SERVICE MANUAL

IMPORTANT INFORMATION, KEEP FOR OPERATOR

This manual provides information for:

MODELS TRI-RES-20G & (2)TRI-RES-20G COMBINATION OVEN

· Self Contained
· Gas Heated
· Capacity: TRI-RES-20G = 10 Steamer Pans Per Cavity

MADE IN USA

THIS MANUAL MUST BE RETAINED FOR FUTURE REFERENCE. READ, UNDERSTAND AND FOLLOW THE INSTRUCTIONS AND WARNINGS CONTAINED IN THIS MANUAL.

FOR YOUR SAFETY
Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

POST IN A PROMINENT LOCATION
Instructions to be followed in the event user smells gas. This information shall be obtained by consulting your local gas supplier. As a minimum, turn off the gas and call your gas company and your authorized service agent. Evacuate all personnel from the area.

WARNING
Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

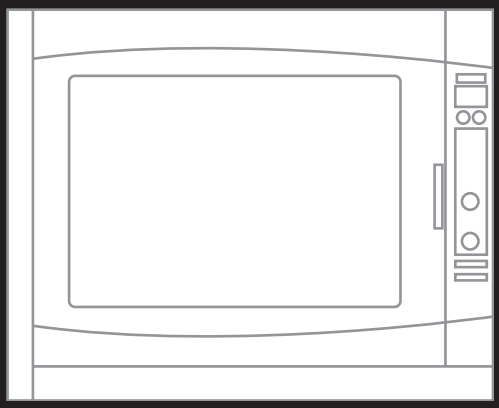
NOTIFY CARRIER OF DAMAGE AT ONCE
It is the responsibility of the consignee to inspect the container upon receipt of same and to determine the possibility of any damage, including concealed damage. Unified Brands suggests that if you are suspicious of damage to make a notation on the delivery receipt. It will be the responsibility of the consignee to file a claim with the carrier. We recommend that you do so at once.

Manufacture Service/Questions 888-994-7636.

Information contained in this document is known to be current and accurate at the time of printing/creation. Unified Brands recommends referencing our product line websites, unifiedbrands.net, for the most updated product information and specifications.

PART NUMBER 152797, REVISION A

GROEN®



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1.1 The Groen Service Concept

Since 1907 Groen has been in the business of designing and manufacturing the finest commercial appliances for the food service industry. Chefs, cooks and kitchen support personnel have come to depend upon the quality of construction and the reliability of operation.

Groen, in turn, depends upon our service centers and their field service personnel to keep the equipment in top operating condition. In order to do this, our designs are made with service and reliability in mind.

Once the Groen equipment is sold, manufactured, delivered and installed, our reputation is clearly in your hands. As part of our team, we value your efforts and input to our product design.

We will do all we can to make your job of keeping the equipment in perfect working order as easy as we can. Together, we will keep our customers satisfied.

1.2 Groen Certified Service

The Tri-Res has been carefully designed to provide many years of efficient and reliable service. Part of the quality program is Groen certified Service. This includes:

- Groen certifies that all equipment delivered to our customers has been inspected and tested for compliance with the specifications.
- Groen certifies that all parts required for service and maintenance will be readily available.
- Groen certifies that this manual will be updated by means of periodic service bulletins to provide the most up-to-date information for field maintenance and service personnel.

1.3 Warranty and Non-Warranty Repair

Groen Warranty provisions are clearly presented in the customer's Operator Manual.

Certain procedures for the cleaning and/or adjustment of the Tri-Res are presented in this manual for reference, but not warranty related.

1.4 Safety

The Groen Tri-Res has been designed with safety in mind. This includes safety to the operating and maintenance personnel, safety to the facility in which the equipment is installed and safety to the equipment itself.

The Tri-Res has been designed to the highest industry standards and has been certified by the National Sanitation Foundation Testing Laboratory (NSF), Underwriters Laboratory (UL) and/or CSA (gas).

The Tri-Res contains several devices which are specifically used to prevent unsafe conditions. If they are disconnected during service, make sure they are reinstalled properly and tested before the Tri-Res is operated.

The safety precautions in this manual are in accordance with ANSI 535 Standard. Three different signal words alert you to a hazardous situation: **DANGER, WARNING, AND CAUTION**

DANGER: The signal word **DANGER** indicates that a hazardous situation exists and could result in serious injury or death.

- Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.
- When you open the Tri-Res door, be very careful to avoid escaping steam. Steam can cause burns.
- After removing the fan baffle partition, do not put your hands or other object into the cooking cavity until the fan comes to a complete stop. Rotating fan blades can cause severe injury!

WARNING: The signal word **WARNING** tells you that a possibly hazardous situation is present, and if not avoided, could cause serious injury or death.

- Always turn off the Tri-Res power before removing partitions or panels.
- Disconnect the Tri-Res from the power source before per forming any service.

CAUTION: The signal work **CAUTION** warns you of a hazardous situation which, if not avoided, may result in minor or moderate injury.

- Tri-Res may be hot. Take precautions to prevent any contact with hot surfaces.
- Be sure all interior partitions have been installed before operating the Tri-Res.
- All Tri-Res operators and service personnel should be familiar with correct and safe operating procedures.
- Be sure Tri-Res drain is not blocked as this could result in improper Tri-Res operations.

Two other signal words, not directly related to personal safety, are also used in this manual: **NOTICE** and **IMPORTANT.**

NOTICE is used to highlight an operating or maintenance tip or suggestion.

IMPORTANT is used to highlight an operating or maintenance tip or suggestion.

1.5 Glossary of Terms

The following abbreviations and terms are use in this manual:

BTU	British Thermal Unit
GPM	Gallons Per Minute
LED	Lighting Emitting Diode
MM	Millimeter
NEC	National Electric Code
N.P.T.	National Pipe Thread
NSF	National Sanitation Foundation
PSI	Pounds per Square Inch (Pressure)
U.L.	Underwriter's Laboratory, Inc.

