VIP UNIVERSAL X-PRESS FURNACE

120V, 50/60 Hz Models
and
230V, 50/60 Hz Models

Operator's Manual

ISO 9001
ISO 13485
FDA-GMP COMPLIANT

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CONGRATULATIONS

Congratulations on your purchase of a Jelrus VIP Universal X-Press Furnace, which hereafter is referred to in this manual as the VIP Furnace. This premium vacuum furnace is designed for use with all regular and low fusing porcelain, as well as, pressable ceramic material. The VIP Furnace brings the power of an Intelligent Memory System to the dental laboratory. It remembers 100 different programs and performs each accurately at your command. In addition, an LCD Digital Display clearly shows all program information at all times.

Your VIP Furnace contains many advanced features including:

- 100 User-Adjustable Firing Programs - 20 for pressable ceramics and 80 for regular porcelain
- Precision Platinum Thermocouple
- Spiral Quartz Muffle
- Power Failure Recovery

This manual covers the installation, operation and maintenance of the VIP Furnace. Review and follow the guidelines included in this manual to ensure that your system gives the highest level of service.

WARRANTY

This Jelrus equipment is warranted to be free from defects in material and workmanship for a period of twelve months (24 months for Muffle) from the date of installation by authorized Jelrus Dealer service personnel.

Any item returned to our factory during the warranty period, through a Jelrus Authorized Dealer, will be repaired or replaced at our option at no charge provided that our inspection shall indicate it is defective. Dealer labor, shipping and handling charges are not covered by this warranty.

This warranty does not apply to damage due to shipping, misuse, careless handling or repairs by non-authorized service personnel. Warranty void if installed or serviced by other than authorized service personnel. Jelrus is not liable for indirect or consequential damages or loss of any nature in connection with this equipment.

This warranty is in lieu of all other warranties expressed or implied. No representative or person is authorized to assume for us any liability in connection with the sale of our equipment.

ON-LINE WARRANTY REGISTRATION

Quickly and easily register your new Jelrus vacuum furnace on-line. Just have your product model number and serial number available. Then go to the Jelrus web site, **www.jelrus.com**, click the **Warranty Registration link** and complete the registration form. This on-line registration ensures a record for the warranty period and helps Jelrus keep you informed of product updates and other valuable information.

SAFETY NOTICE

Markings.

The following terms or symbols are used on the equipment or in this manual to denote information of special importance:

Alerts users to important Operating and Maintenance instructions. Read carefully to avoid any problems.

Warns users that uninsulated voltage within the unit may be of sufficient magnitude to cause electric shock.

Indicates the presence of a hot surface or component. Touching this surface could result in bodily injury..

Indicates that the unit must be disposed of in accordance with the WEEE Directive as applicable.

Indicates the Furnace is a UL Listed product.

Indicates models so labeled comply with the European Council Directives 73/23/EEC and 89/336/EEC. .

ATTENTION USERS:

Manufacturing date code on serial number label is in the format: MONTH YYYY.

SAFETY NOTICE

This equipment has been designed to minimize exposure of personnel to hazards. While the VIP Furnace is designed for safe operation, certain precautions must be observed. Use of the VIP Furnace **not** in conformance with the instructions specified in this manual may result in permanent failure of the unit.

General Safety Information.

- ❑ Check with your authorized dealer for packing material requirements if it is necessary to return the product to the manufacturer. Correct packing guarantees optimal safety of the device during transport. Should it become necessary to return the device to the manufacturer during the warranty period, Jelrus will not accept claims for damage arising from using incorrect packing materials.
- ❑ When handling the Muffle, **do not touch** the heating coil with bare fingers. Oil from the skin on the fused quartz tubing causes overheating and rapid blowout.
- ❑ Before every use, the operator must check the functional safety and the condition of the device.
- ❑ The operator must be knowledgeable in the operation of the device.
- ❑ This device is not to be used in any areas where the atmosphere could cause fire or explosion.

Electrical Safety Notes.

- ❑ The line cord is the main power disconnect device.
- ❑ Use only the line cord provided with the unit.
- ❑ Use only grounded electrical connections.
- ❑ To avoid risk of electric shock, fire, short-circuit or dangerous emissions, never insert any flammable object into the equipment.
- ❑ Only use connection cable(s) delivered with the device.
- ❑ Check the device cables for possible damage before switching on. Damaged cables, plugs and sockets must be replaced before use.
- ❑ Do not locate unit where it could be sprayed with water, or in a damp environment.

Knowledge of Warnings and Cautions.

Users must exercise every precaution to ensure personnel safety, and be familiar with the warnings and cautions presented throughout this manual and summarized below.

In this manual, the following definitions apply for all WARNINGS and CAUTION Statements:

WARNINGS: Any operation, procedure or practice, which, if not strictly observed, may result in injury or long-term health hazards to personnel.

CAUTIONS: Any operation, procedure or practice, which, if not strictly observed, may result in destruction of equipment or loss of effectiveness or damage to equipment.

CAUTION

Maintain a minimum clearance of 10 inches (25 cm) in all directions around the VIP Furnace.

Ensure that the line cord is accessible for emergency removal of operating power.

To ensure safe operation of the VIP Furnace, MUFFLE CONDITIONING program number 400 must be run two times after storing or shipping.

The VIP Furnace is designed for indoor use only.

The VIP Furnace is designed for installation in over voltage category II environments.

General Notes.

- ❑ All instructions in this manual form an integral part of the unit. They must be kept close to the unit and in readiness whenever required. Precise observance of these instructions is a pre-condition for use of the unit for the intended purpose and for its correct operation. This manual should be passed on to any future purchaser or operator.
- ❑ Safety of the operator as well as trouble-free operation of the unit are only ensured if use is made of original equipment parts. Moreover, use may only be made of those accessories that are specified in the technical documentation or that have been expressly approved and released by Jelrus for the intended purpose. Jelrus cannot warranty for the safety or proper functioning of this unit in the case where parts or accessories are used that are not supplied by Jelrus.
- ❑ There is no guarantee against damage arising where parts or accessories are used that are not supplied by Jelrus.
- ❑ Observe the usage and storage conditions.
- ❑ Appliances which accumulate condensation or become wet through a change of temperature may only be operated after they are fully dry again.
- ❑ Jelrus regard themselves as being responsible for the equipment with regard to safety, reliability and proper functioning only if assembly, resetting, changes or modifications and repairs have been carried out by an authorized dealer and if the equipment is used in conformity with the instructions contained in this manual.
- ❑ The device conforms to the relevant safety standards valid at this time.
- ❑ Any reprinting of the technical documentation, in whole or in part, is subject to prior written approval by Jelrus.

Note: Two different Firing Blocks are shipped with the VIP Universal X-Press Furnace:
A Firing Block with an universal ring insert used for pressing programs (shown).
A Firing Block without a ring insert used for porcelain programs.

INCLUDED ITEMS

The following items are packed with each furnace:

1. Line cord (Varies by model. See below.)
2. Press firing block with universal ring insert
3. Porcelain firing block
4. Compressed air hose, 10 feet
5. Compressed air fitting, 1/4 NPT x 1/4 Push-in
6. Quick Start Guide
7. Operator's Manual (this manual)

Model No.	Description	Line cord
A4200	120V, 50/60Hz	(line cord for US)
A4301	230V, 50/60Hz	(line cord for UK)
A4302	230V, 50/60Hz	(line cord for Europe)
A4303	230V, 50/60Hz	(line cord for Italy)
A4304	230V, 50/60Hz	(line cord for Israel)
A4305	230V, 50/60Hz	(line cord for Australia)

ACCESSORIES AND REPLACEMENT PARTS

Description	Part No.
Pur-I-Fire Decontaminant	7102
Porcelain Firing Block Kit	A4151
Press Firing Block Kit	A4152
Press Ring Insert Kit	A4153
Muffle Replacement Kit, 120V	A4012
Muffle Replacement Kit, 230V	A4013
Thermocouple Replacement Kit	A4014

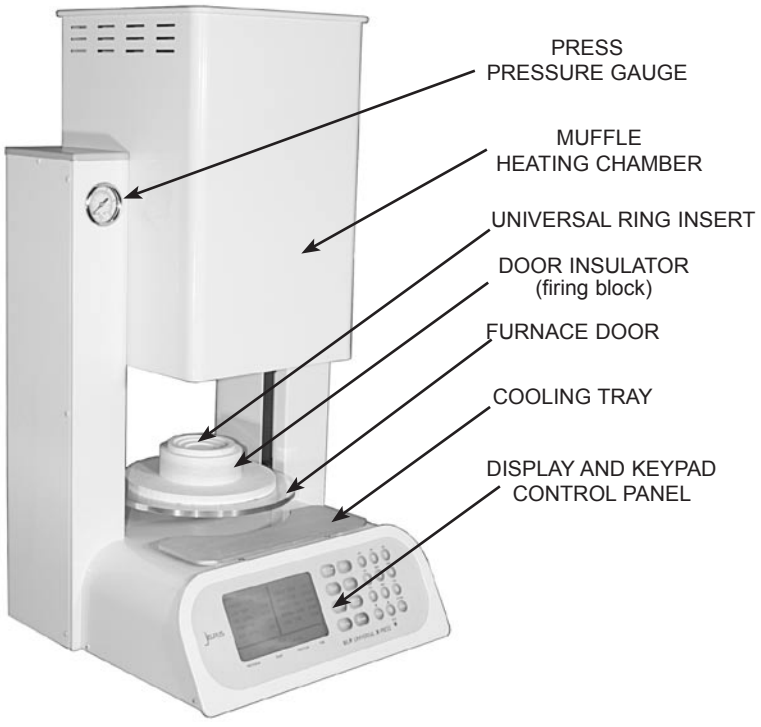


Figure 1. VIP Universal X-Press Furnace

TECHNICAL DATA

Electrical and Mechanical

Temperature Sensor:	Type-S thermocouple
AC Power:	120VAC, 13.7A, 1644W, 50/60Hz (US version) 230VAC, 7.8A, 1794W, 50/60Hz (Euro version) (with 400W maximum vacuum pump)

Overall Furnace Dimensions:

Width	Depth	Height
15.0 in. (38.10 cm)	16.0 in. (40.64 cm)	27.5 in. (69.85 cm)

Weight:	58.5 lbs. (26.5 kg)
Muffle Dimensions:	
Diameter	3.95 in. (10.03 cm)
Height	3.25 in. (8.26 cm)

Environmental

Operating Temperature:	50 to 104° F (10 to 40° C)
Relative Humidity:	10 to 90%, non-condensing
Altitude:	Up to 6562 feet (2000 meters)
Intended use	Indoor use only
Pollution Degree	2 (Per UL 61010)
Installation Category	II (Per UL 61010)

Rear Panel Connections

IEC Power Connector:	AC power cord input (15A for 120V or 10A for 230V)
IEC Power Socket:	AC vacuum pump power output (3.33A for 120V or 1.74A for 230V)
DB25 Female:	Parallel printer port output
Vacuum Port:	Vacuum pump hose inlet, Manual vacuum release valve provided
Compressed Air Port:	Press cylinder compressed air hose inlet. Filter/regulator with 0 to 100 PSI (0 to 7 Bars) pressure adjustment valve provided

Technical Features

Runs Regular Porcelain and Pressable Ceramic Programs
Spiral Quartz Muffle accommodating three 5gm Pressable Ceramic Ingots
English or Metric Display Units
Nite Mode (ie: Power Save)
Adjustable Idle Temperature
Program Edit/Review Before and During Program Run
Selectable Quick Pre-Cooling and Quick Cooling
Three Underfire/Overfire Temperature Adjustment Ranges
Built-In Muffle Conditioning and Decontamination Programs
Print Current Program
Diagnostic Tests
Power Failure Recovery

Notes: A user-supplied vacuum pump must be connected to the VIP Furnace in order for the furnace to run all pressing programs and porcelain programs requiring vacuum. Use a vacuum pump that can achieve 26.5 in-Hg (67.3 cm-Hg) in 50 seconds or less.

A user-supplied compressor must be connected to the VIP Furnace in order for the furnace to run all pressing programs. For optimum press performance, use a compressor that achieves 40 PSI (2.8 bars) to 90 PSI (6.2 bars). It is also recommended that the compressor be used when running porcelain programs with vacuum so there is sufficient air pressure to prevent the vacuum from pulling the Press Plunger into the Muffle Heating Chamber.

Unpack and Setup. Perform the following procedures to unpack and setup your VIP Furnace for operation.

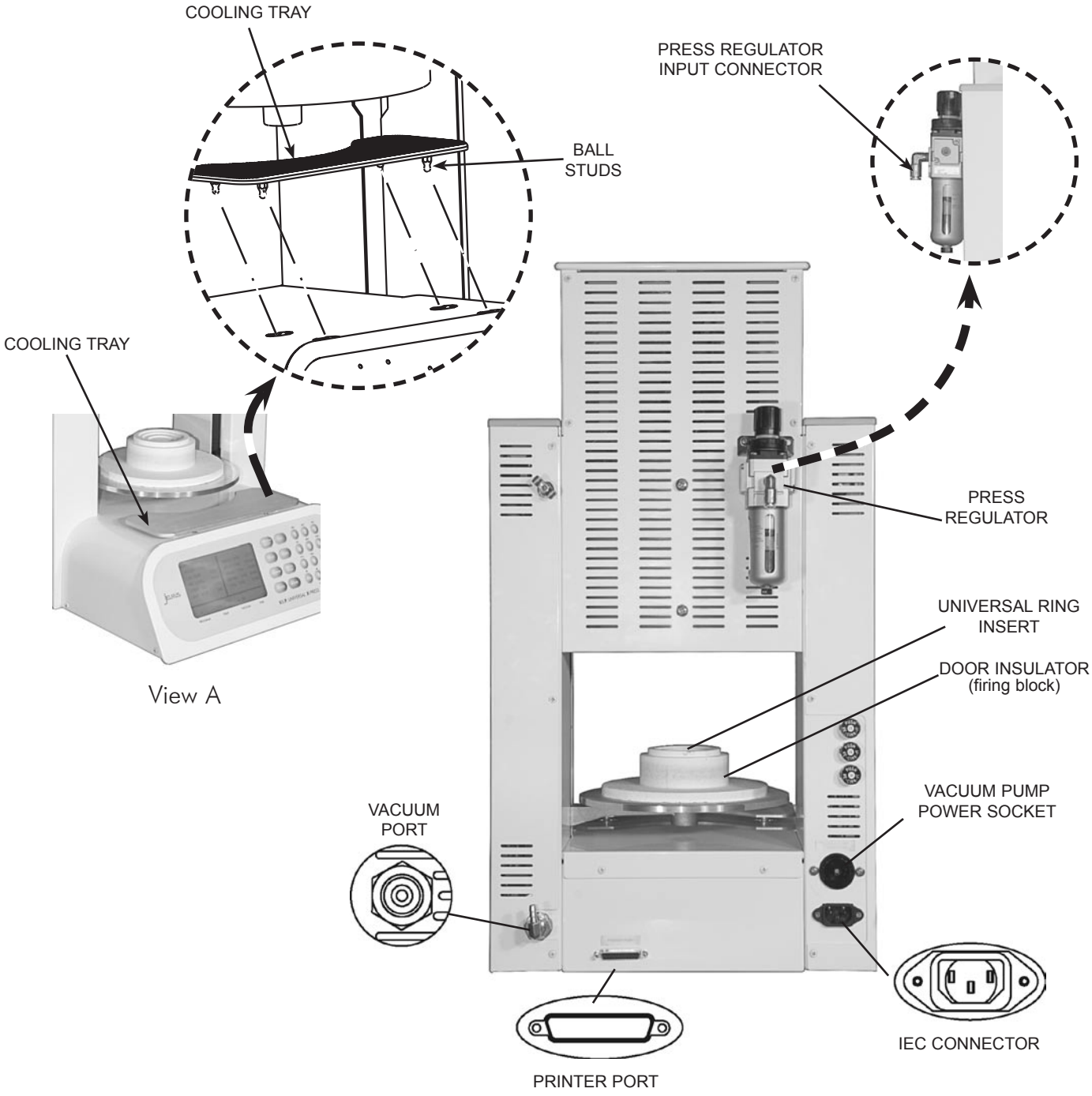
1. Remove all packing material from around the VIP Furnace.
2. Position the VIP Furnace in an area that permits comfortable operation. Make sure it is at least 10 inches (25cm) from any combustible surface.
3. Unpack and set up the user-supplied vacuum pump per the pump manufacturer's instructions.

