- Vacuum dust and dirt from the furnace rather than attempting to blow the dust off. This will minimize the amount of air born particles.
- Use a soft damp cloth to clean the control panel. Avoid excess water or solution when cleaning the furnace. These solutions can attack the panel or electronics and cause the furnace to malfunction.

**REPLACEMENT FUSES:** PCB - F1: F 250V, 1.0A      Receptacle: F250V, 10A

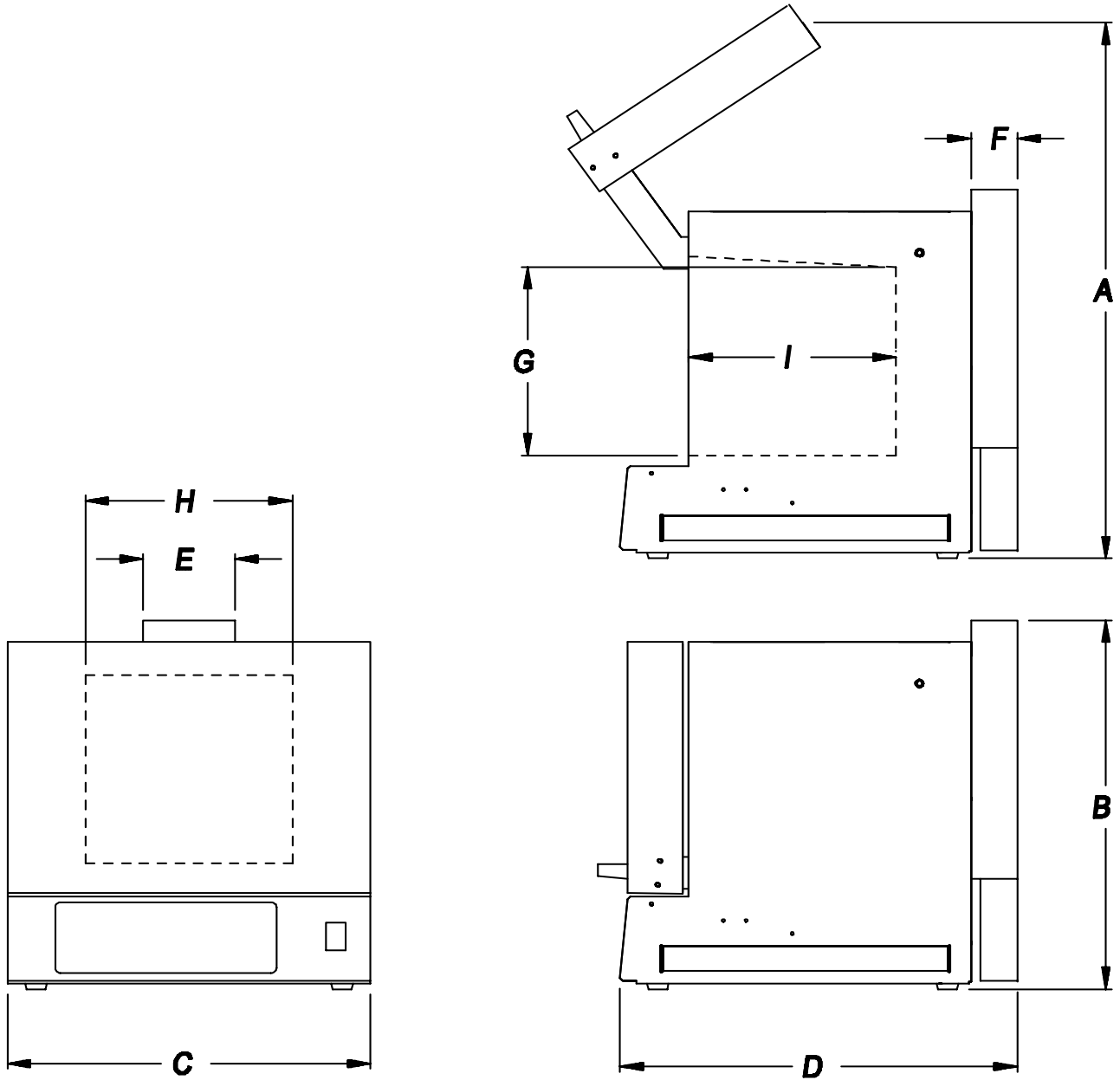
**MECHANICAL OUTLINE DRAWING:**

Exterior Dimensions:

Model:	A	B	C	D	E	F
3-400HTA	635mm(25.0")	430mm(17.0")	400mm(15.8")	489mm(19.3")	100mm(4.0")	7mm(2.3")

Internal Muffle Dimensions:

Model:	G	H	I
3-400HTA	163mm(6.4")	183mm(7.2")	225mm(8.9")



Furnace Weight:	26kg(57lbs)
Shipping Weight:	30kg(66lbs)

## TROUBLESHOOTING

### ERROR CODES:

Err codes can be cleared from the display by turning the front panel power switch off and then on again.