1.6 Tools and Supplies

This Section identifies the tools, instruments and supplies which will be required and useful in the inspection, repair and testing of the equipment and described in this manual.

Most likely, many of these tools and supplies are already in your tool kits and are used in everyday maintenance. Make sure to use only the specified sealants, compounds and dressings recommended by Groen.

CAUTION: Care should be taken in using the correct tool as indication. Using the wrong tool may inflict damage to the part being removed, installed and/or adjusted. Make sure that the calibrations on instruments are periodically checked for accuracy.

1.6.1 Required Tools

- Screw Drivers: Flat Blade No. 1 and No. 2
- Phillips No. 1 and No. 2
- Socket Wrenches: 1/4" through 7/8"
- Nutdrivers (metric and inches)
- Open Ended Wrenches 1/4" through 7/8"
- Pipe Wrenches: 6" and 8" size
- Allen Wrenches: 1/16" through 1/4"
- Slip Joint Pliers: ChannelLock or Equivalent
- Wire Crimpers

1.6.2 Recommended Instruments

- Digital Multimeter: Fluke Model 77 or equivalent

1.6.3 Helpful Hardware

- Extension Mirror
- Screw Starter
- Level: 18' Model
- Fuse Puller

1.6.4 Recommended Supplies

- Pipe Thread Compound: LACO PipeTite Stik
  No. 11176 or equivalent
- Motor Sealant Grease: Bel-Ray
- 2" Aluminum Duct Tape
- Removable Thread Locker:
  Locktite Type 242 (Door)
  Locktite Type 222 (Exterior)
- Clear Silicone Sealant:
  Dow Corning Type 732

- High Temperature Anti-Seize and Lubricating Compound Bostix NEVER SEEZ NSBT-16

1.7 How To Use This Manual

Read this manual completely before attempting any disassembly or repairs.

Please note the similarities and differences between the various models described in the manual.

Before making repairs, you should have knowledge of the Tri-Res operation as described in the Operations Section of this manual and a good understanding of service techniques as presented by the Groen Service School.

This service manual should be taken with you on all service calls. Use the correct tools in accordance with the procedures shown and use only Groen Replacement Parts when performing Tri-Res repairs.

Initial Startup

After the Tri Res has been installed, test it to ensure that the unit is operating correctly.

WARNING
WHEN YOU OPEN THE DOOR, STAY AWAY FROM STEAM COMING OUT OF THE UNIT. STEAM CAN CAUSE BURNS.

1. Remove all literature and packing materials from the interior and exterior of the unit.
2. Make sure the water supply line is open.
3. Make sure that the gas supply line is open and that the manual knob on the main gas valve is turned to the ON position. This valve is at the rear on the left side of the unit.
4. Turn on electrical service to the unit. The unit will not operate without electrical power. Do not attempt to operate the unit during a power failure.

   NOTE: The door MUST be closed for the fan to work.
5. To turn the unit on, press the ON switch on the control panel.
6. When any of the four (4) cooking modes are selected, the main burners will ignite automatically. The unit will indicate that it's ready to cook within 25 minutes or less. The ready condition is indicated as follows:
   - In oven mode - Temperature display (red LED) will stop flashing.
   - In combination mode - Temperature display (red LED) will stop flashing.
   - In steamer mode – The dashes in temperature display (red LED) will stop flashing.
7. In order to use the timer-
   - To set or change time, push START to start timer, rotate the knob to desired setting.
   - At the end of time cycle the beeper will sound and the red CANCEL light will flash.
   - To stop flashing push CANCEL button at top.
8. Press the LIGHT button to turn on interior lights. The lights will automatically turn off after 5 seconds.
9. If the unit operates as described, the unit is functioning correctly and ready for use.

NOTE: For operation at high altitudes (2000 feet and above), please consult the Groen Engineering Department.

Operating Procedure

1. Press the ON switch on the control panel. SELECT MODE and PREHEATING are displayed. The burner will light (indicated by the * in the upper right corner of the display). When the temperature in the cavity rises above 180 degrees PREHEATING disappears from the display. The temperature levels off at 200 degrees F (burners cycle on and off).

2. Load food into pans in uniform layers. Pans should be filled to about the same levels and should not be mounded.

3. Open the door and slide the pans onto the racks. If only one or two pans will be cooked put them on the middle rack.

4. Close the door and take one of the following steps:

A. Push STEAM to start the steaming mode. The STEAM indicator will light. All three burners light. When the temperature is above 200 degrees the three reservoirs fill with water. If STEAM was pushed while PREHEATING was displayed the TEMPERATURE display shows three blinking dashes until the temperature rises above 230 degrees. After that the display shows three steady dashes indicating that the steaming temperature has been reached (the ready condition). The temperature continues to rise. When it is above 250 degrees the outer two burners go off and the center burner continues to operate. The temperature levels off somewhere around 350 degrees depending on the food load in the cavity. If the door is opened and the cavity is loaded with cold food the temperature may drop below 250 degrees. All three burners light to bring the temperature up quickly.

B. Push COMBO to start the combo mode. The COMBO and LO moisture level indicators light. The center reservoir fills with water. Adjust the TEMPERATURE knob (the upper knob) for the desired cooking temperature; the lower limit is 200 degrees, the upper limit is 450 degrees. If the cavity temperature is more than 20 degrees below the selected temperature the TEMPERATURE display flashes until the temperature is within 20 degrees of the selected temperature (the ready condition). All three burners cycle on and off to maintain the selected temperature.

C. Push Moisture Level HI. The HI indicator lights. The two side reservoirs fill and the center reservoir empties. The temperature knob operates the same way as in COMBO LO except that the upper limit is reduced to 350 degrees.

D. Push OVEN to start oven mode. The OVEN indicator lights. All three reservoirs empty. The temperature knob operates the same way as in COMBO LO with an upper limit of 450 degrees. All three burners cycle on and off to maintain the selected temperature.

Typical Operations

The following is a sequence of events typical on the Tri-Res.