   Note: VACUUM CALIBRATION - The VIP Furnace uses an absolute vacuum sensor, which is calibrated at the factory using computerized digital equipment and does not require additional calibration. An absolute vacuum sensor does not require reprogramming vacuum levels at high altitudes.
4. Connect the vacuum pump hose from the user-supplied vacuum pump to the Vacuum Port on the rear of the VIP Furnace.
5. Plug the vacuum pump line cord into the Vacuum Pump Power socket on the rear of the VIP Furnace. The current rating of the pump must be less than 3.33A for 120V models and 1.74A for 230V models.
6. If necessary, unpack and set up the user-supplied compressor per the compressor manufacturer's instructions.

   Note: Make sure that the compressor air hose is routed away from the Muffle Heating Chamber so there will be no danger of exposure to high temperatures when the furnace door is opened.
7. Connect the supplied air hose from the user-supplied compressor to the compressed air port on the rear of the VIP Furnace.

WARNING: Connect the VIP Furnace to an individual branch circuit. The overall circuit power rating must be 15 amps minimum for the 120-volt model and 10 amps minimum for the 230-volt model. No other devices shall be connected to the circuit powering the VIP Furnace.

8. Plug one end of the furnace power cord into the IEC receptacle on the rear of the VIP Furnace and the other end into the wall receptacle.
9. Press POWER key. The VIP Furnace turns on and the door opens automatically.
10. Select the Firing Block for the desired operation. Select the block with the ring insert for pressing programs and use the block without ring insert for porcelain programs.
11. Place the selected Firing Block onto furnace door.
12. The VIP furnace will heat up to the default idle temperature setting of 1000°F (538°C). If desired, this setting can be changed using special program #700.
13. Run MUFFLE CONDITIONING program #400 two times. (See page 24.)
14. Your new VIP Furnace has been temperature calibrated. It is not necessary to re-calibrate the Muffle before use. If over/under fired temperature adjustment is desired, perform Program #300 #310 or #320 as necessary. (See page 23 or 24.)
15. Your VIP Furnace is now ready for operation.



WARNING: Connect the VIP Furnace to an individual branch circuit. The overall circuit power rating must be 15 amps **minimum** for the 120-volt model and 10 amps **minimum** for the 230-volt model. No other devices shall be connected to the circuit powering the VIP Furnace.

Figure 2. VIP Furnace Installation

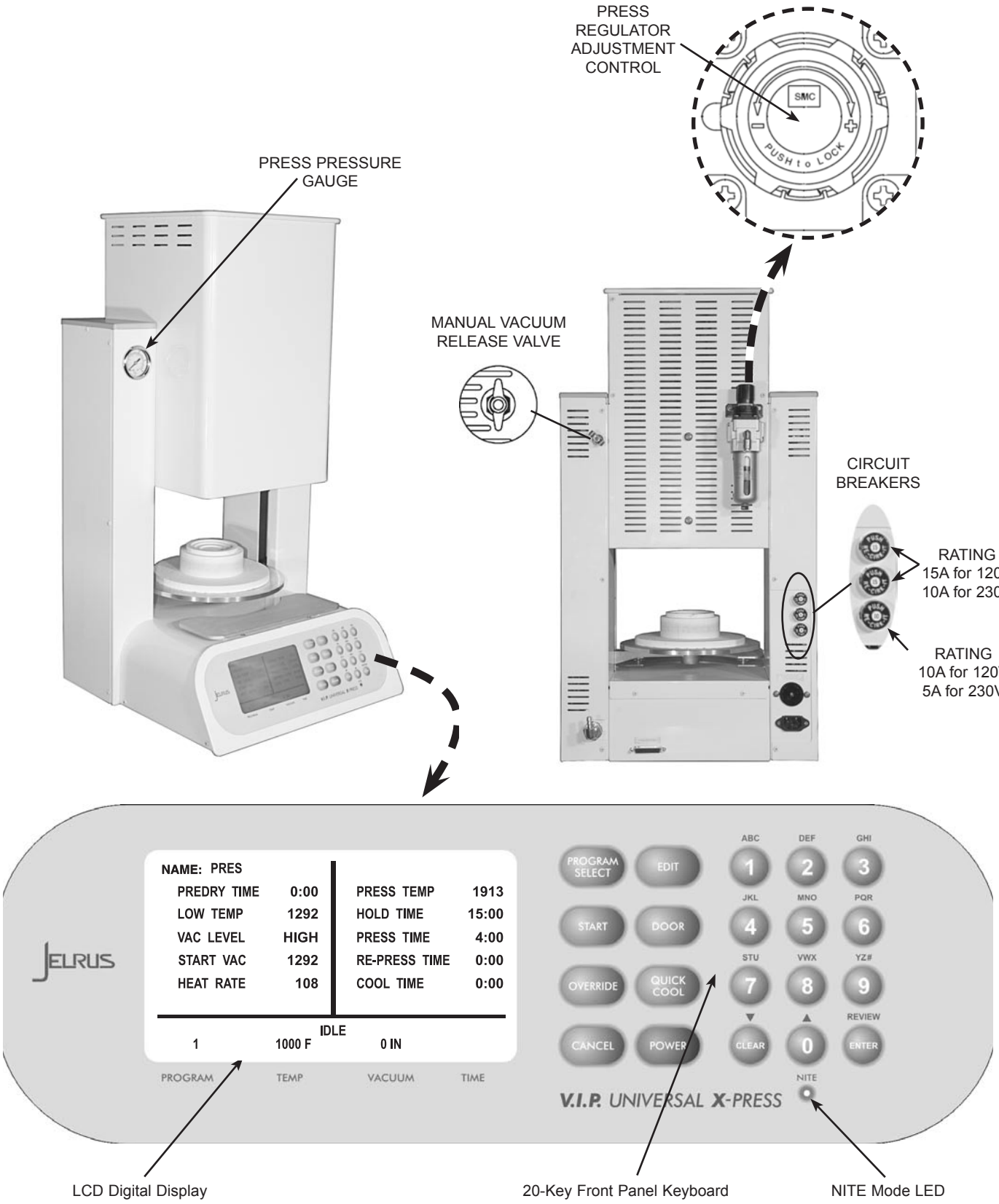


Figure 3. VIP Furnace Controls and Indicators Location

CONTROLS AND INDICATORS

Table 1. VIP Furnace Controls and Indicators

Front Panel Indicators	**Description**
LCD Digital Display	Blue characters on white background. Simultaneously displays name, parameter settings and run status of current program. Display contrast and brightness adjustable via front panel keypad.
NITE Mode LED	Red LED lights when furnace is set in Nite Mode.
Tower Indicator (Front)	**Description**
Press Gauge	Displays pressing plunger regulated pressure in units of PSI and Bars as set by Press Regulator Adjustment Control.
Rear Panel Controls	**Description**
Press Regulator Adjustment Control	Sets pressing plunger pressure as shown by Press Pressure Gauge. Turning clockwise increases plunger pressure. Turning counter-clockwise decreases plunger pressure.
Manual Vacuum Release Valve	A petcock valve used to release the vacuum from the furnace chamber. Turning counter-clockwise opens the valve to release chamber vacuum. Turning clockwise closes the valve to keep chamber vacuum contained.
Circuit Breakers (15A for 120V 10A for 230V)	Each protects against shorts in the internal furnace wiring.
Circuit Breaker (10A for 120V 5A for 230V)	Protects against shorts in the user-supplied vacuum pump line cord.
20-Key Front Panel Keypad	**Description**
Program Select	Selects current program number
Edit	Allows program information to be entered/modified
Start	Starts currently selected program
Door	Raises and lowers the door
Override	Used for porcelain programs only. Allows work to be re-entered into hot Muffle prior to program completion
Quick Cool	Activates quick pre-cool and/or quick cool
Cancel	Aborts current program
Power	Toggles between power on and standby modes
Alpha Numeric Keys	Used to enter program name, number and settings
Clear	Used to correct a keypad entry or clear an error condition
Down Arrow	Reduces LCD display contrast
Up Arrow	Increases LCD display contrast
Enter/Review	Used to review existing values or enter new values for program parameters while in program edit mode

The VIP Furnace allows 20 different user-generated pressable ceramic firing programs (# 0 - 19) to be stored in its Intelligent Memory System. These programs are created or edited as needed by selecting program parameters via the 20-Key Front-Panel Keypad. Table 2 lists each available parameter, range and definition used to create pressable ceramic firing programs. Figure 4 shows a typical front-panel pressable ceramic program display and Figure 5 provides the VIP Furnace Muffle Temperature Curve for Pressing Programs.

Table 2. Available Pressable Ceramic Firing Program (# 0 - 19) Variables

PARAMETER	RANGE*	DEFINITION
PRE-DRY TIME	0 to 99 min. 59 sec.	Selected amount of time the door completes movement from fully open position to fully closed position.
LOW TEMP	150° to 2150°F (66° to 1176°C)	Temperature at which the cycle starts.
VAC LEVEL	10 to 29 in Hg (25 to 74 cm Hg) 1 2	**Note:** FULL or HIGH vacuum is recommended for all programs. Three vacuum setting options available for firing the work material are as follows: Vacuum pump turns on and off as needed to maintain selected value. FULL= Vacuum pump turns on and off as needed to maintain 26.5 in-Hg (67.3 cm-Hg). HIGH= Vacuum pump turned on continuously allowing maximum vacuum available.
START VAC TEMP	LOW TEMP to 2197°F (1203°C)	Temperature at which vacuum will turn on. If selected value of START VAC TEMP is equal to LOW TEMP, vacuum starts as soon as door is closed.
HEAT RATE	40° to 250°F/min (22° to 139°C/min)	Rate at which Muffle temperature increases with time.
PRESS TEMP	START VAC TEMP + 2°F/1°C to 2200°F (1204°C)	Temperature at which the pressing is performed.
		Note: If RE-PRESS TIME is used, then make sure that a long enough HOLD TIME interval is used to ensure that the ingot material is liquefied prior to the start of the initial press.
HOLD TIME	0 to 99 min. 59 sec.	Amount of time furnace will hold at press temperature before pressing begins.
PRESS TIME (See example on page 12.)	1 to 99 min. 59 sec.	Works in conjunction with RE-PRESS TIME as follows: If RE-PRESS TIME time **is 0**, then the PRESS TIME is the amount of time material is pressed under pressure. If RE-PRESS TIME **is not 0**, then material is pressed under pressure for the PRESS TIME setting or until plunger stops moving for 1 minute **whichever is shorter**. Then the material is pressed for the RE-PRESS TIME setting.
RE-PRESS TIME (See example on page 12.)	0 to 99 min. 59 sec.	Works in conjunction with PRESS TIME as follows: If RE-PRESS TIME time **is 0**, then no re-pressing is performed and only the set PRESS TIME is in effect . If RE-PRESS TIME **is not 0**, then see the PRESS TIME description above
COOL TIME	0 to 99 min. 59 sec.	Selected amount of time that the door completes movement from fully closed position to fully opened position.

***Note:** Attempts to enter a value outside of acceptable limits will result in an INVALID ENTRY message on the Display.

Press and Re-Press Time Examples

Two examples of press and re-press time settings are given below:

Note: The minimum press time setting is 1:00 (ie: 1 minute) and therefore, the minimum total time the material can be pressed under pressure is 1 minute.

Example #1: Typical Press Time <u>Without</u> Re-Press

In this example, the furnace will ramp up to and hold at 1913°F for 15 minutes and then press the material for 4 minutes without re-press before moving onto cool time where the door opens at the maximum possible speed. The total time the material will be pressed under pressure is fixed at 4 minutes.

PRESS TEMP:	**1913**
HOLD TIME:	**15:00**
PRESS TIME:	**4:00**
RE-PRESS TIME:	**0:00** ← Note Zero Re-press Time
COOL TIME:	**0:00**

Note: When re-press is used, select a hold time that is long enough to insure the material is fully liquefied prior to the start of the initial press time to prevent the furnace from prematurely aborting the initial press 1 minute after it starts.

Example #2: Typical Press Time <u>With</u> Re-Press

In this example, the furnace will ramp up to and hold at 1913°F for 15 minutes and then attempt to press the material for up to 4 minutes before moving onto the <u>2 minute re-press</u>.

If the press rod stops moving for 1 minute during the initial 4 minute press interval, the furnace will abort the remainder of this interval and move onto the fixed 2 minute re-press.

After the 2 minute re-press, the furnace will move onto cool time where the door opens at the maximum possible speed. The total time the material will be pressed under pressure can range from 3 to 6 minutes (ie: 3 min = 1 min press + 2 min re-press, 6 min = 4 min press + 2 min re-press).

PRESS TEMP:	**1913**
HOLD TIME:	**15:00**
PRESS TIME:	**4:00**
RE-PRESS TIME:	**2:00** ← Note 2-minute Re-press Time
COOL TIME:	**0:00**

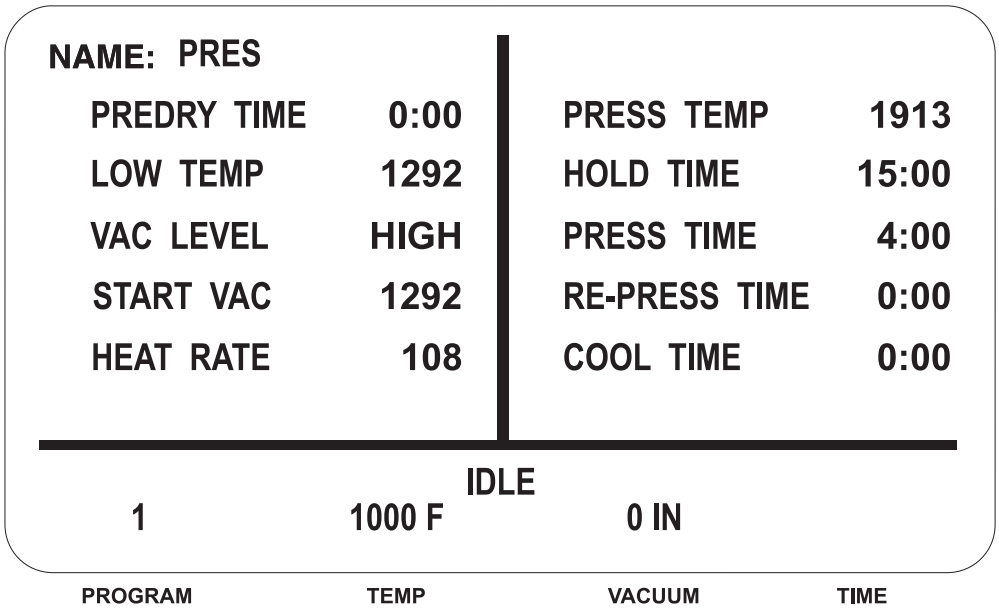


Figure 4. VIP Furnace LCD Digital Display Showing Default Parameter Settings for Pressing Programs #0 to 19

Notes:

1. When running a press program (#0 to 19), the Press Plunger position is displayed in place of IDLE on the display status line. When program is completed, the message PROGRAM COMPLETE is displayed along with the maximum plunger position that was achieved during the run cycle.
2. See Table 2 definition for PRESS TIME.
3. See Table 2 definition for RE-PRESS TIME.