Code	Description	Possible Cause
<b>Err 1</b>	Over Temperature	Temp > 1248°C, shorted thermocouple, shorted triac, shorted optotriac, wiring connections, computer PCB
<b>Err 2</b>	Open Thermocouple	Open TC tip, connection to TC, TC to (TC) PCB connection, computer PCB
<b>Err 3</b>	Temp > Tmax	Muffle temperature has exceeded the programmed limit temperature TMAX (see SETUP?).
<b>Err 7</b>	Brown-out	Low line voltage < 90VAC (<190VAC for 200-240V), wall socket shared with other loads, furnace connected with small extension cord
<b>Err 8</b>	EEPROM error	Parameter program memory error; computer PCB
<b>Err 19</b>	Line frequency	No line frequency detected, computer PCB

## TROUBLESHOOTING THE VULCAN "3" - CONTROL

PROBLEM	CHECK LIST / CAUSES
Dead, Not Operating No Power / Display	<ul style="list-style-type: none"> <li>- Check power receptacle or outlet for power</li> <li>- Check line or power cord connections</li> <li>- Turn on green power switch</li> </ul>
Not Heating During Program Operation	<p>Does the green power switch light when the Start key is pressed?</p> <p>No: - Is door completely closed? Door switch may be interrupting power.</p> <p>Yes: - Check the fuses on the controller PCB</p> <ul style="list-style-type: none"> <li>- Check heating element tubes for continuity</li> </ul>
Door Too Loose or Tight	<ul style="list-style-type: none"> <li>- The amount of force or drag on the door movement can be changed by adjusting the hex screws located on the upper rear corners of the furnace cabinet. Turning the screw clockwise adds drag and requires more force</li> </ul>
Heating Too Slow	<ul style="list-style-type: none"> <li>- Rate programmed wrong. 1.5°/minute rather than 15.0°/minute</li> <li>- Large loads will slow down response time and increase the time to temperature by 2 to 5 times</li> </ul>
Program Turns Off Too Early	<ul style="list-style-type: none"> <li>- Programming a Rate to zero will terminate the remainder of the program</li> <li>- End of program option has been changed from 1 or 2 to option 3 which turns off the furnace at the end of the program [End].</li> </ul>
Fan Does Not Operate	<ul style="list-style-type: none"> <li>- Operates only in a start cycle</li> <li>- Setting of 0 means no fan active</li> </ul>



## WARRANTY

**WARRANTY:** Except with respect to those components parts and uses which are hereinafter described, DENTSPLY Neytech warrants this furnace to be free from defects in material and workmanship for a period of one year from the date of sale. DENTSPLY Neytech 's liability under this warranty is limited solely to repairing or, at DENTSPLY Neytech 's option, replacing those products included within the warranty which are returned to DENTSPLY Neytech within the applicable warranty period (with shipping charges prepaid), and which are determined by DENTSPLY Neytech to be defective. This warranty shall not apply to any product which has been subject to misuse; negligence; or accident; or misapplied; or modified; or repaired by unauthorized persons; or improperly installed.

**INSPECTION:** Buyer shall inspect the product upon receipt. The buyer shall notify DENTSPLY Neytech in writing of any claims of defects in material and workmanship within thirty days after the buyer discovers or should have discovered the facts upon which such a claim is based. Failure of the buyer to give written notice of such a claim within this time period shall be deemed to be a waiver of such claim.

**DISCLAIMER:** The provisions here-in stated DENTSPLY Neytech sole obligation and exclude all other remedies or warranties, expressed or implied, including those related to *MERCHANTABILITY* and *FITNESS FOR A PARTICULAR PURPOSE*.

**LIMITATION OF LIABILITY:** Under no circumstances shall DENTSPLY Neytech be liable to the buyer for any incidental, consequential or special damages, losses or expenses.

**LIMITATION OF ACTIONS:** The buyer must initiate any action with respect to claims under the warranty described in the first paragraph within one year after the cause of action has accrued.

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