1. Preheating

When the power switch is turned on the burners light and raises the cavity temperature to 200 degrees (the set point). No cooking mode has been selected and the display shows SELECT MODE on the first line and PREHEAT on the second line.
If the temperature is below 180 degrees when the power switch is turned on it means that the flue is cold. In this case only the center burner is turned on for the first two minutes and the cavity fan is off to allow the flue to heat gradually. This prevents the pilot flame from being drawn away from the flame sensor due to a strong draft that would be present if all three burners were turned on with a cold flue. After the two minutes all three burners are lit. Three minutes later the cavity fan operates at low speed.
When the temperature rises above 180 degrees (20 degrees below the set point) PREHEAT disappears from the display. The fan is allowed to operate at the selected speed. The temperature continues to rise to the set point at which time the burners cycle on and off to keep it there. At any time the user may select any cooking mode. However, if steam or combo modes are selected water will not enter the reservoirs until the temperature rises above 200 degrees.

2. Flame-out detection

When the oven is started the cavity temperature should rise at least 50 degrees in ten minutes. If the burner didn't start or has gone out the temperature at that time will be too low. The message "Burner not on. Relight" is displayed and the oven turns itself off. Push the ON switch to relight the burner.

3. Ready indication
The ready condition is satisfied (the oven is ready) when the cavity temperature is less than 20 degrees below the set point. In the idle condition (no cooking mode selected) the set point is 200 degrees. In steam mode it is 250 degrees. In combo and oven modes it is whatever is set in the temperature display. When the oven is not ready the word PREHEAT is displayed or the temperature display flashes. Once the oven comes up to ready PREHEAT disappears and the temperature display stops flashing. If the door is opened and the oven is loaded with cold food the cavity temperature will fall. However, since the ready condition has already been met the temperature display will not start flashing.
If the cooking mode or the temperature setting is changed then the oven will resume flashing if the current cavity temperature is more than 20 degrees below the new set point, that is, the oven is not ready. Once ready is achieved with the new settings the flashing stops.

4. Water level
If combo or steam mode is selected one or more of the reservoirs will fill with water (as long as the temperature is above 200 degrees). There are two water level sensor probes, one for the center reservoir and one for the right reservoir. When the water level drops below a sensor probe (boils off) the associated water valve opens and refills the reservoir. The probes are connected to the controller thru a debouncing circuit which keeps the water valve open about a second or two after the probe senses water. This minimizes the number of times the water valve has to cycle to keep the reservoir filled.
Whenever a fill or drain valve is first opened a timer is started, 60 seconds for fill and 90 seconds for drain. It the water level has not changed when this timer finishes an error message is displayed telling which valve (fill or drain) in which reservoir (1 or 2) took too long to change. If it takes too long to fill or drain a reservoir it could mean that the sensor probe is contaminated and should be cleaned. Fill timeout could also mean that the water pressure is very low or the main water valve is turned off. Drain timeout could mean that the drain is plugged. Clean it.
Whenever a drain valve is first opened the associated water valve is opened for one second to help open the pinched drain hose and to flush food particles out of the drain line.

5. Door
The door may be opened for brief periods to move food into and out of the cavity without disturbing the burners. However, if the door is open for five minutes or more the burners are turned off. As soon as the door is closed the burners resume normal operation.
Whenever the door is open the cavity fan is stopped and the timer (if running) is paused. During the clean cycle the rinse water is stopped whenever the door is open.

6. Cavity fan
The cavity fan normally operates at high speed. Pushing the Fan Speed LO button selects the low speed. Whenever the cooking mode is changed the fan speed is automatically set to high.

7. Timer
When the power switch is turned on the timer is paused, the colon (:) in the TIMER display does not flash to indicate pause. Adjust the TIMER knob (the lower knob) for the desired cooking time in hours and minutes. Push START to allow the timer to run, the colon flashes indicating that it is running. At the end of the timing period the beeper sounds and the CANCEL indicator flashes. Push CANCEL to stop the beeper. Note that this is all the timer does; it is a simple kitchen timer. It does not stop any cooking process, it simply alerts the operator that the timer has timed out.

8. Muffin fan
The two muffin fans run whenever the power switch is on. The forward fan draws cooling air in from the bottom of the control panel housing and over the control board. The rear fan exhausts the air out the back panel. When the power switch is turned off the cavity is still hot. The muffin fans continue to operate until the temperature drops below 180 degrees.

9. Light
When the LIGHT button is pushed the door lights turn on to illuminate the cavity. When the button is released the lights stay on for five seconds and automatically turns off.

10. Condensate spray
When a steam-water valve is first turned on a large puff of steam may be created if the water is sent to a hot reservoir. Part of this puff of steam goes out the overflow drain. During this time the condensate spray is turned on for 45 seconds to condense the steam and cool it.
When a drain valve is opened it discharges hot water into the

oven drain. During this time the condensate spray is turned on for 90 seconds to cool the drain water.
During the remaining time, that is, most of the time, the condensate spray is turned off to conserve water.

11. Secret buttons
There is an unmarked button under the text display window, about ½ inch above the O in Groen. When this button is pushed the TEMPERATURE display shows the actual measured temperature in the cavity. This is useful for diagnosing heating and cooling under normal operation.
During normal operation it is necessary to push only one button at a time. Special features may be called by pushing a combination of buttons at the same time.
When STEAM, COMBO, and OVEN are pushed at the same time the currently installed firmware version is shown in the red TEMPERATURE display. This is useful to determine if the oven contains the latest firmware release.
When STEAM, COMBO, OVEN, and CLEAN are pushed at the same time (it takes two hands to do it) the diagnostics are started. The first diagnostic is Diagnostics Exit. Push START to exit the diagnostics and return to normal operation. Or rotate the TIMER knob (the lower knob) to select the desired diagnostics. When finished select Diagnostics Exit and push START.