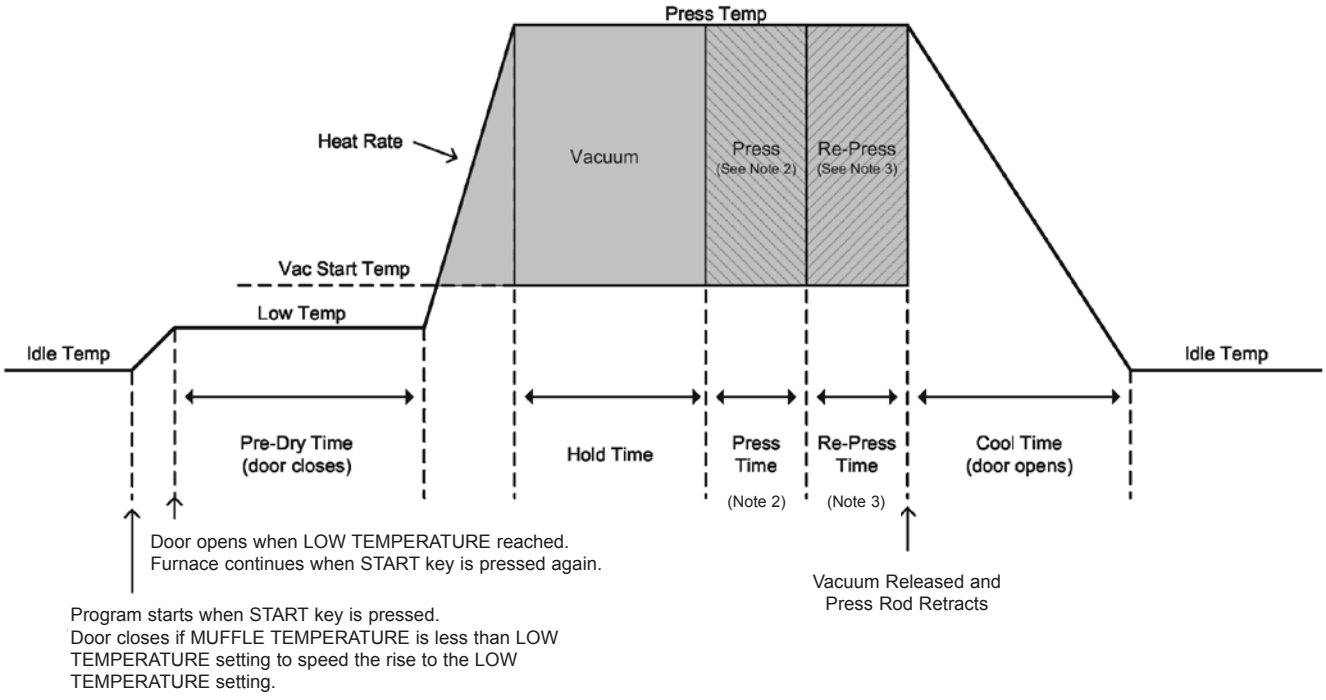


Figure 5. VIP Furnace Muffle Temperature Curve for Pressing Programs

The VIP Furnace allows 80 different user-generated porcelain firing programs (# 20 - 99) to be stored in its Intelligent Memory System. These programs are created or edited as needed by selecting program parameters via the 20-Key Front-Panel Keypad. Table 3 lists each available parameter, range and definition used to create porcelain firing programs. Figure 6 shows a typical front-panel program display and Figure 7 provides the VIP Furnace Muffle Temperature Curve for Porcelain Programs

Table 3. Available Porcelain Firing Program (# 20 - 99) Variables

PARAMETER	RANGE*	DEFINITION
PRE-DRY TIME	0 to 99 min. 59 sec.	Selected amount of time door completes movement from fully open position to fully closed position.
DRY TIME	0 to 99 min. 59 sec.	Selected amount of time during which door remains closed, and Muffle is maintained at LOW TEMP. If the START VAC TEMP is higher than the LOW TEMP, then the DRY TIME **will be without vacuum**. After the DRY TIME is completed the temperature will rise to the START VAC TEMP and the vacuum pump will turn on. If the START VAC TEMP is the same as the LOW TEMP then the DRY TIME **will be done with vacuum**. After the DRY TIME is completed, the furnace will heat to the VAC RELEASE TEMP and HIGH TEMP.
LOW TEMP	150 to 2150°F (66 to 1176°C)	The temperature at which the cycle starts.
VAC LEVEL	0 10 to 29 in Hg (25 to 74 cm Hg) 1 2	**Note:** FULL or HIGH vacuum is recommended for all programs Vacuum at which work is required to be fired. There are four options: OFF = Vacuum pump is not used. START VAC TEMP, VAC RELEASE TEMP and HOLD TIME W/VAC are not used. Vacuum pump turns on and off as needed to maintain selected value. FULL= Vacuum pump turns on and off as needed to maintain 26.5 in-Hg (67.3 cm-Hg). HIGH= Vacuum pump turned on continuously allowing maximum vacuum available.
START VAC TEMP	This value cannot be less than LOW TEMP and must be less than VAC RELEASE TEMP.	Temperature at which vacuum will turn on. If selected value of START VAC TEMP is equal to LOW TEMP, vacuum starts as soon as door is closed.
HEAT RATE	40 to 250°F/min (22 to 139°C/min)	Rate at which Muffle temperature increases with time.
VAC RELEASE TEMP	VAC RELEASE TEMP must be greater than START VAC TEMP and not greater than HIGH TEMP	Vacuum release temperature can be programmed to release vacuum before HIGH TEMP, at HIGH TEMP, or after holding at HIGH TEMP for HOLD TIME W/VAC setting.
HIGH TEMP	Must exceed LOW TEMP (vacuum not used), cannot be less than VAC RELEASE TEMP (vacuum used) and can not exceed 2200° F/1204° C.	Maximum temperature to which work must be heated during processing cycle.
HOLD TIME W/ VAC	0 to 99 min. 59 sec.	Amount of time vacuum will be held at HIGH TEMP. When this time elapses, vacuum will be released.
HOLD TIME NO VAC	0 to 99 min. 59 sec.	Amount of time furnace will maintain HIGH TEMP after vacuum is released.
COOL TEMP	Any TEMP equal to or below HIGH TEMP min.150° F/66° C	Temperature furnace will cool down to with door closed. Default temperature is HIGH TEMP
COOL HOLD	0 to 99 min. 59 sec.	Amount of time furnace will maintain COOL TEMP before door opens. COOL HOLD is not used when COOL TEMP is set to HIGH TEMP.
COOL TIME	0 to 99 min. 59 sec.	Selected amount of time that the door completes movement from fully closed position to fully opened position.

***Note:** Attempts to enter a value outside of acceptable limits will result in an INVALID ENTRY message on the Display.

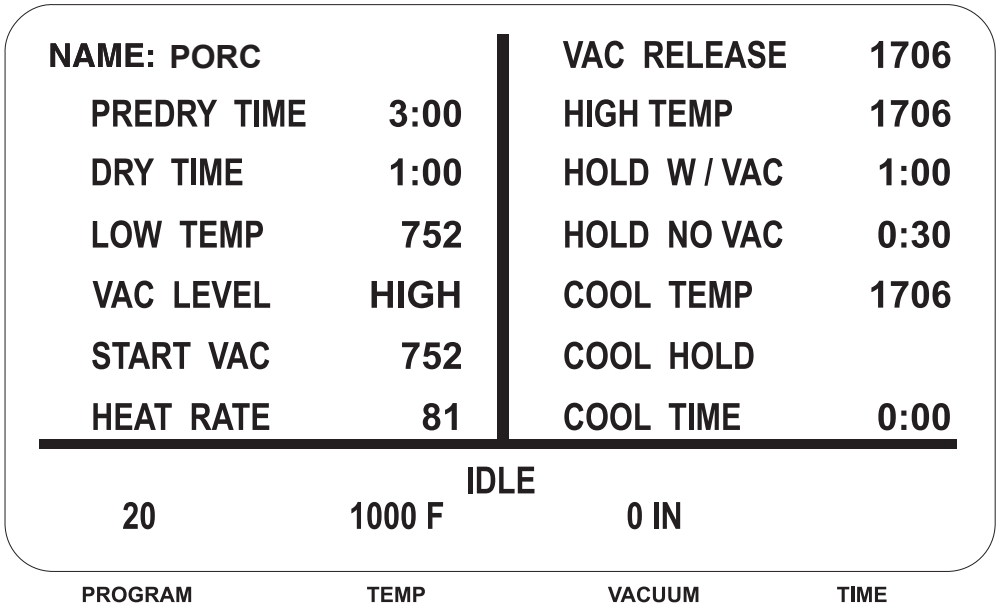
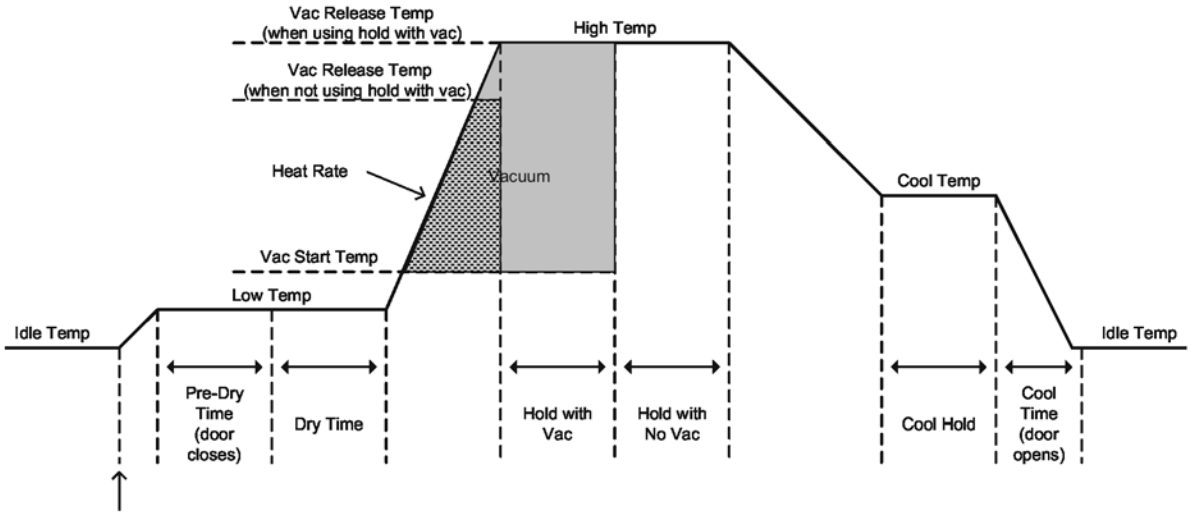


Figure 6. VIP Furnace LCD Digital Display Showing
Default Parameter Settings for Porcelain Programs #20 to 99



Program Starts. Door opens, if closed, when heating up to LOW TEMPERATURE setting to allow work to be placed onto Firing Block.

Figure 7. VIP Furnace Muffle Temperature Curve for Porcelain Programs

EDITING PARAMETERS: PROGRAMS #0-99

Note: If an input error occurs when using the keypad, press the **CLEAR** (▼) key and then press the correct values. Time is expressed in minutes and seconds. For example, one minute is entered as **1:00**, which is **one** minute and **zero** seconds.

User-generated pressable ceramic firing programs (# 0 - 19) and porcelain firing programs (# 20 - 99) parameters are edited as needed by selecting program numbers and entering values via the command and alpha/numeric keys of the 20-Key Front-Panel Keypad. The LCD Digital Display clearly shows all information at all times for the selected program. As shown by Figure 8, this display is divided into two sections. The top (larger) section is the program parameter display section, which shows the current program parameters. The lower (smaller) area under the horizontal line is the second display section. This second section shows the program status during operation and the value being edited while in the EDIT mode. Also when in the EDIT mode, a square status indicator is next to the individual parameter that can be (or is being) changed. This status indicator advances to the next parameter after the new desired parameter is entered by pressing the **ENTER/REVIEW** key.

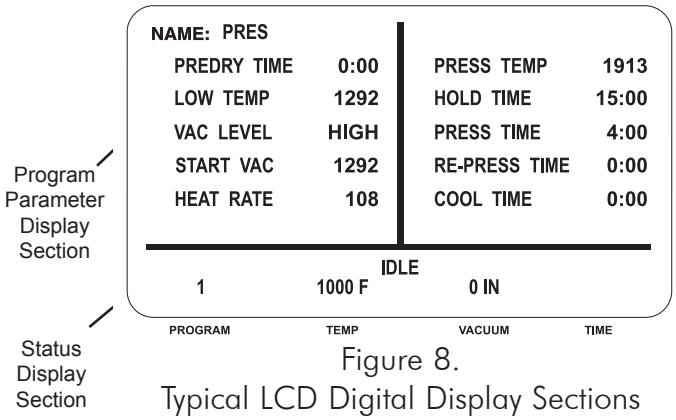


Figure 8.
Typical LCD Digital Display Sections

Refer to Table 2 for parameters of pressable ceramic firing programs (# 0 - 19) or Table 3 for parameters of porcelain firing programs (# 20 - 99) as necessary and edit firing programs (# 0 - 99) by performing the following procedures.

1. **PROGRAM SELECT.** Push the **PROGRAM SELECT** key then enter the program number to be created or edited, and finally press the **ENTER/REVIEW** key. Note that the program number appears on the lower left-hand portion of the status display.
2. **EDIT MODE.** Push the **EDIT** key. Note that the parameter being edited appears on the status display. When in the EDIT mode any or all information of the selected program can be input or changed as shown on the status display.
3. **FRONT PANEL DISPLAY.** The LCD Digital Display continuously shows all current program parameters. The next parameter in that program to be edited will appear on the status display each time the **ENTER/REVIEW** key is pressed. Initially the display reads NAME.
4. **NAME PROGRAM.** When the message NAME appears on the status display, enter the desired name by sequentially pressing the appropriate alpha/numeric keys. Press **ENTER/REVIEW** key on the keypad after the desired name is entered and observe that the top program parameter display section shows the new program name.

   Enter the name one character at a time by sequentially pressing the appropriate alpha/numeric key. For example, sequentially pressing the **2** key changes the displayed character on the status display from D to E to F to 2 and back to D. Changing to a different key automatically shifts to the next cursor position. If no key is pressed for 2 to 3 seconds the cursor automatically moves to the next character position. To repeat a character entry (e.g. LL) enter the first character, wait 2 to 3 seconds for the cursor to move to the next position and enter the second character in the new position. To enter a space press the **0** (▲) key twice. To correct a character input error, press the **CLEAR** (▼) key and reenter the correct character.

5. **PRE-DRY TIME.** When the message PRE-DRY TIME appears on the status display, enter the value desired by depressing the proper numbers on the alpha/numeric keypad. After the proper value is entered, press the **ENTER/REVIEW** key and observe that the top program parameter display section shows the new PRE-DRY TIME value.
6. **DRY TIME.** When the message DRY TIME appears on the status display, enter the desired value by depressing the proper numbers on the keypad. After the proper value is entered, press the **ENTER/REVIEW** key and observe that the top program parameter display section shows the new DRY TIME value.

   If the START VAC temperature is higher than the LOW TEMP then the DRY TIME will be without vacuum. After the DRY TIME is complete the temperature will rise to the START VAC temperature and the vacuum pump will then turn on.

   If the START VAC temperature is the same as the LOW TEMP, then the DRY TIME will be done with vacuum. After the DRY TIME is complete, the furnace will heat to the VAC RELEASE temperature and HIGH TEMP.
7. **LOW TEMP.** Now enter the desired LOW TEMP. After pressing the **ENTER/REVIEW** key, the message VAC LEVEL will appear on the status display.

   Note: The FULL or HIGH setting is recommended for all programs requiring vacuum.
8. **VAC LEVEL.** The VAC LEVEL is displayed on the status display as one of the following:
   a. FULL - Vacuum pump turns on and off as needed to maintain 26.5 in-Hg (67.3 cm-Hg).
   b. HIGH - Vacuum pump turned on continuously allowing maximum vacuum available..
   c. OFF - no vacuum desired.
   d. PARTIAL VACUUM - 10 to 29 in Hg (25 - 74 cm. Hg) if a level less than FULL is desired.

      To select the desired vacuum level:

      For High Vacuum, press 2 on Keypad, then the **ENTER/REVIEW** key.

      For Full Vacuum, press 1 on the Keypad, then the **ENTER/REVIEW** key.