Cleaning

It is best to clean the oven when it is at room temperature. However, it may be cleaned right after cooking, that is, while it is hot. First turn off whatever cooking mode is currently on by pushing its button. For example, if the oven is in steam mode (the STEAM indicator is on) push the STEAM button. The indicator will go out showing that no cooking mode is currently selected.
If the oven is off turn it on with the power switch. Push CLEAN. The message OPEN DOOR AND REMOVE RACKS appears in the display. Do what is says. When the door is open the message changes to SPRAY CLEANER AND CLOSE DOOR. Do it. When the door is closed the message changes to CLEAN MODE SOAK TIME and the oven rests for two minutes to allow the cleaner to work. A counter in the second line of the display shows the number of seconds remaining in each timed cleaning step. Then the rinse valve opens for one minute (message is CLEAN MODE RINSE TIME) to flush the cleaner off the cavity walls. This is followed by a two minute drain period (CLEAN MODE DRAIN TIME) followed by another one minute rinse. When this is complete the message CLEAN COMPLETE TIME LEFT is displayed for a minute and the oven turns itself off.
If the oven is hot at the beginning of the soaking period the message OPEN DOOR TO COOL OVEN is displayed. Do it. While the door is open the message COOLING is displayed. When the oven has cooled sufficiently to allow it to continue the message CLOSE THE DOOR is displayed. Do it. The cleaning cycle starts with the message OPEN DOOR AND REMOVE RACKS.
At any time during the cleaning cycle the user may open the door and spray more cleaner in the cavity. When the door is closed the cycle starts over with the soaking period followed by the two rinses.
Once a cleaning cycle has been started all other cooking modes are inactive (locked out). The cleaning cycle must run to completion before the oven will operate in the cooking modes.
The oven may be turned off at any time during the cleaning cycle. However, since the two rinses have not been complete there is probably some cleaner on the cavity walls. When the oven is turned on again it remembers that it was interrupted in the middle of the cleaning cycle. The message is PUSH CLEAN TO FINISH CLEANING. Do it (no other cooking mode buttons will operate). When the clean cycle is complete (all the cleaner has been rinsed from the cavity walls) it shuts itself off. It can then be turned on and operated in any mode.

Deliming

The oven may be delimed at any temperature. However, since it is necessary to remove the steam lid from the inside of the cavity the oven should be allowed to cool before starting the procedure. First turn off whatever cooking mode is currently on by pushing its button.
If the oven is off turn it on with the power switch. Push LIGHT. While the LIGHT is on push CLEAN. The message OPEN DOOR AND REMOVE STEAM LID appears in the display. This indicates that the oven is in deliming mode. If the message OPEN DOOR AND REMOVE RACKS appears it means that the LIGHT was not on while CLEAN was pushed. You have another chance to put the oven in delime mode. Push LIGHT again. While the LIGHT is on push CLEAN. The STEAM LID message should appear.
Open the door and remove the steam lid from the bottom of the cavity. The messages changes to ADD DELIMER AND CLOSE DOOR. Water begins to fill the three reservoirs and the heaters turn on. Pour 1/3 cup of delimer into each reservoir, 1 cup total. Close the door.
The message changes to DELIME MODE TIME LEFT. The oven

will steam for 20 minutes (the display shows the number of seconds remaining) and drain for two minutes (message is DE-LIME MODE DRAIN TIME). At this time the oven is hot and the message changes to OPEN DOOR TO COOL OVEN. When the door is opened the message changes to COOLING. When the oven has cooled sufficiently to allow it to continue the message CLOSE THE DOOR is displayed. When the door is closed the oven enters the cleaning cycle at the first rinse step. It rinses twice, displays CLEAN COMPLETE TIME LEFT, and turns itself off. Once a deliming cycle has been started all other cooking modes are inactive (locked out). The deliming cycle must run to completion before the oven will operate in the cooking modes. The oven may be turned off at any time during the deliming cycle. However, since the two rinses have not been complete there is probably some delimer in the cavity reservoirs. When the oven is turned on again it remembers that it was interrupted in the middle of the deliming cycle. The message is PUSH CLEAN TO FINISH CLEANING. Do it (no other cooking mode buttons will operate). The oven enters the clean cycle at the rinse step to remove all delimer from the reservoirs and it shuts itself off. It can then be turned on and operated in any mode.

Information Display Console: This is a two line display that shows various operating functions of the unit and other operating information.

START: Push this button to start kitchen timer (see Timer below).

CANCEL: Push this button to shut off the beeper after timer times out.

STEAM: Push to cook in convection steamer mode.

COMBO: Push to cook in convection oven/steamer combination mode, then select;

HI - When this button is pushed, the oven cooks in a high humidity environment

LO - When this button is pushed, the oven cooks in a low humidity environment

NOTE – Default is LO (if HI or LO is not pushed).

OVEN: Push to cook in convection oven mode.

Temperature Display:

A) Convection oven and combination cooking modes –
Shows set temperature in °F
Flashes until the set temperature is reached during pre-heat

B) Steamer cooking mode –
Shows dashes
Flashes until steamer is ready during pre-heat

TEMPERATURE Knob: Turn to set cooking temperature in oven and combination cooking modes. Maximum temperature that can be set is 350°F for Combo HI, 450°F for Combo Lo and Oven, the minimum temperature that can be set is 200°F.

TIMER Display: Shows remaining time when kitchen timer is operating. Beeper sounds when remaining time is zero. The two dots on display flash when timer is in use.

TIMER Knob: Turn to set kitchen timer. Time can be set from 1 minute 9 hours 59 minutes. Push 'Start' button to start timer count. Time setting can be readjusted (higher or lower) during the timing cycle. Beeper sounds when the set time cycle is complete. Push CANCEL to stop the beeper

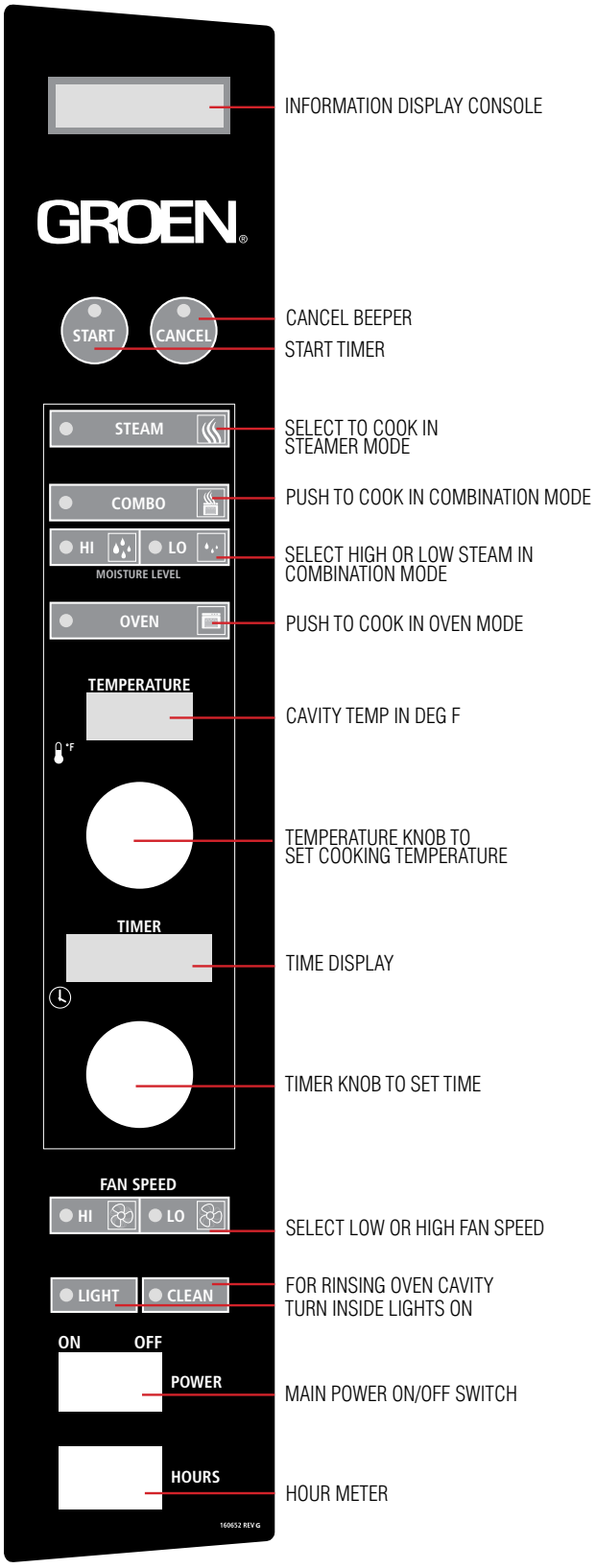
FAN SPEED: Convection fan can be operated at high or low speed. When a fan speed is not selected (default) the fan operates at high speed. Low speed is recommended for cooking delicate products.

LIGHT: Push this button to turn interior oven lights on. The light will automatically shut off after a brief period.

CLEAN: Push this button to start the semi-automatic cleaning cycle. Familiarize yourself throughly with the cleaning procedure in the "cooking cavity cleaning" section of this manual before using the clean function.

POWER ON/OFF SWITCH: This rocker switch is the main power switch for the oven. Push the ON side to start the unit and OFF side to shut unit down. It is recommended that this switch be used once or twice per day at the beginning of cooking period.

HOUR METER: Shows the unit's total hours of operation.



3.1 Gas Model Installation

WARNING

The unit must be installed by personnel who are qualified to work with gas, electricity and plumbing. Improper installation can cause injury to personnel and/or damage to the equipment. The unit must be installed in accordance with applicable codes.

CAUTION

Do not install the unit with the rear vents blocked or within 6 inches of a heat source such as a braising pan, deep fat fryer, charbroiler or kettle.

To avoid drainage problems, level the unit front to back and pitch it slightly to the rear.

Although Groen recommends the Tri-Res is installed near non-combustible surfaces, the following minimum clearances are to any surface, combustible or non-combustible.
Right Side.....6 inches
Left Side .....6 inches
Rear.....0 inches from motor

Recommended Service Clearances
Right Side.....14 inches
Left Side .....6 inches
Rear.....24 inches
Front.....36 inches

The Tri-Res must be installed in a well-ventilated room with an adequate air supply. The Tri-Res must be installed beneath a ventilation hood since gas combustion products exit the appliance.

Any item which might obstruct or restrict the flow of air for combustion and ventilation must be removed. Do not obstruct the flue cover or rear vents after installation.

The area directly around the appliance must be cleared of all combustible material. The installation must conform with local codes or, in the absence of local codes, with the National Fuel Gas Code, ANSI Z223.1/NFPA 54, or the Natural Gas and Propane Installation Code, CSA B149.1

The unit and it individual shutoff valve must be disconnected from the gas supply which has test pressures in excess of 1/2 PSI (3.45 kPA). It must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system which has test pressures equal to or less than 1/2 PSI (3.45 kPA).

1. Electrical Supply Connection
Provide 115 VAC, 60 HZ, 1 PH, 15 AMP service. Bring wire in through hole on the back panel. Each cavity requires a separate cord for connection. Local codes and/or the National Electrical Code should be observed in accordance with ANSI/NFPA 70. AN ELECTRICAL GROUND IS REQUIRED. The wiring diagram located in the service compartment and in this manual. Maximum load is 12 AMPs. In Canada, provide electrical service in accordance with the Canadian Electrical Code, CSA C22.2 Part 1 and/or local codes.

2. Gas Supply Connection
Connection to the gas supply shall be in accordance with the chart below. Supply pressure must be at least 5" W.C. (maximum 14" W.C.) for natural gas or 12" W.C. (maximum 14" W.C.) for LP gas. In Canada, the installation must conform to the Canadian Gas Code, CAN 1-B149, Installation Codes for Gas Burning Appliances and Equipment and/or local codes. Check all gas connections for leaks prior to unit operation.