      For No Vacuum, press 0 on the Keypad, then the **ENTER/REVIEW** key.

      For Partial Vacuum, press the digits for the numerical value of the vacuum desired between 10 and 29 in Hg (25 and 74cm Hg), then the **ENTER/REVIEW** key.

      (We suggest you select a vacuum level only if you want less than FULL vacuum).

   Note: The VIP Furnace skips the vacuum start temperature parameter (START VAC) setting and goes to the heat rate parameter (HEAT RATE) if the No Vacuum setting has been selected (run a program without vacuum).
9. **START VAC.** When a vacuum setting has been selected (See step 8.), the message START VAC is displayed on the status display requesting a value for the START VAC temperature. The VIP Furnace has a feature that enables a program to start without vacuum and then have the vacuum come on later at a specific temperature.

   If the vacuum is desired to start as soon as the door closes at LOW TEMP, enter the same value for the START VAC temperature as is entered for the LOW TEMP value (step 7).

   If it is desired to start the vacuum at a temperature higher than the LOW TEMP, enter this higher value for START VAC temperature.

   When the appropriate temperature value has been entered, press the **ENTER/REVIEW** key and observe that the top program parameter display section shows the new START VAC temperature value. The message HEAT RATE now appears on the status display.

10. **HEAT RATE.** The VIP Furnace can be programmed to operate at any heat rate from 40 to 250°F/ min. (22 to 139°C/ min.). Enter the HEAT RATE desired on the keypad. When the chosen value has been entered, press the **ENTER/REVIEW** key and observe that the top program parameter display section shows the new HEAT RATE value. For porcelain programs, the message VAC RELEASE appears on the status display. The message PRESS TEMP (step 17) appears on the status display for pressable ceramic programs.

    Note: Steps 11 through 16 pertain to porcelain programs only.
    Proceed to step 17 when working with pressable ceramic programs.

11. **VAC RELEASE.** The vacuum can be released below HIGH TEMP, at HIGH TEMP, or after holding at HIGH TEMP for the HOLD TIME W/VAC setting. Enter the VAC RELEASE temperature desired on the keypad. When the chosen temperature value has been entered, press the **ENTER/ REVIEW** key and observe that the top program parameter display section shows the new VAC RELEASE value. The message HIGH TEMP now appears on the status display.
12. **HIGH TEMP.** Enter on the keypad any value equal to or greater than the VAC RELEASE temperature selected in step 11, up to a value of 2200°F (1204°C). Press the **ENTER/REVIEW** key and observe that the top program parameter display section shows the new HIGH TEMP value.
13. **HOLD W/VAC.** When a HIGH TEMP value equal to the VAC RELEASE temperature is selected, the message HOLD W/VAC appears on the status display after pressing the **ENTER/REVIEW** key. Enter the time desired; from 0 to 99 minutes, to have the furnace execute HOLD W/VAC at HIGH TEMP before releasing vacuum.
14. **HOLD NO VAC.** If a VAC RELEASE temperature lower than the HIGH TEMP has been selected, the furnace cannot execute HOLD W/VAC at HIGH TEMP since the vacuum has already been released. The VIP Furnace Intelligent Memory System knows this and the square status indicator will skip over this setting right to the HOLD NO VAC (hold time without vacuum). Enter the time desired; from 0 to 99 minutes, to hold without vacuum at HIGH TEMP.
15. **COOL TEMP.** Enter the desired COOL TEMP, between 150°F (66°C) and the HIGH TEMP. When the chosen temperature value has been entered, press the **ENTER/REVIEW** key and observe that the top program parameter display section shows the new COOL TEMP value.

    Note: COOL HOLD is not used when COOL TEMP is set to HIGH TEMP.

16. **COOL HOLD.** Enter the desired COOL HOLD time between 0 and 99 minutes. This is the holding time at COOL TEMP. When the chosen time value has been entered, press the **ENTER/ REVIEW** key and observe that the top program parameter display section shows the new COOL HOLD value.
17. **PRESS TEMP.** Enter the desired PRESS TEMP between START VAC + 2°F/1°C and 2200°F (1204°C). When the chosen value has been entered, press the **ENTER/REVIEW** key and observe that the top program parameter display section shows the new PRESS TEMP value. The message HOLD TIME appears on the status display.
18. **HOLD TIME.** Enter the time desired; from 0 to 99 minutes. When the value has been entered, press the **ENTER/REVIEW** key and observe that the top program parameter display section shows the new HOLD TIME value. The message PRESS TIME appears on the status display.
19. **PRESS TIME.** Enter the time desired; from 1 to 99 minutes. When the value has been entered, press the **ENTER/REVIEW** key and observe that the top program parameter display section shows the new PRESS TIME value. The message RE-PRESS TIME appears on the status display.
20. **RE-PRESS TIME.** Enter the time desired; from 0 to 99 minutes. When the value has been entered, press the **ENTER/REVIEW** key and observe that the top program parameter display section shows the new RE-PRESS TIME value. The message COOL TIME appears on the status display.
21. **COOL TIME.** Enter the desired COOL TIME, between 0 and 99 minutes. When the time value has been entered, press the **ENTER/REVIEW** key and observe that the top program parameter display section shows the new COOL TIME value. The message NAME now appears on the status display. You have now completed entering the information into this program. Press EDIT to go out of the EDIT mode and return to IDLE mode.

EDITING WHILE PROGRAM IS RUNNING

- ❑ After a program has started, all programmed information (except NAME and LOW TEMP) may be edited only if the parameter to be edited has not yet been reached in the program. After pressing the **EDIT** key, if no other key is pressed, the EDIT mode will turn off in 5 seconds.
- ❑ When changing vacuum parameters during PRE DRY TIME, the START VAC temperature will be initially set to LOW TEMP.
- ❑ HEAT RATE may not be changed after the DRY TIME mode is completed and heating has begun.
- ❑ After the program is completed, the modified parameters return to the original programmed numbers. The LCD Digital Display continuously shows all programmed parameters.

Note: If an input error occurs when using the keypad, press the **CLEAR** (▼) key and then press the correct values.

PROGRAM SCROLL FEATURE

The VIP furnace provides two methods to rapidly locate a specific program. They include special program 640 (refer to page 26) and a built-in Scroll mode feature. Using the Scroll mode allows the user to scroll through all firing programs in numerical order. Perform scrolling by pressing the **PROGRAM SELECT** key. Once operating in the Program Select mode, pressing the **PROGRAM SELECT** key again advances to the next program. This can be repeated to continue advancing through the available programs. A specific program number may also be entered. Press the **ENTER/REVIEW** key to select the currently displayed program and to exit from program select mode.

Note: All programs **must** run from the beginning.

STARTING A PROGRAM

To change or run a firing program, it is necessary to select the desired program and have it displayed on the LCD Digital Display.

1. Enter or scroll to the desired program number using the **PROGRAM SELECT** key as described in the section above. The selected program number, name and parameters will be displayed on the LCD Digital display.
2. If desired, edit program parameters using the **EDIT** key as described in section above.
3. Press the **START** key to start the program.
   When a pressing program is started, the door closes when the Muffle temperature is below the Low Temp setting to help speed up the rise to Low Temp. The message PRE-PRESS is displayed while checking that there is adequate compressed air pressure to operate the press plunger.
   When the Low Temp setting is reached, the furnace door opens, the message PRESS START AGAIN is displayed and a continuous beep sounds to indicate the furnace is ready to accept the hot ring from the burn-out oven. The beeping can be silenced by pressing any key. The **START** key must be pressed again to clear the message and to continue with the press firing cycle.
   When a regular porcelain is started, the furnace door opens, if closed, to allow placement of the work onto the firing block. The furnace then heats to the Low Temp setting and closes the door per the programmed pre-dry time setting.
4. While the program is running, the LCD Digital display shows a solid square indicator next to each completed program step and a flashing square indicator next to the step currently running.
5. Press the **CANCEL** key to stop the program while it is in progress.
6. When the program is completed, the furnace displays the message PROGRAM COMPLETE. If a pressing program was completed, the furnace also displays the maximum plunger position that was achieved during the run. Press **any** key to clear this message and return to Idle mode.
7. The program can be re-started from the beginning by pressing the **START** key again.

USING OVERRIDE

Important: The Override feature is **only used** when running porcelain firing programs (# 20 - 99)

INTRODUCTION

Override is a feature that allows work to be reintroduced into the hot Muffle for rework. It allows the work material to be re-heated to the programmed HIGH TEMP setting or to a higher setting for one minute . No Vacuum is used during Override process.

WHEN OVERRIDE CAN BE ACTIVATED

Initially, OVERRIDE can only be activated during COOL TIME of a porcelain firing program, as the door is coming down. Once the program is completed, Override cannot be activated. If it is desired to reintroduce the work after this cycle's completion, a new cycle would have to be initiated.

HOW TO ACTIVATE OVERRIDE

Press the **OVERRIDE** key to initiate an Override cycle. At this point, OVERRIDE is displayed. To increase HIGH TEMP press the **OVERRIDE** key again. Every time the **OVERRIDE** key is pressed, the HIGH TEMP value increases by one degree. (The original stored value for HIGH TEMP in your program is not affected.) The work will return into the hot Muffle for one additional minute starting from the moment HIGH TEMP is reached.

At the end of the one minute Override cycle, the programmed cooling cycle (COOL TEMP, COOL HOLD, COOL TIME) begins. This process may be repeated as many times as necessary. Each additional Override cycle begins at the originally programmed HIGH TEMP and lasts for 1 minute.

HOW TO CANCEL OVERRIDE

The Override cycle can be cancelled at any time by pressing the **CANCEL** key. When cancelled, the message PROGRAM CANCELED appears on the status display and the furnace door opens at maximum speed.

USING QUICK PRE-COOL OR QUICK COOL

Note: During Quick Pre-Cooling, the vacuum pump turns on **only** when the Muffle temperature exceeds the programmed low temperature setting.

QUICK PRE-COOLING FEATURE

Quick Pre-Cooling turns on the vacuum pump connected to the furnace after a program has been started to cool the Muffle down to the programmed low temperature setting. This feature can be automatically or manually activated. Manual activation is done by pressing the **QUICK COOL** key after the program has been started. Automatic activation of Quick Pre-Cooling is set when special program #800 is enabled. After being turned on, the vacuum pump may be manually turned off, when desired, by pressing the **QUICK COOL** key.

QUICK COOLING FEATURE

Quick Cooling turns on the vacuum pump connected to the furnace while the door is being opened during the cool time step of a running program. This helps to cool the Muffle down to the programmed low temperature setting. Manual activation is done by pressing the **QUICK COOL** key during the cool time step. Automatic activation of Quick Cooling is set when special program #810 is enabled. After being turned on, the vacuum pump may be manually turned off, when desired, by pressing the **QUICK COOL** key.

CONTRAST ADJUSTMENT IN THE IDLE MODE

To adjust the contrast of the display in the IDLE mode press the **0** (▲) key. Observe that a contrast graph is displayed as shown at right.

Use the **CLEAR** (▼) key and the **0** (▲) key to adjust the contrast of the display. When the desired contrast is obtained, press the **ENTER/REVIEW** key to save the setting.

Table 4 provides a summary of the 24 different permanent Special Programs provided with the VIP Furnace. These programs allow the user to quickly set operational preferences and perform maintenance. The available Special Programs are listed in the table by program number, program name, default setting and page number where the particular program is described in this manual.

Table 4. Summary of Available Special Programs

PROGRAM NUMBER	PROGRAM NAME	DEFAULT SETTING	PAGE NUMBER
100	Manually Activate Nite Mode	Not Applicable	22
1XX	Enable Automatic Nite Mode (for program #XX from 01 to 99)	Not Applicable	22
200	Run Decontamination with Vacuum	Not Applicable	22
210	Run Decontamination without Vacuum	Not Applicable	22
300	Adjust Low Temp Under/Over Fires	0	23
310	Adjust High Temp Under/Over Fires	0	23
320	Adjust Very High Temp Under/Over Fires	0	24
400	Run Muffle Conditioning	Not Applicable	24
410	Enable Automatic Muffle Conditioning at Power-Up	Not Enabled	24
500	Enable Automatic Door Close	Not Enabled	25
600	Print Current Program	Not Applicable	25
610	Print Selected Range of Programs	Not Applicable	25
620	Used with optional iBOX Transfer Box. Used to Copy furnace programs to and from the iBOX™.	Not Applicable	See iBOX™ Manual PN A4270
640	List User Firing Programs	Not Applicable	26
700	Set Idle Temperature	1000°F (538°C)	26
800	Enable Automatic Quick Pre-Cooling	Not Enabled	26
810	Enable Automatic Quick Cooling	Not Enabled	27
830	Enable Automatic Decontamination Reminder Message	Not Enabled	27
910	Adjust Display Backlight Brightness	100%	27
912	Select English Units (ie: °F, in-Hg, inches)	Default for 120V Models	27
913	Select Metric Units (ie: °C, cm-Hg, centimeters)	Default for 230V Models	28
914	Audible Beeps On/Off	On	28
915	Display Software/ Hardware Rev Level	Not Applicable	28
951	Run Diagnostic Tests	Not Applicable	28

SPECIAL PROGRAMS

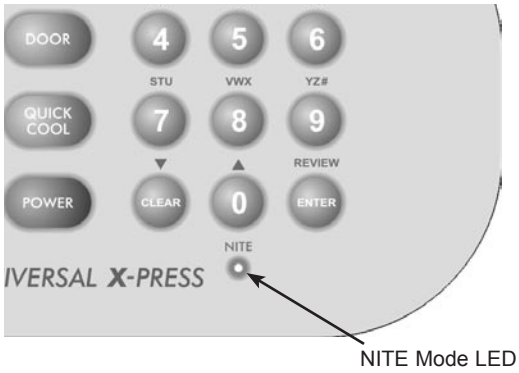
MANUALLY ACTIVATE NITE MODE

Program # 100

This program keeps the furnace door closed and maintains the Muffle temperature at 250°F (121°C).

Place the furnace in NITE mode by simply pressing the **PROGRAM SELECT** key, entering program number 100, and pressing the **ENTER/REVIEW** key. Observe that the door closes, the display goes dark and the NITE mode LED illuminates RED.

Press the **CANCEL** key to get out of NITE mode.



AUTOMATIC NIGHT MODE

(Upon completion of Programs # 1 - 99)

When 100 is added to the program number, the VIP Furnace will complete the program, cool down to a temperature of 250°F (121°C), then close the door and go into NITE mode automatically.

Example: Program number 2 plus 100 = Program 102. This program displays 2N and automatically go into NITE mode upon completion of the program after the furnace cools down to 250°F (121°C).

NAME: PRES			
PREDRY TIME	0:00	PRESS TEMP	1913
LOW TEMP	1292	HOLD TIME	20:00
VAC LEVEL	HIGH	PRESS TIME	8:00
START VAC	1292	REPRES TIME	0:00
HEAT RATE	108	COOL TIME	0:00

IDLE

PROGRAM	TEMP	VACUUM	TIME
2N	500 F	0 IN	

RUN DECONTAMINATION WITH VACUUM

Program # 200

This program should be run with Jelrus Pur-I-Fire™ charcoal pellets to remove metallic oxide contaminants from the Muffle after running a number of porcelain to-metal-programs.

Simply place Pur-I-Fire™ decontamination pellets into their tray and place onto the firing block. Select the program by pressing the **PROGRAM SELECT** key, entering program number 200, and pressing the **ENTER/REVIEW** key. Press the START key and the program runs automatically. The LCD Digital Display shows the program parameters while in progress.

NAME: DECONT W VAC			
PREDRY TIME	0:00	VAC RELEASE	2000
DRY TIME	0:00	HIGH TEMP	2000
LOW TEMP	1200	HOLD W / VAC	10:00
VAC LEVEL	FULL	HOLD NO VAC	0:00
START VAC	1200	COOL TEMP	2000
HEAT RATE	100	COOL HOLD	
		COOL TIME	0:00

DECONTAMINATE-W / VAC

PROGRAM	TEMP	VACUUM	TIME
200	500 F	0 IN	

RUN DECONTAMINATION WITHOUT VACUUM

Program # 210

Jelrus Pur-I-Fire™ charcoal pellets are not needed for this program, which is used to burn off ceramic ingot contaminants from the Muffle after running a number of pressing programs.