Ratings for Gas Tri-Res
***Measured at gas manifold**

	BTU	*Operating Pressure	MIN Incoming Gas Feed Rate	MAX Incoming Gas Feed Rate
Tri-Res-20G-NG	60,000	3.50" WC	5" WC	14" WC
Tri-Res-20G-LP	60,000	10.0" WC	12" WC	14" WC

In Canada, the installation must conform to the Canadian Gas Code, CAN 1-B1 49, Installation Codes for Gas Burning Appliances and Equipment and/or local codes.

WARNING

For unit installed on customer supplied stands, casters are required with restraining requirement as listed.

After the unit has been connected to the gas supply, all gas joints must be checked for leaks. Do not use flame checking for leaks. A thick soap solution or other suitable leak detector should be used.

CAUTION

When the unit is moved from its original position for cleaning or service, the hooks on the restraining cable assembly must be reconnected at both ends. Detailed Instructions for the re-connection to the appliance are shown below under Unit Restraining Requirement.

Unit Restraining Requirement:

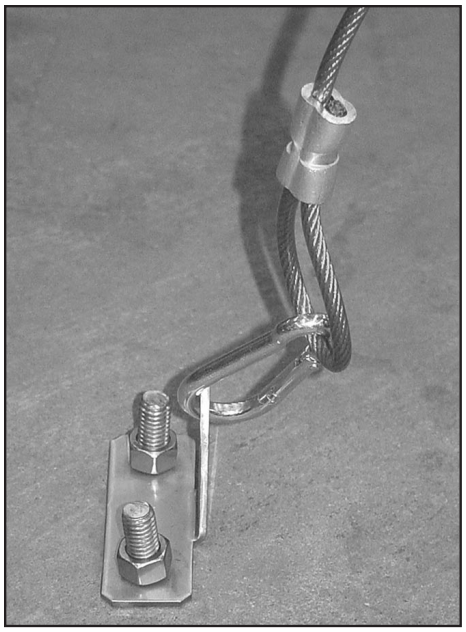
A. The installation shall be made with a connector that complies with the standard for connectors for movable gas appliances. ANSI Z21.69.CSA 6.16, and a quick-disconnect device that complies with the standard for quick-disconnect devices for use with gas fuel, ANSI Z21.41.CSA 6.9.

B. Adequate means must be provided to limit the movement of the appliance without depending on the connector and the quick-disconnect device or its associated piping to limit the appliance movement.

C. The location where the restraining device may be attached to the appliance shall be in accordance with Groen specifications for the device. (see photo)

Eyebolt connector on the back of the unit.

D. Anchor restraining cable bracket to a secure structure. One of the preferred locations is on the concrete floor using anchor bolts (not provided) as shown below.



3.2 Installation

Many of the problems associated with the degraded performance or non-operation of the Tri-Res can be traced directly to improper installation and/or lack of proper periodic cleaning-all of which is the responsibility of the customer.

This section is provided to determine that the equipment was installed correctly, to indicate the proper cleaning techniques are to be used by Groen customers and Tri-Res test procedures.

It is to be expressly noted that ALL work associated with the installation and cleaning of the Tri-Res is NOT covered by Groen warranty provisions.

3. Water Connection(s)

Install a check valve to prevent back flow in the incoming cold water line, as required by local plumbing codes. Water pressure in the line should be between 30 and 60 PSI. If the pressure is above 60 PSI, a pressure regulator will be needed. These pressures must provide the **1.5 gallons per minute** required for proper unit function.

4. A 3/4 inch female NH connector (garden house type) is used to attach the water supply to the inlet valve. **Minimum inside diameter of the water feed line is 1/2 inch.** Use a washer in the hose connection. Do not allow the connection to leak, no matter how slowly. Do not over-tighten hose connections.

5. This equipment is to be installed to comply with basic plumbing code of the Building Officials and Code Administrators International, Inc. (BOCA) and Food Service Sanitation Manual of the Food and Drug Administration (FDA).

NOTE: Local code may also require check valves in the water supply line.

ANSI 21.69.CSA 6.16, and a quick-disconnect device that complies with the standard for quick-disconnect devices for use with gas fuel, ANSI Z21.41.CSA 6.9

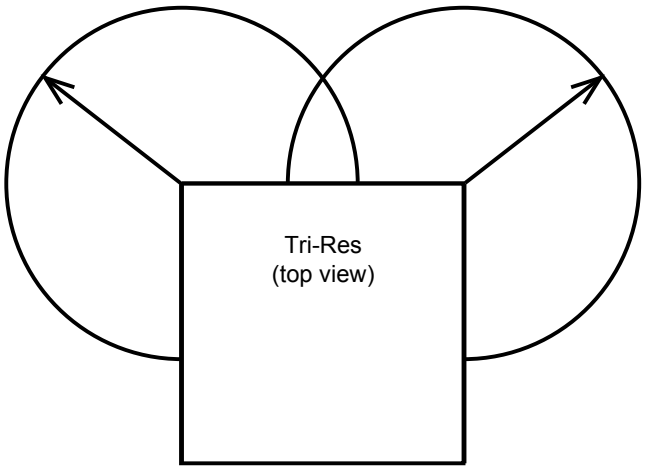
Adequate means must be provided to limit the movement of the appliance without depending on the connector and the quick-disconnect device or its associated piping to limit the appliance movement.

The location where the restraining device may be attached to the appliance shall be in accordance with Groen specifications for the device.

6. Drain Line Installation

The drain line should not be less than:
1-1/2" – for single units
2" – for double stacked units
There must be a 2" air gap to the (non-pressurized) building drain. Make sure that the drain is sloped AWAY and DOWN from the Tri-Res and that there are no obstructions in the line. Failure to observe these requirements may cause a water trap in the drain line and produce enough back pressure to prevent proper cavity draining-resulting in condensate water leaking from the door. Drain line must **NOT** be made of plastic pipe. It must be able to withstand boiling water.

Steam Free Zone: The Tri-Res can be damaged by steam from external sources. **Do not install** the unit over a steam venting drain. Ensure that steam is not present in an area bounded by the footprint of the unit and a circle 18 inches in radius about the right and left rear corner of the unit (see figure below).