Select the program by pressing the **PROGRAM SELECT** key, entering program number 210, and pressing the **ENTER/REVIEW** key. Press the START key and the program runs automatically. The LCD Digital Display shows the program parameters while in progress.

NAME: DECONT NO VAC			
PREDRY TIME	0:00	VAC RELEASE	
DRY TIME	0:00	HIGH TEMP	2000
LOW TEMP	1200	HOLD W / VAC	
VAC LEVEL	OFF	HOLD NO VAC	10:00
START VAC		COOL TEMP	2000
HEAT RATE	100	COOL HOLD	
		COOL TIME	0:00

DECONTAMINATE-NO VAC

PROGRAM	TEMP	VACUUM	TIME
210	500 F	0 IN	

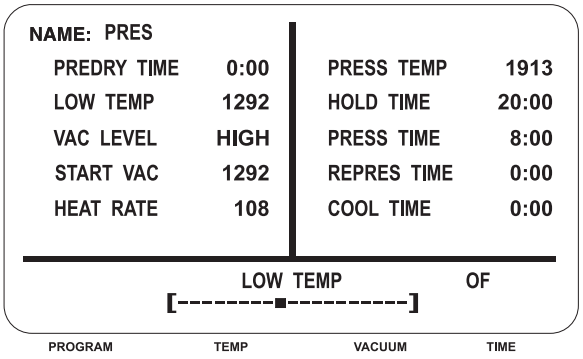
Note: The displayed number indicates the number of degrees + (overfired) or - (underfired) from the factory calibration setting. The horizontal bar is a graphic indication of the adjustment setting.

ADJUST LOW TEMP UNDER/OVER FIRES

Program # 300

This program allows the Muffle temperature to be adjusted for programs with a HIGH TEMP (porcelain programs) or a PRESS TEMP (pressing programs) setting less than or equal to 1500°F (816°C).

Press the **PROGRAM SELECT** key, enter program number 300, and press the **ENTER/REVIEW** key. Observe that a horizontal temperature bar appears on the status display section.



Make the following adjustment as necessary.

1. **Overfired Temperature Adjustment.** When the work looks **overfired**, press the **0** (▲) key one or more times as needed to move the temperature bar indicator to the right until it shows the number of degrees the work material appears to be overfired. Press the **ENTER/REVIEW** key and the temperature automatically adjusts by the value entered. Press the **CANCEL** key to exit without changing the setting.
2. **Underfired Temperature Adjustment.** When the work looks **underfired**, press the **CLEAR** (▼) key one or more times as needed to move the temperature bar indicator to the left until it shows the number of degrees the work material appears to be underfired. Press the **ENTER/REVIEW** key and the temperature automatically adjusts by the value entered. Press the **CANCEL** key to exit without changing the setting.

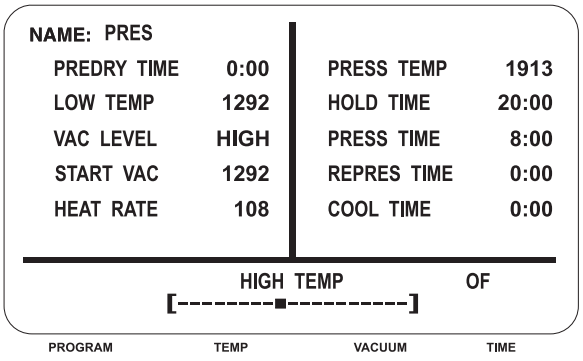
Note: The displayed number indicates the number of degrees + (overfired) or - (underfired) from the factory calibration setting. The horizontal bar is a graphic indication of the adjustment setting.

ADJUST HIGH TEMP UNDER/OVER FIRES

Program # 310

This program allows the Muffle temperature to be adjusted for programs with a HIGH TEMP (porcelain programs) or a PRESS TEMP (pressing programs) setting above 1500°F (816°C) but less than or equal to 1800°F (982°C).

Press the **PROGRAM SELECT** key, enter program number 310, and press the **ENTER/REVIEW** key. Observe that a horizontal temperature bar appears on the status display section.



Make the following adjustment as necessary.

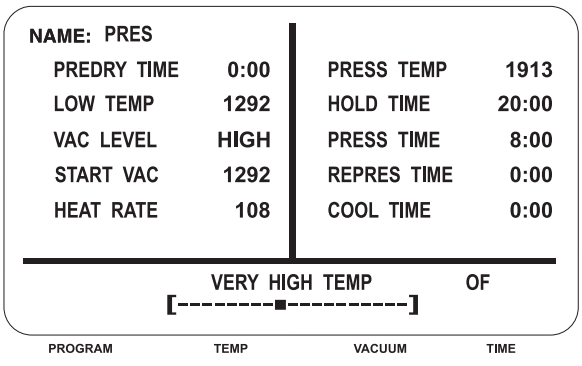
1. **Overfired Temperature Adjustment.** When the work looks **overfired**, press the **0** (▲) key one or more times as needed to move the temperature bar indicator to the right until it shows the number of degrees the work material appears to be overfired. Press the **ENTER/REVIEW** key and the temperature automatically adjusts by the value entered. Press the **CANCEL** key to exit without changing the setting.
2. **Underfired Temperature Adjustment.** When the work looks **underfired**, press the **CLEAR** (▼) key one or more times as needed to move the temperature bar indicator to the left until it shows the number of degrees the work material appears to be underfired. Press the **ENTER/REVIEW** key and the temperature automatically adjusts by the value entered. Press the **CANCEL** key to exit without changing the setting.

ADJUST VERY HIGH TEMP UNDER/OVER FIRES

Program # 320

This program allows the Muffle temperature to be adjusted for programs with a HIGH TEMP (porcelain programs) or a PRESS TEMP (pressing programs) setting above 1800°F (982°C).

Press the **PROGRAM SELECT** key, enter program number 320, and press the **ENTER/REVIEW** key. Observe that a horizontal temperature bar appears on the status display section.



Make the following adjustment as necessary.

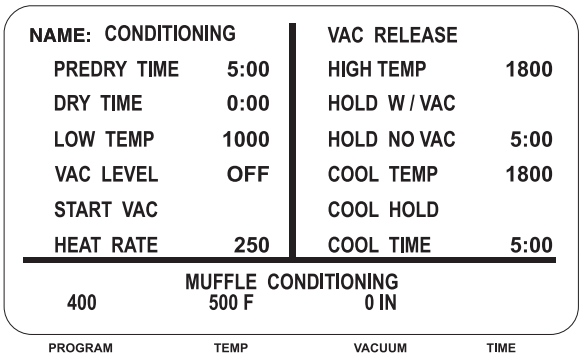
1. **Overfired Temperature Adjustment.** When the work looks **overfired**, press the **0** (▲) key one or more times as needed to move the temperature bar indicator to the right until it shows the number of degrees the work material appears to be overfired. Press the **ENTER/REVIEW** key and the temperature automatically adjusts by the value entered. Press the **CANCEL** key to exit without changing the setting.
2. **Underfired Temperature Adjustment.** When the work looks **underfired**, press the **CLEAR** (▼) key one or more times as needed to move the temperature bar indicator to the left until it shows the number of degrees the work material appears to be underfired. Press the **ENTER/REVIEW** key and the temperature automatically adjusts by the value entered. Press the **CANCEL** key to exit without changing the setting.

Note: Equipment cannot be assumed to meet all the safety requirements of UL61010A-1 during the Muffle conditioning process.

RUN MUFFLE CONDITIONING

Program # 400

Select the program by pressing the **PROGRAM SELECT** key, entering program number 400, and pressing the **ENTER/REVIEW** key. Press the **START** key and the program runs automatically. The LCD Digital Display shows the program parameters while in progress. Muffle conditioning is required to remove absorbed moisture from the insulation materials within the Muffle chamber.



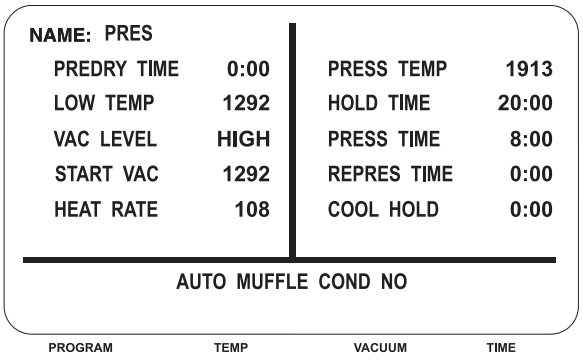
ENABLE AUTOMATIC MUFFLE CONDITIONING AT POWER UP

Program # 410

This program provides an option to automatically run Muffle conditioning program #400 when the **POWER** key is pressed to turn the furnace on. When enabled, this feature ensures that the Muffle temperature has reached thermal equilibrium (and will have better temperature control performance) before any user firing program is run.

By default, this feature is disabled.

This feature may be enabled or disabled by pressing the **PROGRAM SELECT** key, entering program number 410, and pressing the **ENTER/REVIEW** key. When AUTO MUFFLE COND displays on the status line, press the **0** (▲) key to select **no** (disabled) or the **1** key to select **yes** (enabled) and then press the **ENTER/REVIEW** key to save the selected setting.



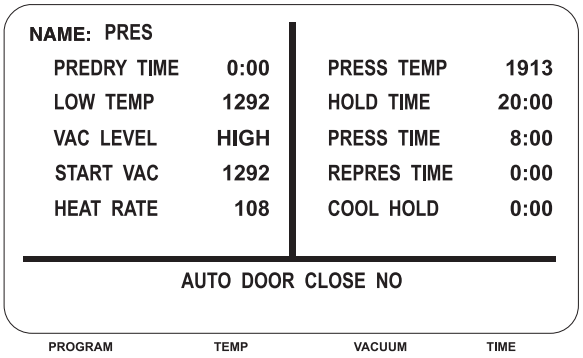
Note: The Automatic Door Close Program #500 only functions when the furnace is operating in the Idle mode and not at the completion of a program (program complete displayed).
Make sure to press any key at the end of a program to place the furnace in the Idle mode.

ENABLE AUTOMATIC DOOR CLOSE

Program # 500

Press the **PROGRAM SELECT** key, enter program number 500, and press the **ENTER/REVIEW** key. The LCD Digital Display shows AUTO DOOR CLOSE NO on the status line.

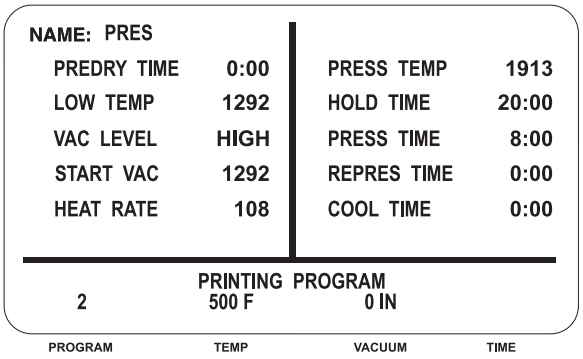
Press **0** for NO or **1** through **99** for the time duration in minutes, then press the **ENTER/REVIEW** key. The door will automatically close after the entered number of minutes of no activity during IDLE mode. Factory setting is NO.



PRINT CURRENT PROGRAM

Program # 600

Connect a IBM compatible printer to the printer port on the rear of the VIP Furnace. Press the **PROGRAM SELECT** key, enter program 600 and press the **ENTER/REVIEW** key. The currently selected program that was displayed before entering program 600 will be printed.



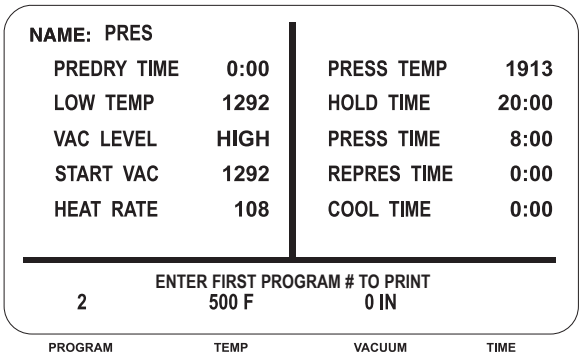
PRINT SELECTED RANGE OF PROGRAMS

Program # 610

This program allows a selected range of up to 100 firing programs (ie. 0 to 99) to be printed on an IBM compatible text printer connected to the printer port on the rear of the VIP Furnace.

Press the **PROGRAM SELECT** key, enter program 610 and press the **ENTER/REVIEW** key.

Perform the following as necessary.



Note: Up to 3 programs will be printed on a single sheet of paper before advancing to a new sheet.
Press the **CANCEL** key at any time to abort the initial program selection or printing operation.

1. When ENTER FIRST PROGRAM # TO PRINT displays on the status line, enter the first program number to be printed in the range and then press the **ENTER/REVIEW** key to accept entry or the **CLEAR** key to correct or change the entry.
2. When ENTER LAST PROGRAM # TO PRINT displays on the status line, enter the last program number to be printed in the range and then press the **ENTER/REVIEW** key to accept entry or the **CLEAR** key to correct or change the entry.
3. Observe that PRINTING PROGRAM displays on the status line while the selected program range is printing.
4. The VIP furnace returns to the Idle mode and the status line displays IDLE when all programs have been printed.

LIST USER FIRING PROGRAMS

Program #640

This program displays the names of user firing programs (ie: programs 0 – 99) on the LCD screen in groups of 10 names at a time to help the user rapidly locate and select a specific firing program.

Press the **PROGRAM SELECT** key, enter program number 640 and then press the **ENTER/REVIEW** key to display the names of programs 0 – 9. Press the **0** (▲) key to scroll forward to the next 10 program names or press the **CLEAR** (▼) key to scroll back to the previous 10 program names in sequence. The displayed program names automatically wrap around from the last to the first program group (90 – 99 to 0 – 9) or from the first to the last (0 – 9 to 90 – 99) when scrolling.

When scrolling from one LCD screen to the next, the furnace automatically displays the starting program at the bottom of this screen. To select this program, press the **ENTER** key. Select a different program from this screen by entering the number of the desired program and pressing the **ENTER** key. The furnace will return to **IDLE** mode with the parameters of the selected program being displayed.

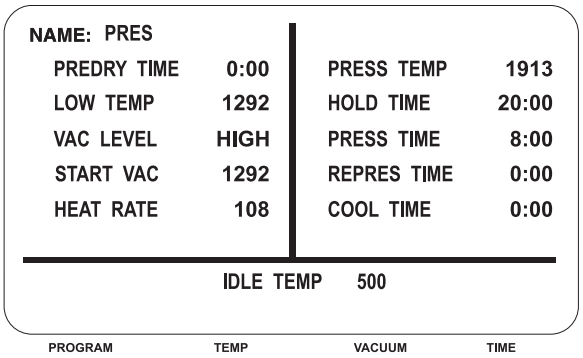
Press the **CANCEL** key at any time to return to **IDLE** mode without changing the program that was selected prior to entering program number 640.

SET IDLE TEMPERATURE

Program # 700

This program allows the user to adjust the furnace Idle temperature from the factory default of 1000°F (538°C). Adjustments between 250 and 1400°F (121 and 760°C) can be made by pressing the **PROGRAM SELECT** key, entering program number 700, entering the desired setting and pressing the **ENTER/REVIEW** key.

Example: Pressing alpha/numeric keys 2, 5 and 0 equals an adjustment to 250°F (121°C).

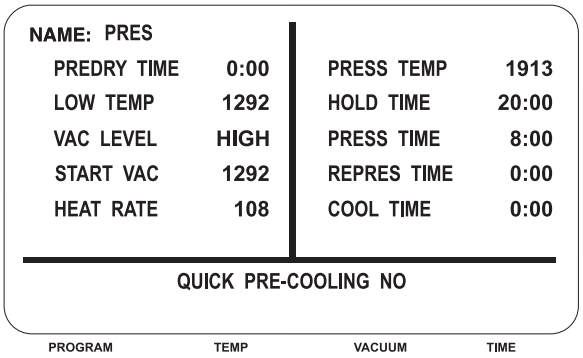


ENABLE AUTOMATIC QUICK PRE-COOLING

Program # 800

The program automatically enables a quick pre-cooling cycle for all programs by turning on the vacuum pump prior to the start of a program's pre-dry time when the Muffle temperature exceeds the low temperature setting.

Select the program by pressing the **PROGRAM SELECT** key, entering program number 800, and pressing the **ENTER/REVIEW** key. When QUICK PRE-COOLING is displayed, press the **0** (▲) key to select **no** (disabled) or the **1** key to select **yes** (enabled) and then press the **ENTER/REVIEW** key to save the selected setting.

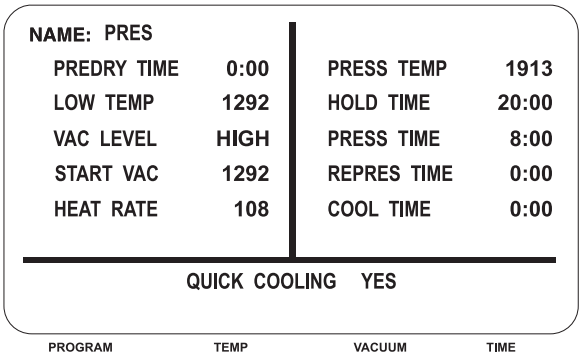


ENABLE AUTOMATIC QUICK COOLING

Program # 810

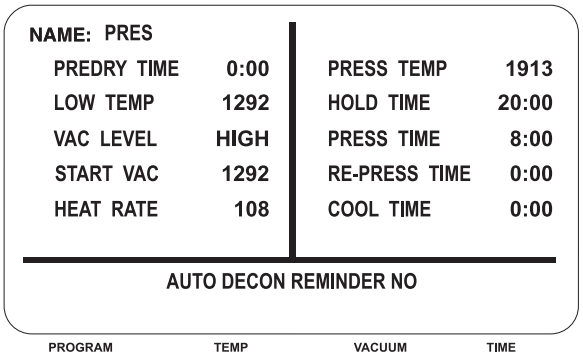
The program automatically enables a quick cooling cycle for all programs by turning on the vacuum pump when the furnace door starts to open during the user-set cool time and stays on until the Muffle temperature has dropped to the low temperature setting.

Select the program by pressing the **PROGRAM SELECT** key, entering program number 810, and pressing the **ENTER/REVIEW** key. When **QUICK COOLING** is displayed, press the **0** (▲) key to select **no** (disabled) or the **1** key to select yes (enabled) and then press the ENTER/REVIEW key to save the selected setting.



ENABLE AUTOMATIC DECONTAMINATION REMINDER MESSAGES Program #830

Automatically enables the display of a message indicating that the furnace must be decontaminated. The message will be displayed while the furnace is in Idle mode after completion of 100 user programs without either program #200 or #210 having run. When displayed, this message is removed after any key is pressed but will return after another program is run unless special program #200 or #210 is run.



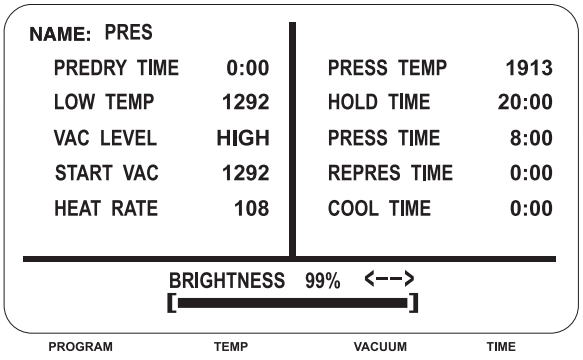
Select the program by pressing the **PROGRAM SELECT** key, entering program number 830 and then pressing the **ENTER/REVIEW** key. When AUTO DECON REMINDER is displayed, press the **0** (▲) key to select **NO** (disabled) or the **1** key to select **yes** (enabled) and press the **ENTER/REVIEW** key to save the selected setting.

ADJUST BACKLIGHT BRIGHTNESS

Program # 910

Press the **PROGRAM SELECT** key, enter program number 910 and press the **ENTER/REVIEW** key.

A horizontal brightness bar is displayed to graphically show the setting. Use the **CLEAR** (▼) key to reduce the brightness and the **0** (▲) key to increase the display brightness. When the desired brightness is obtained, press the **ENTER/REVIEW** key to memorize this setting.

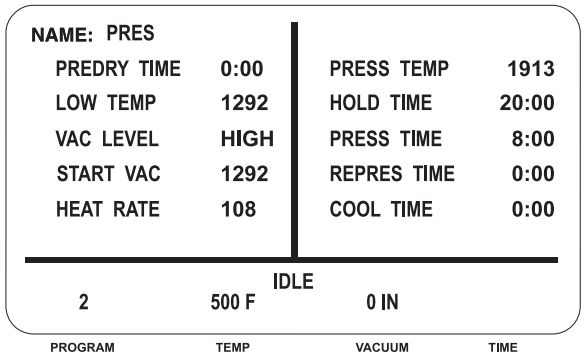


SELECT ENGLISH UNITS

Program # 912

Press the **PROGRAM SELECT** key, enter program number 912 and press the **ENTER/REVIEW** key. The LCD Digital Display of the VIP Furnace automatically switches to English units.

Temperature will now be shown in degrees Fahrenheit. Vacuum will be in inches of Hg. Press Plunger position will be displayed in inches while pressing program is running.

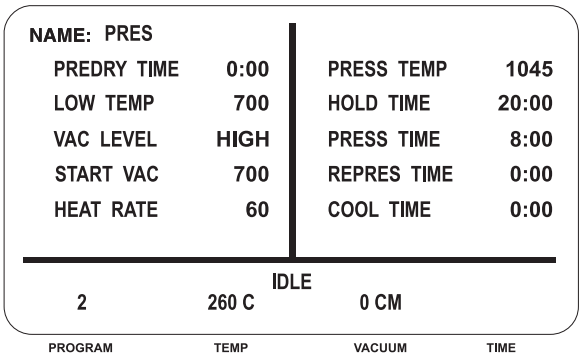


SELECT METRIC UNITS

Program # 913

Press the **PROGRAM SELECT** key, enter program number 913 and press the **ENTER/REVIEW** key. The LCD Digital Display of the VIP Furnace automatically switches to Metric units.

Temperature will now be shown in degrees Celsius. Vacuum will be in centimeters of Hg. Press Plunger position will be displayed in centimeters while pressing program is running.



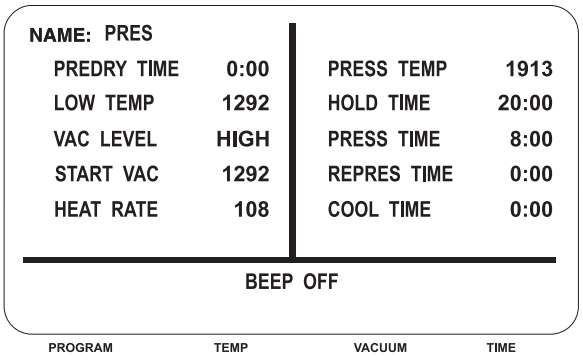
AUDIBLE BEEPS ON/OFF

Program #914

Select the program by pressing the **PROGRAM SELECT** key, entering program number 914, and pressing the **ENTER/REVIEW** key. The LCD Digital Display shows BEEP ON status.

Press the **0** key for BEEP OFF or the **1** key for BEEP ON, then press the **ENTER/REVIEW** key.

The audible tones will be ON or OFF as selected.

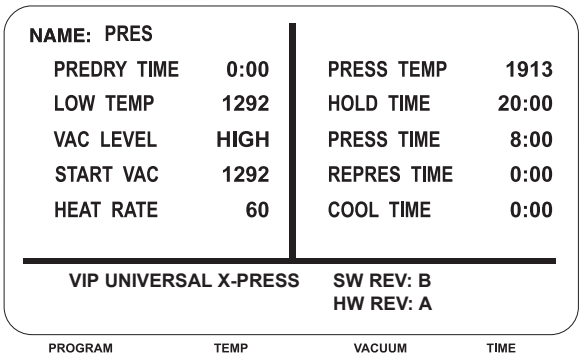


DISPLAY SOFTWARE/HARDWARE REV LEVEL

Program #915

Select the program by pressing the **PROGRAM SELECT** key, entering program number 915, and pressing the **ENTER/REVIEW** key.

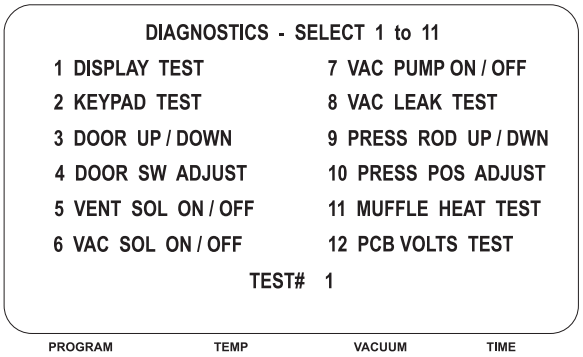
The LCD Digital Display status line shows revision level of the software and hardware currently in use with the VIP Furnace.



RUN DIAGNOSTIC TESTS

Program #951

Select the program by pressing the **PROGRAM SELECT** key, entering program number 951, and pressing the **ENTER/REVIEW** key. The LCD Digital Display shows a menu of the available 12 diagnostic tests. A specific test can be run by entering the number (1 – 12) corresponding to that test and then pressing the **ENTER/REVIEW** key.



With exception of the Display Test, which ends automatically, press the **CANCEL** key to end the test and to return to the main test selection menu. Press **CANCEL** key again when the main test selection menu is displayed to exit from Diagnostic program #951. A description of each test is provided on pages 29 and 30.

DIAGNOSTIC TEST No. 1

Display Test

Used to check that LCD display is working correctly. When selected, turns the Nite LED on, repeats the display sequence shown below 3 times, turns the Nite LED off and then returns to the main test selection menu.

a. The screen displays alphanumeric characters (A – Z, 0 – 9) for 1 second
b. The screen displays a solid black rectangle for 1 second
c. The screen is cleared showing only the white backlit background for 1 second

DIAGNOSTIC TEST No. 2

Keypad Test

Used to check that keypad is working correctly. When selected, displays the name of each key that is pressed on the status line until the **CANCEL** or **POWER** key is pressed. Press the **CANCEL** key to exit this test and return to the main test selection menu.

DIAGNOSTIC TEST No. 3

Door Up/Down Test

Used to check that the door drive mechanism is working correctly. When selected, opens the door if it was closed or closes the door if it was open. Pressing the **3** key during this test toggles the direction of door motion. Press the **CANCEL** key to exit this test and return to the main test selection menu.

DIAGNOSTIC TEST No. 4

Door Sw Adjust Test

Used to adjust the door drive mechanism's upper and lower limit switches. These switches are factory adjusted and there is normally no need to re-adjust them in the field. Consult the factory if there is a door drive problem that requires these switches to be re-adjusted. Press the **CANCEL** key to exit this test and return to the main test selection menu.

DIAGNOSTIC TEST No. 5

Vent Sol On/Off Test

Used to check that Muffle vent solenoid is working correctly. When selected, turns vent solenoid on causing an audible click and displays a VENT SOL ON message. Pressing the **5** key during this test toggles the vent solenoid off and on. Press the **CANCEL** key to exit this test and return to the main test selection menu.

DIAGNOSTIC TEST No. 6

Vac Sol On/Off Test

Used to check that Muffle vacuum solenoid is working correctly. When selected, turns vacuum solenoid on causing an audible click and displays a VAC SOL ON message. Pressing the **6** key during this test toggles the vacuum solenoid off and on. Press the **CANCEL** key to exit this test and return to the main test selection menu.

DIAGNOSTIC TEST No. 7

Vac Pump On/Off Test

Used to check that external vacuum pump is working correctly. When selected, turns vacuum pump on and displays a VAC PUMP ON message. Pressing the **7** key during this test toggles the vacuum pump off and on. Press the **CANCEL** key to exit this test and return to the main test selection menu.

Note: Run Muffle conditioning program #400 one or two times to remove any residual moisture from the Muffle chamber before performing the Vac Leak Test, Diagnostic Test No. 8.

DIAGNOSTIC TEST No. 8

Vac Leak Test

Used to check for vacuum leaks in the door/Muffle seal, the internal and external vacuum hoses and the external vacuum pump. When selected, closes the door, turns the external vacuum pump on, displays Muffle vacuum reading on the LCD display and then turns vacuum pump off when the LCD Digital Display shows a reading of 26.5 in-Hg (67.3 cm-Hg). The vacuum reading should remain above 24.5 in-Hg (62.2 cm-Hg) for at least 15 minutes. Press the **CANCEL** key to exit this test and return to the main test selection menu.

DIAGNOSTIC TEST No. 9

Press Rod Up/Down Test

Used to check that press mechanism is working correctly. When selected, displays the press plunger position and then fully extends the press plunger. Pressing the **9** key during this test alternately retracts and then extends the plunger. The plunger position should be 0 in (0 cm) when plunger is fully retracted and 1.65 in (4.2 cm) when plunger is fully extended. Consult the factory if the message HOME IS NOT SET is displayed at any time during the test. Press the **CANCEL** key to exit this test and return to the main test selection menu.

DIAGNOSTIC TEST No. 10

Press Pos Adjust

Used to adjust the press plunger's home (ie: fully retracted) position. This position is factory adjusted and there is normally no need to re-adjust it in the field. Consult the factory if there is a press mechanism problem that requires the home position to be re-adjusted. Press the **CANCEL** key to exit this test and return to the main test selection menu.

DIAGNOSTIC TEST No. 11

Muffle Heat Test

Used to check Muffle heating system. When selected, turns the Muffle heater on for up to 30 seconds, checks that the Muffle heats correctly and then turns the Muffle heater off. Displays the message HEATING GOOD when the Muffle heats correctly or the message HEATING FAILED when it does not. Press the **CANCEL** key to exit this test and return to the main test selection menu.

DIAGNOSTIC TEST No. 12

PCB Volts Test

Used to check whether the voltages on the furnace main PC board are within acceptable limits. These voltages are factory checked and there is normally no need to re-check them in the field unless directed to do so by the factory personnel. Press the **CANCEL** key to exit this test and return to the main test selection menu.

The VIP Furnace automatically checks for operating errors which are reported via error messages shown on the LCD Digital Display status line. Table 5 lists these error messages, identifies the potential cause of the problem and recommends the corrective action required by the operator to clear the error.

Table 5. Summary of Error Messages

MESSAGE	CAUSE	COMMENTS
INVALID ENTRY	Number entered is outside of allowable limits.	Press the **CLEAR** (▼) key and enter new number.
	Two or more parameters are in conflict.	Press the **CLEAR** (▼) key and enter new parameter
INVALID PROGRAM NO	Program number entered is outside of allowable limits.	Displayed for 1 second. Enter new program number after message clears.
CHECK VACUUM	Low or no vacuum.	Press the **CLEAR** (▼) key. Check pump, hoses, and connections. Pump must achieve selected vacuum within 50 seconds. (programmed partial vacuum or 26.5 in Hg (67.3 cm Hg) for FULL or HIGH vacuum).
CHECK DOOR	Debris on gasket, obstruction or door sensor difficulty. The closing or opening time is 20% greater than the programmed time.	When detecting an obstruction the door will automatically reverse and go to the opposite end of travel. A warning beep will sound. Press the **CLEAR** (▼) key.
POWER FAIL	Power Failure.	Can occur anytime when a program is running. Press the **CLEAR** (▼) key.
OPEN THERMOCOUPLE	Break in Thermocouple.	Check the wires at the Thermocouple and at TB1 on the Main Board. If wires are OK, Thermocouple needs to be replaced. Press the **CLEAR** (▼) key.
TEMPERATURE PROBLEM	Muffle temperature exceeds 2235°F (1223°C). Message appears instantly.	Press the **CLEAR** (▼) key. If problem persists, replace Main Board.
	Thermocouple leads reversed. Message appears 1 minute after **POWER** key is pressed to turn furnace on.	RED wire to RED terminal on main board, RED wire to RED painted post on the thermocouple. Press the **CLEAR** (▼) key.
	Thermocouple leads shorted. Message appears 1 minute after **POWER** key is pressed to turn furnace on.	Remove the shorted condition. Press the **CLEAR** (▼) key.
	Temperature is less than 100°F (38°C) 1 minute after **POWER** key is pressed to turn furnace on.	Check connections. Press the **CLEAR** (▼) key. Run Diagnostic Test Program #951, Test 11.
HEATING GOOD		Initiated by Run Diagnostic Test Program #951, Test 11.
HEATING FAILED	Faulty heating system.	Initiated by Run Diagnostic Test Program #951, Test 11. Check connections. Measure Muffle resistance, which should be approximately 11 ohms for the 120V models and 37 ohms for 230V models. Replace Muffle if necessary.
CHECK PRINTER	Printer cable not connected. Printer AC not plugged in.	Correct problem with printer. Press the **CLEAR** (▼) key.
CHECK PRESS ROD	No air pressure.	Check compressor connection and operation. Press the **CLEAR** (▼) key.