3.3 Installation Checklist

General

_____ Refer to section 3.3 for proper clearances.

_____ Do not install Tri-Res directly above steam venting

_____ Make sure the unit rear vents are not blocked and the unit is not within 6" of a heat source.

_____ Make sure Tri-Res is level or pitched slightly to the rear.

_____ Check that fan is clean and clear of foreign materials.

Gas Connection Checks

_____ Make sure the installation conforms to local codes.

_____ Make sure Tri-Res is installed under a ventilation hood. Check that the flue and all vents are free of obstruction.

_____ Check that gas supply is 5" W.C. (min) to 14" W.C.(max) for natural gas, and 12" W.C. (min) to 14" W.C.(max) for propane.

_____ Check that gas supply piping is 1/2" NPT.

_____ Verify operating gas pressure is per chart in section 3.2

Electrical Checks

_____ Make sure the Tri-Res is properly grounded.

_____ Verify that the electrical connections conform to all local codes and the NEC requirements.

_____ Make sure the power supply branch circuit conforms to the specifications indicated on the Tri-Res nameplate. Tri-Res Door Check

_____ Make sure the door gasket is making good contact with the cavity frame.

_____ Instruct operators to leave the door open when the Tri-Res is shut down overnight or longer.

Cold Water Supply Connections

_____ Make sure plumbing connections conform to local codes.

_____ If permitted by local codes, check that hose connection is flexible to allow Tri-Res movement for servicing.

_____ Check inlet water pressure is 30-60 PSIG.

_____ Check that the water feed line is minimum of 1/2" inside diameter.

_____ Check water flow in section 3.3

Drain Connections

_____ Make sure drain plumbing connections comply with local codes.

_____ Make sure drain line is 1-1/2" and 2-1/2" on stacked units.

_____ Check that drain line is suitable for boiling water. Make sure PVC is not being used for drain plumbing.

_____ Check that drain line is pitched downward.

_____ Make sure drain line is free of obstruction.

_____ Make sure drain is not connected to a building drain.

Water Quality and Treatment

It is essential to supply the steam generator with water that will not form scale. Even though the boilerless steam generator is engineered to minimize scale formation, scale development depends on the hardness of your water and the number of hours you operate the equipment each day.

Most water supplies contain minerals which form scale it is this scale which could lead to an early component failure.

Your local water utility can tell you about the minerals in your water. The water going to the steam generator should have between 30 and 40 parts per million (ppm) total dissolved solids (TDS) and should have a pH (acidity rating) of 7.0 to 9.0. Please follow these simple precautions:

1. The best way to prevent scale is to use a Groen PureSteam TM Water Treatment System which has been specifically designed for Groen steamers and combination ovens. **Do not rely on unproven water treatments** sold for scale prevention and removal. They are not specifically designed to work with Groen steamers and combination ovens.

2. A well-maintained water treatment system and a regular cartridge replacement schedule is essential.

3. Using a Groen water treatment system will provide longer steam generator/boiler life, higher steam capacity, and reduce maintenance requirements.

4. If you notice a slowdown in steam production, check the unit's bottom for scale build-up. This could be an indication that the water treatment cartridges need replacing. Heavy scale reduces the unit's ability to boil water, and can even cause component failure.

MINIMIZE SCALE PROBLEMS BY INSTALLING AND MAINTAINING A GROEN WATER TREATMENT SYSTEM AND BY DELIMING THE STEAM GENERATOR/BOILER REGULARLY.

Groen Tri-Res ovens feature two separate water inlets – one for the steam generator (for treated water), the other for the spray condenser (untreated water) and semi automatic wash cycle. The second intake will reduce water treatment requirements resulting in significant savings.

The dual water connections are on the rear of the unit.

3.4 General Cleaning

To keep your Tri-Res in proper working condition, use the following procedure to clean the unit. This regular cleaning will reduce the effort required to clean the steam reservoir and cavity.

A. Suggested Tools

- Mild detergent or vinegar
- Stainless steel exterior cleaner such as Zepper
- Cloth or sponge
- Spray bottle
- Nylon pad
- Towels
- Plastic disposable gloves

B. Procedure Exterior Cleaning

a. Prepare a warm solution of the mild detergent as instructed by the supplier. Wet a cloth this solution and wring it out. Use the moist cloth to clean the outside of the unit. Do not allow freely running liquid to touch the controls, the control panel, any electrical part, or on the side or rear panels.

b. To remove material which may be stuck to the unit use a fiber brush, or a plastic or rubber scraper with a detergent solution.

c. Stainless steel surfaces may be polished with a recognized stainless steel cleaner such as "Zepper".

WARNING

Disconnect the power supply before cleaning the outside of the Tri-Res. Keep water and cleaning solutions out of controls and electrical components. Never hose or steam clean any part of the unit.

Avoid contact with any cleanser, deliming agent or degreaser as recommended by the supplier. Many are harmful. Read the warnings and follow the directions.

Even when the unit has been shut off, don't put hands or tools into the cooking chamber until the fan has stopped turning.

Don't operate the unit unless the removable partition has been put back in its proper location.

Do not use any cleaning agent that contains any sulfamic agent or any chloride, including hydrochloric acid(HCI). To check for chloride content, see any material safety data sheets provided by the cleaning agent manufacturer.

WARNING

DO NOT DISASSEMBLE DURING CLEANING, BREAKAGE WILL RESULT. USE HOT WATER TO WASH OUT.

Interior Cleaning

NOTE: Clean the unit daily or as residue builds upon the bottom of the oven cavity.

1. Turn off the unit by pressing once on the current or last operating mode. For example if you are in steam mode press STEAM button once more so that the red indicator light is off.

NOTE: The unit cannot be operated in the CLEAN mode while the oven is in operation.

2. Press CLEAN button. The LCD display will instruct you to empty the oven. (Display reads OPEN DOOR AND REMOVE RACKS).

3. Open the door and remove all food pans, oven racks, the two rack support on side and the two halves of steam baffle located on the bottom of the oven. (When door is opened, display reads SPRAY CLEANER AND CLOSE DOOR)

4. Once these are removed, spray a detergent/cleaner on interior walls.

NOTE: use a cleaner that is safe for oven use and will degrease in presence of steam.