MUFFLE DECONTAMINATION

It is good practice to decontaminate your furnace at least twice a month. Even if you do not use silver/palladium alloys, contamination can take place simply from the use of steel tweezers or tongs. Use of Pur-I-Fire™ Decontaminant (Jelrus Order # 7102) when running Muffle decontamination with vacuum (program #200) is recommended for porcelain programs. Muffle decontamination without vacuum (program #210) is recommended for pressing programs and does not require the use of the Pur-I-Fire™ Decontaminant.

Note: It may be necessary to decontaminate an excessively contaminated Muffle and/or door brick more than once.

1. If needed, place a single layer of Pur-I-Fire™ pellets on the ceramic tray provided. Place the ceramic tray on the firing block.
2. Select program number 200 or 210.
3. Press the **START** key. When the LOW TEMP is reached, the door will close and the VIP Furnace will automatically perform the proper decontamination program. This typically takes about 20 to 25 minutes.
4. When the door opens, remove the tray and discard the used Pur-I-Fire™ pellets. Save the tray for reuse.

TEMPERATURE CALIBRATION

The VIP Furnace has been temperature calibrated at the factory using high precision equipment. It is not necessary to recalibrate the furnace. The calibrated Muffle temperature may be adjusted to correct for underfire or overfire conditions without changing the firing program HIGH TEMP or PRESS TEMP settings by using special programs #300, #310 or #320 as appropriate. Refer to pages 23 and 24.

POWER FAILURE PROTECTION

If power failure occurs while a program is running, you have the following three choices:

1. Do nothing. When the power resumes, the program in progress will automatically restart at the point where the power failure occurred regardless of the amount of time that has passed.
   To indicate that a power failure has occurred, POWER FAILURE will appear on the lower display. Press the **CLEAR** (▼) key to remove this message and return to normally displayed information.
2. Do nothing. When the power resumes, the program in progress will automatically restart at the point where the power failure occurred regardless of the amount of time that has passed.
   The restarted program may be stopped by pressing the **CANCEL** key. At this time the door will open and the work may be removed.
3. If you want to remove your work from the Muffle during the power failure and prior to the power returning, perform the following steps:
   a. Turn knob on the back of the VIP Furnace one-half turn in a counterclockwise direction to release vacuum. (Be sure to close this knob TIGHTLY after vacuum is released.) See Fig 9.
   b. Gently pull down on the lift mechanism and remove work.

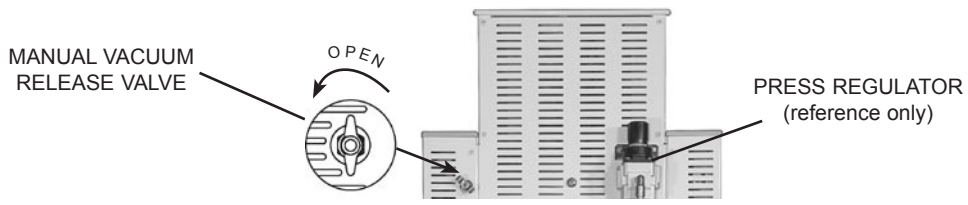


Figure 9. VIP Furnace Vacuum Release Valve

Always make sure that the furnace is cool before performing any maintenance procedures.
Touching hot surfaces could result in bodily injury.

Always disconnect main power before performing any maintenance procedures.
Voltage within the unit may be of sufficient magnitude to cause electric shock.

Maintenance Procedures

The VIP Furnace is designed for many years of trouble-free operation. Maintenance as described herein is minimal.

Important: Do **not** spray solvents or liquid directly on the furnace.

Cleaning the VIP Furnace Exterior

Turn off the VIP Furnace and disconnect the line cord from the Mains wall outlet. Allow the VIP Furnace to cool down before cleaning. Wipe the outside surfaces with a soft paper towel dampened with a non-abrasive household cleaner. Be careful not to allow liquids TO RUN OR DRIP into the VIP Furnace. This could cause damage to the VIP Furnace. Allow to air dry before plugging in or turning the VIP Furnace back on.

Important: The furnace door must be clean of **any** small particles or debris accumulated during the conduct of firing procedures. Accumulated debris will adhere to the heating chamber sealing o-ring causing a vacuum leak between the furnace door and the heating chamber.

Cleaning the VIP Furnace Door

Turn off the VIP Furnace and disconnect the line cord from the Mains wall outlet. Allow the VIP Furnace to cool down before cleaning. Remove the Door Insulator and wipe the sealing o-ring and furnace door surface with a soft paper towel dampened with clean water. Be especially careful to remove any debris from the door area that mates with the sealing o-ring that could cause damage to the furnace vacuum seal.

Always disconnect main power when servicing unit.
Voltages within the unit may cause electric shock.

REMOVAL OF THE DECK COVER

Removal of the Deck Cover allows access to the main electronics of the VIP Furnace should replacement of Main PC board or Front Panel assemblies be necessary. Remove the Deck Cover by performing the following procedure.

1. Close furnace door.
2. Shut off Power and disconnect the line cord from the Mains wall outlet.
3. If necessary, allow the VIP Furnace to cool down.
4. Remove the top 2 screws securing the Deck Cover to the rear of the unit as shown by Figure 10, View A
5. Remove the cooling tray by lifting it from the Deck Cover as shown by Figure 10, View B
6. As shown by Figure 10, View C
   a. Remove the 2 screws securing the Deck Cover to the top of the chassis.
   b. Remove the 2 screws securing the Deck Cover to the left-side of the chassis.
   c. Remove the 2 screws securing the Deck Cover to the right-side of the chassis.
7. Carefully lean the VIP Furnace back slightly to access the 2 thumbscrews located at the bottom of the chassis. Loosen both thumbscrews shown by Figure 10, View D.
8. Return the VIP Furnace flat onto the work table and slide the Front Panel forward away from the Deck Cover.
9. Lift and carefully remove the Deck Cover.

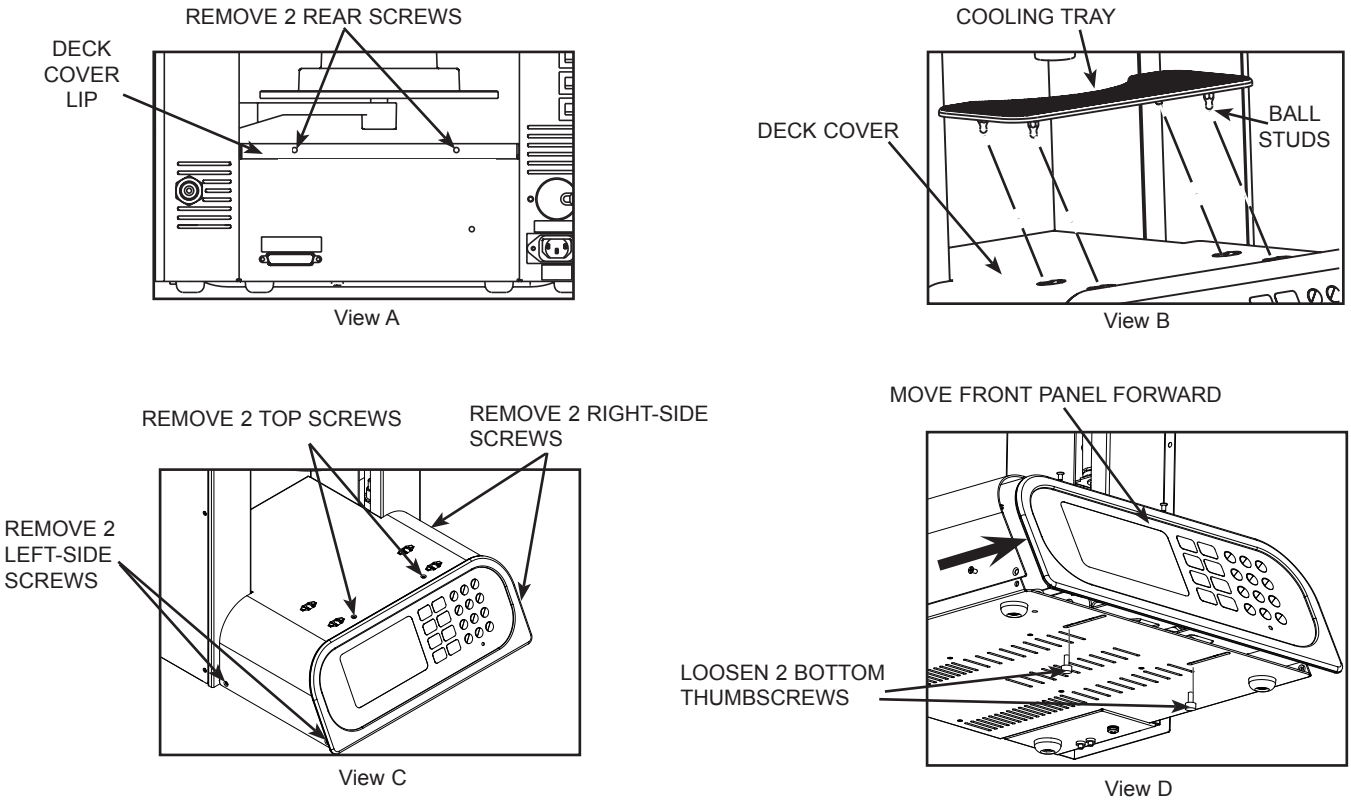


Figure 10. VIP Furnace Deck Cover Removal

INSTALLATION OF THE DECK COVER

Install the Deck Cover by performing the following procedure.

1. Install the Deck Cover by sliding the cover between the supporting towers and placing the rear Deck Cover lip over the rear panel. Make sure all screw holes are aligned.
2. As shown by Figure 10, View A, install 2 screws hand tightened into the top 2 screw holes of the rear Deck Cover lip installed over the rear panel.
3. Slide the Front Panel back into the Deck Cover.
4. As shown by Figure 10, View C
   a. Install 2 screws hand tightened into the 2 top screw holes of the Deck Cover.
   b. Install 2 screws hand tightened into the 2 left-side screw holes of the Deck Cover.
   c. Install 2 screws hand tightened into the 2 right-side screw holes of the Deck Cover.
5. Tighten all 8 screws to secure the Deck Cover to the furnace chassis.
6. Carefully lean the VIP Furnace back slightly to access the 2 thumbscrews located at the bottom of the furnace chassis. Tighten both thumbscrews shown by Figure 10, View D.
7. Return the VIP Furnace flat onto the work table and install the cooling tray on the Deck Cover by snapping the four ball studs into the corresponding clips as shown by Figure 10, View B.
8. Connect the line cord to the Mains wall outlet. The VIP Furnace is now ready for operation.

REMOVAL OF FRONT COVER

Removal of the Front Cover allows access to the Muffle Top Plate of the VIP Furnace should replacement of the Muffle, Cooling Fan, Solenoid, Thermocouple, Thermostat, or Press Sensor PC board assemblies be necessary. Remove the Front Cover by performing the following procedure.

1. Open furnace door.
2. Shut off Power and disconnect the line cord from the Mains wall outlet.
3. If necessary, allow the VIP Furnace to cool down.
4. Remove the 4 rear screws securing the rear of the Front Cover as shown by Figure 11, View A.
5. Refer to Figure 11, View A, and carefully lift up cover enough to clear the Insulating Ceramic Spacers.
6. Tilt cover and remove Front Cover. Figure 11, View B.

INSTALLATION OF FRONT COVER

Install the Front Cover by performing the following procedure.

1. Facing the front of the furnace, align the 4 slots on the side of the cover (2 each side) with the 4 Insulating Ceramic Spacers.
2. Carefully slide the Front Cover into the 4 Insulating Ceramic Spacers and allow cover to rest on spacers.
3. Observe that the rear screw holes are aligned.
4. Install and tighten the 4 rear screws to secure the rear of the Front Cover.
5. Connect the line cord to the Mains wall outlet. The VIP Furnace is now ready for operation.

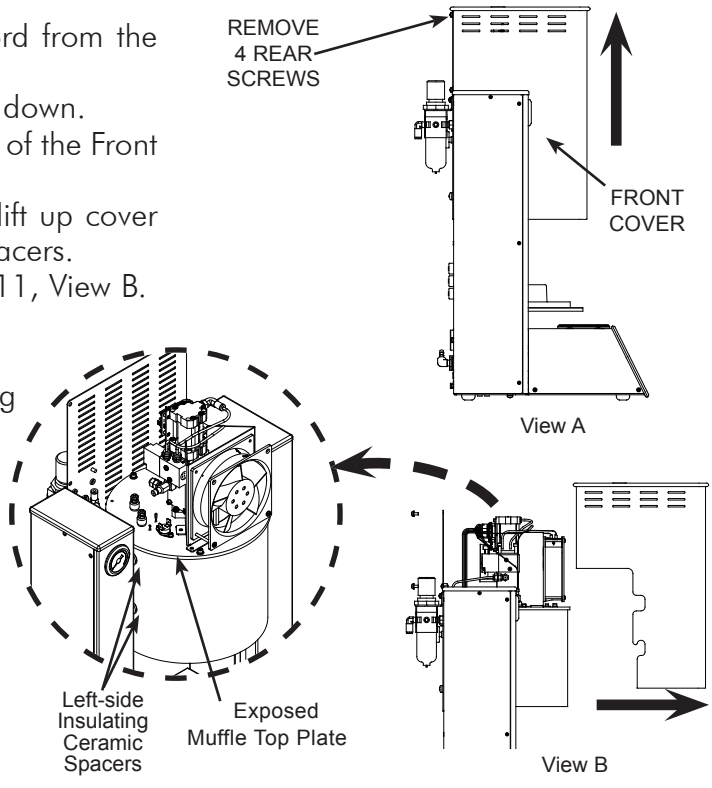


Figure 11. VIP Furnace Front Cover Removal

MUFFLE REPLACEMENT

Muffle replacement consists of removing the defective Muffle and installing the direct replacement Muffle. Refer to Figure 12 and replace the Muffle by performing the following removal and installation procedures.

MUFFLE REMOVAL

Remove the Muffle by performing the following procedure.

1. Shut off Power and disconnect the line cord from the Mains wall outlet.
2. Set the Press Regulator to zero pressure.
3. If necessary, allow the VIP Furnace to cool down.
4. Remove the Front Cover by performing the Removal of the Front Cover procedure on page 35.
5. Remove the two thermocouple leads that are attached to the thermocouple terminals. Make sure to note the position and color coding of the thermocouple leads so they may be reattached the same way. Tag wires if necessary for correct reconnection.
6. Using a 13/16-inch wrench, loosen the thermocouple nut and remove the thermocouple and O-ring by carefully pulling up and away from the Muffle Top Plate. (See Figure 12, View B.) Set removed thermocouple aside.

   Important: The lug on each power lead is secured to the power terminal with a hex nut above and below the lug. **DO NOT** attempt to loosen the top hex nut without holding the bottom hex nut with a wrench.

7. Remove the two power leads (orange) that are attached to the power terminals on the Muffle Top Plate. Tag wires if necessary for correct reconnection.
8. Remove the two ground leads (green/yellow stripe) that are attached to the associated terminals on the Muffle Top Plate. Tag wires if necessary for correct reconnection.
9. Remove the vacuum hose from the barbed fitting on the Muffle Top Plate by pulling the hose.

   Important: Make sure that the Press Regulator is set to zero pressure. See step 2 above.

10. Remove the compressed air line from the push-to-connect fitting on the Press Solenoid by pushing the connector sleeve in while pulling the air line from the connector.
11. Remove the 5 hex head screws securing the Muffle Top Plate to the Vacuum Chamber.
12. Disconnect the wire harness from the 10-pin header on the Press Sensor PC board.

    Important: Make sure to securely hold the Muffle/Muffle Top Plate assembly while working to remove the Muffle to prevent damage to the Cooling Fan, Solenoid, Thermostat, or Press Sensor PC board assemblies installed on the Muffle Top Plate.

13. Carefully remove the Muffle Top Plate with attached Muffle from the Vacuum Chamber. Turn the complete assembly over and gently place on any level work table surface on the flat end of the Press Cylinder with the Muffle side up. This position, shown by View C, is recommended in order to access the two Muffle power leads still attached between the Muffle and the Muffle Top Plate.
14. Refer to Views D and E and remove the three screws securing the Muffle to the Muffle Top Plate.

    Important: The Muffle and the Muffle Top Plate are still attached via the two Muffle power leads attached between the Muffle and the Muffle Top Plate.

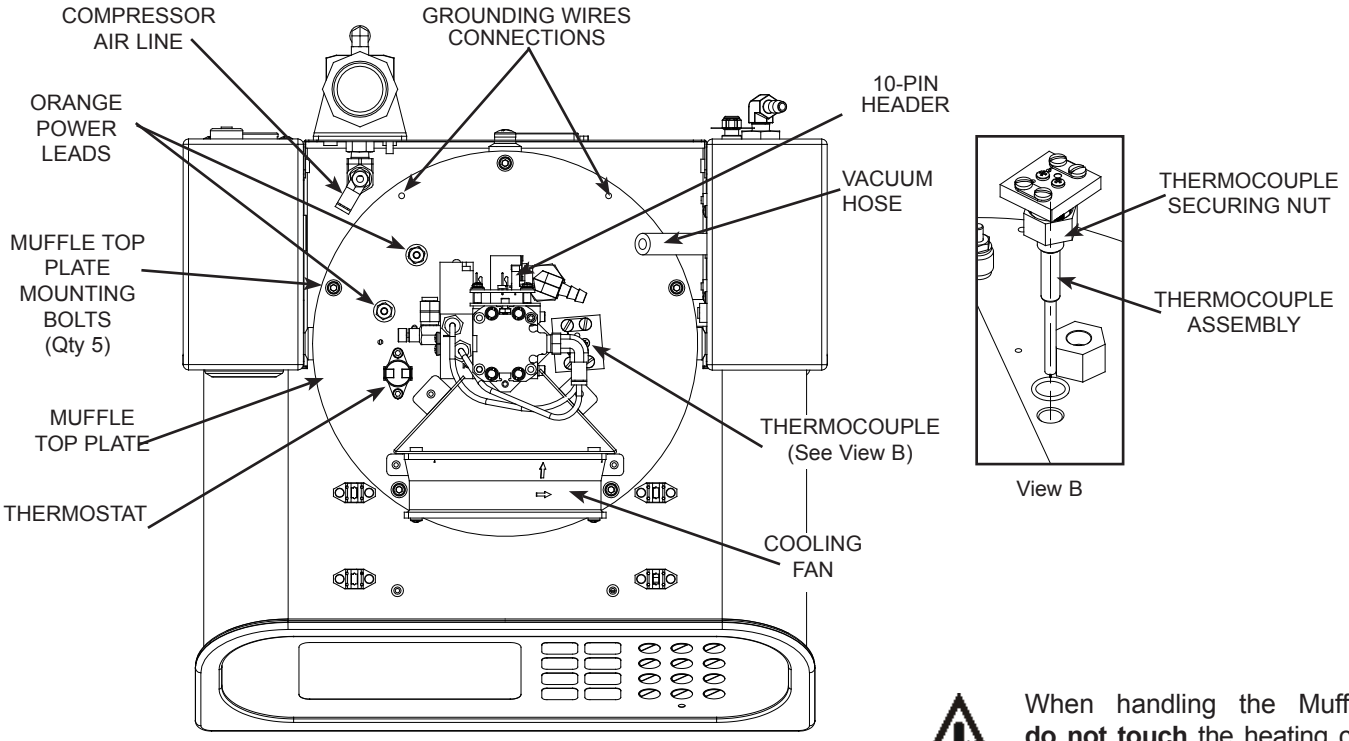
    When handling the Muffle, **do not touch** the heating coil with bare fingers.

    Oil from the skin on the fused quartz tubing causes overheating and rapid blowout.

15. Refer to View F and separate the Muffle from the Muffle Top Plate being careful not to topple the Muffle Top Plate and set the Muffle next to the Muffle Top Plate. Observe the connected power leads.

    Important: The lug on each power lead is secured to the power terminal with a hex nut above and below the lug. **DO NOT** attempt to loosen the top hex nut without holding the bottom hex nut with a wrench.

16. Refer to View G and remove the two Muffle power leads that are attached to the two power terminals on the exposed (bottom) side of the Muffle Top Plate.
17. Remove the O-ring from the Muffle Top Plate and discard.

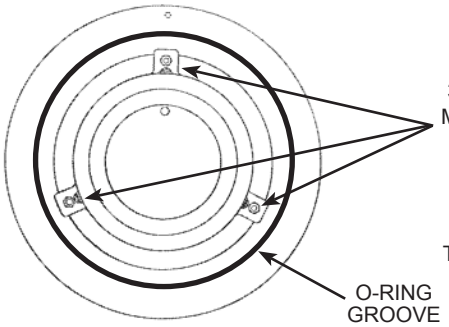


View A. Furnace Top View

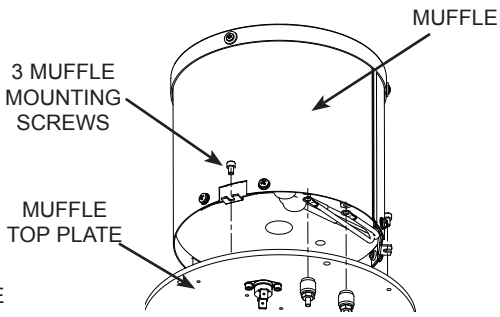
View B

When handling the Muffle, **do not touch** the heating coil quartz tubing with bare fingers.

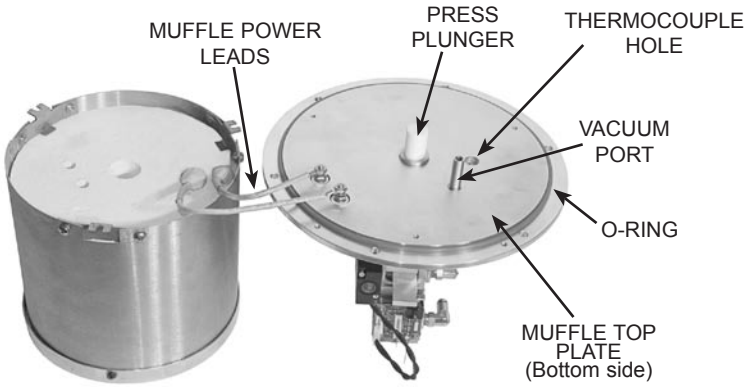
View C



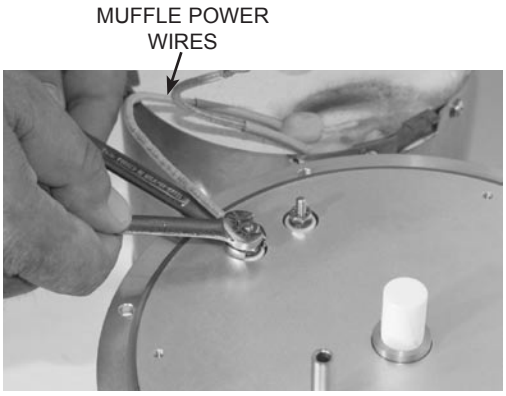
View D. Muffle Bottom View



View E



View F



View G

Figure 12. VIP Furnace Muffle Removal

NEW MUFFLE INSTALLATION

Refer to Figure 12 and install a replacement Muffle by performing the following procedure.

Important: Make sure to securely hold the Muffle Top Plate assembly while installing the Muffle to prevent damage to the Cooling Fan, Solenoid, Thermostat, or Press Sensor PC board assemblies installed on the Muffle Top Plate.

1. Refer to Figure 12, View F, and place the replacement Muffle next to the overturned Muffle Top Plate removed previously.

Important: The lug on each power lead is secured to the power terminal with a hex nut above and below the lug. **DO NOT** attempt to loosen the top hex nut without holding the bottom hex nut with a wrench.

2. As shown by View G, install the two Muffle power leads to the two power terminals on the exposed (bottom) side of the Muffle Top Plate and secure with washer and hex nut previously removed.
3. Refer to View F, and carefully align the replacement Muffle with the vacuum port, press plunger and thermocouple hole located on the Muffle Top Plate. Slide the replacement Muffle over the vacuum port shaft.
4. Secure the Muffle to the Muffle Top Plate by installing the three sets of screws and washers as shown by Views D and E.
5. Clean the O-ring groove on the Muffle Top Plate.
6. Refer to View F, and apply a thin uniform coat of vacuum grease (supplied with the new Muffle) to the replacement O-ring. Place the O-ring onto the O-ring groove on the Muffle Top Plate.
7. Hold the O-ring in place while placing the complete Muffle/Muffle Top Plate assembly into the Vacuum Chamber.
8. Rotate the Muffle/Muffle Top Plate assembly so that the Cooling Fan assembly is facing to the front of the furnace as shown by View A.
9. Reconnect the vacuum hose, being careful not to kink the hose.
10. Align the 5 screw holes of the Vacuum Chamber with the screw holes on the Muffle Top Plate and install 5 hex head screws.
11. Apply O-ring lubricant (provided) to O-ring and carefully insert the thermocouple with O-ring, shown by View B, into the Muffle Top Plate and hand tighten. Tighten using a 13/16-inch wrench.
12. Observing the earlier wire color codes (RED and BLACK), reconnect the thermocouple. Tighten each connection securely.
13. Being careful not to kink the line, reconnect the compressor air line to the Muffle Top Plate by carefully pushing onto the push-to-connect fitting.

Important: The lug on each power lead is secured to the power terminal with a hex nut above and below the lug. **DO NOT** attempt to loosen the top hex nut without holding the bottom hex nut with a wrench.

14. Install the two power leads (orange) to the two power terminals on the top of the Muffle Top Plate and secure with washer and hex nut previously remove.
15. Install the two ground leads (green/yellow stripe) to the two ground terminals on the top of the Muffle Top Plate and secure with washer and hex nut previously remove.
16. Reconnect the 10-pin connector to the Press Sensor PC board.
17. Replace the Front Cover by performing Installation of the Front Cover procedures on page 35.
18. Perform the Run Muffle Conditioning Program (#400). This will break in the new Muffle and eliminate any moisture that may have been absorbed by the Muffle and the firing block. (Moisture can affect vacuum.) If any moisture collects on the firing platform, repeat Program #400.

Always disconnect main power when servicing unit.
Voltages within the unit may cause electric shock.

THERMOCOUPLE REPLACEMENT

Thermocouple replacement consists of removing the defective Thermocouple and installing the direct replacement Thermocouple. Refer to Figure 12, View B, and replace the Thermocouple by performing the following removal and installation procedures.

THERMOCOUPLE REMOVAL

Remove the Thermocouple by performing the following procedure.

Note: The thermocouple used in this furnace contains PLATINUM and may be returned for credit against the purchase of a replacement thermocouple.

1. Shut off Power and disconnect the line cord from the Mains wall outlet.
2. If necessary, allow the VIP Furnace to cool down.
3. Remove the Front Cover by performing the Removal of the Front Cover procedure on page 35.
4. Remove the two thermocouple leads that are attached to the thermocouple terminals. Make sure to note the position and color coding of the thermocouple leads so they may be reattached the same way. Tag wires if necessary for correct reconnection.
5. Using a 13/16-inch wrench, loosen the thermocouple nut and remove the thermocouple and associated O-ring by carefully pulling up and away from the Muffle Top Plate.

THERMOCOUPLE INSTALLATION

Install a replacement Thermocouple by performing the following procedure.

1. Apply O-ring lubricant (provided) to O-ring before installing.
2. Carefully insert the thermocouple with O-ring into the Muffle Top Plate and hand tighten. Tighten using a 13/16-inch wrench.
3. Observing the earlier wire color codes (RED and BLACK), reconnect the thermocouple. Tighten each connection securely.

Important: Make sure all wires are properly connected before installing Front Cover.

4. Replace Front Cover by performing the Installation of the Front Cover procedures on page 35.
5. Turn the furnace on and verify that the LCD Digital display shows that the muffle heats up to the programmed Idle temperature setting.
6. After running a program, use special programs 300, 310 or 320 to correct underfire or overfire conditions as necessary.

Important: Make sure that all air is purged from the Press Regulator prior to removing the compressed air hose from the compressed port of the furnace.

COMPRESSED AIR HOSE REMOVAL

Remove the compressed air hose from the furnace by performing the following procedure.

1. Set the Press Regulator Adjustment Control on the Press Regulator to 0 PSI.
2. Shut off the customer-supplied compressed air supply (compressor).
3. Loosen the relief valve at the bottom of the Press Regulator until all the air is purged.
4. Tighten the relief valve on the Press Regulator.
5. Remove the compressed air hose from the compressed port of the furnace.

SPARE PARTS

The following lists the ordering number and description for spare parts and accessories available to maintain the VIP Furnace to meet your professional needs. Order via part number listed under corresponding model operating voltage value. Contact your authorized dealer for information.

Description	Part Number	
	120V	230V
Muffle Replacement Kit	A4012	A4013
Bezel, Display and Keypad Assembly	A4171	A4171
Keypad Assembly	A4172	A4172
Sensor PCB Assembly	A4163	A4163
Press Rod Assembly	A4166	A4166
Pressure Gauge	A4167	A4167
Pressure Regulator	A4168	A4168
Cooling Fan	A4169	A4169
Thermostat	A4177	A4177
Press Firing Block Kit	A4152	A4152
Press Ring Insert Kit	A4153	A4153
LCD Display Module	A4176	A4176
Main PCB Assembly	A4178	A4178
Thermocouple Replacement Kit	A4014	A4014
Top Plate Muffle terminal Gasket	23706	23706
Top Plate O-Ring Replacement Kit	A4181	A4181
Door O-Ring replacement Kit	A4182	A4182
Door Drive Motor Assembly	A4183	A4183
Door Drive Belt	A4184	A4184
Door Drive Upper Pulley Kit	23739	23739
Door Switches (Upper & Lower)	24879	24879
Lift Mechanism Kit	A4186	A4186
Vacuum Manifold Assembly	A4187	A4187
Vacuum Hose Kit, Manifold - Transducer w/ Filters	A4188	A4188
Vacuum Hose Kit, Manifold - Inlet	23714	23714
Vacuum Hose Kit, Manifold - Muffle	A4189	A4189
Cooling Tray	24361	24361
Porcelain Firing Block Kit	A4151	A4151
Pure-I-Fire Decontaminant	7102	7102
Line Filter Module	24186	24186
Power Supply	A4179	A4179
Line Cord Kit - US	26202	-
Line Cord Kit - England	-	23202
Line Cord Kit - Continental Europe	-	23203
Line Cord Kit - Israel	-	23204
Line Cord Kit - Italy	-	23205
Line Cord Kit - Australia	-	23206
iBOX™ Program Transfer Box	A4250	A4250

NOTES

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