5. Close the door (Display reads CLEAN MODE SOAK TIME).

6. The rest of the clean cycle is automatic and you have to do nothing but leave or wait till clean cycle is over.

7. If the oven is hot when the clean cycle has started the display will read OPEN DOOR TO COOL OVEN. Open the door (display reads COOLING). When the oven has cooled sufficiently the display reads CLOSE THE DOOR. Close it. The clean cycle continues with the soaking period.

8. After soaking the oven interior will be automatically sprayed with rinse water to remove the cleaner. At anytime during the clean cycle the door may be opened to spray more cleaner on the cavity walls. When the door is closed the cycle resumes with the soaking period.

9. After rinse the oven will drain the water and then go into a second rinse cycle.

10. After the second rinse cycle the oven will drain and the display will read CLEAN COMPLETE TIME LEFT for a minute, then it will shut completely down.

11. At this time you may open the door and leave it open to air dry oven interior.

12. To repeat the clean cycle, turn POWER switch to ON, and press CLEAN again.

13. Power may be turned off at any time during the clean cycle. When power is turned on again the display reads PUSH CLEAN TO FINISH CLEANING. Push the CLEAN button to resume cleaning (no other cooking mode buttons will operate until the clean cycle is complete).

Deliming
Tri-Res is designed to require only a daily cleaning of the cavity, pan racks, steam lid and water level probes to control scale build-up. When the unit is used in heavy duty, continuous operation in an area with extreme hard water. Additional steps should be taken to remove lime build up.

The following procedure outlines steps for optional periodic deliming for Tri-Res in heavy duty applications and extreme water conditions. The frequency of the deliming depends upon the severity of the scale build-up and individual operators, but typically would not be more frequently than bi-monthly.

Recommended Tools & Cleaners
a. Nylon scrub pad, cloth or sponge, Scotch-BriteTM medium duty scrubbing sponges preferred. **DO NOT use metal scrub pads.**

b. Delimer/Descaler – Groen Delimer Descaler (P/N 114800), Commercial Lime Away or any equivalent. **DO NOT** use any cleaning or deliming agent that contains Citric Acid, any Sulfamic Agent or any chloride, including Hydrochloric Acid.

WARNING: Follow the handling instructions provided with the delimer/descaler, including the recommendations for protective rubber gloves, protective clothing/ boots and protective eyewear.

c. Vinegar – commercial vinegar (5 to 7% strength) has been used successfully by a number of Tri-Res users as a descaler. Follow the same instructions as when using delimer/descaler.

IMPORTANT

Do not use any metal material (such as metal sponges) or metal implements (such as a spoon, scraper or wire brush) that might scratch any stainless steel surface. Scratches make the surface hard to clean and provide places for bacteria to grow. Do not use steel wool, which may leave particles imbedded in the surface which could eventually cause corrosion and pitting.

Cleaning Steps
WARNING! ALLOW THE UNIT TO COOL COMPLETELY BEFORE DELIMING. HOT SURFACES CAN CAUSE SEVERE BURNS.

STEP 1 Press OFF to turn the unit off. Open the unit door.

STEP 2 Allow the Tri-Res to cool completely before cleaning.

STEP 3 After the unit has cooled completely, press LIGHT. While the LIGHT is on press CLEAN. The message OPEN DOOR AND REMOVE STEAM LID appears in the display. Remove the pans and racks,

STEP 4 Remove any spilled foods from the steam lid. Remove the steam lid from the steam reservoir.

NOTE: Use protective gear, including eyewear for the following steps involving delimer/descaler.

STEP 5 With the door open, add 1/3 cup of delimer/descaler (or vinegar) to the water in each reservoir (one cup total), and close the unit door.

NOTE: ADDITIONAL AMOUNTS OF DELIMER AND LONGER TIME SETTINGS ARE NOT RECOMMENDED. THEY WILL NOT INCREASE THE EFFICIENCY OF THE PROCEDURE.

STEP 6 The unit will steam for 20 minutes (the display shows the number of seconds remaining) and drain for two minutes. At this time, the oven is hot and the message changes to OPEN DOOR TO COOL OVEN. When the door is opened the message changes to COOLING. When the oven has cooled sufficiently to allow it to continue the message CLOSE THE DOOR is displayed. When the door is closed the oven enters the cleaning cycle at the first rinse step. It rinses twice, displays CLEAN COMPLETE TIME LEFT, and turns itself off.

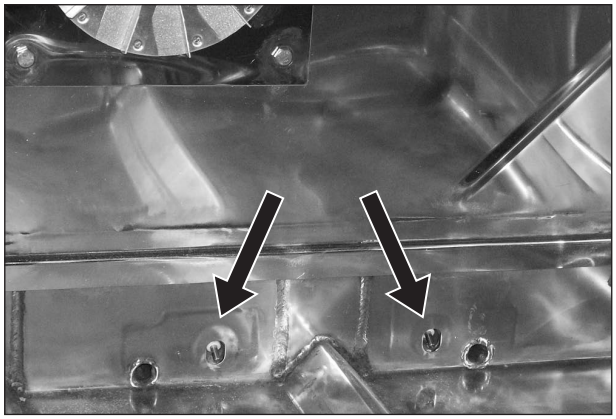
STEP 7 Open the door and wipe down the cavity and steam reservoir to remove all traces of scale and cleaning solution. Reinstall the panracks and lid.

NOTE: IF SCALE BUILD-UP STILL REMAINS, REPEAT THE PROCEDURE (STEPS 5-7) AS NECESSARY.

Maintenance
The Tri-Res is designed for minimum maintenance. Certain parts may need replacement after prolonged use. If there is a need for service, only Groen personnel or authorized Groen representatives should perform the work.

Always supply water with a low mineral content that meets the standards outlined in the Water Quality and Treatment section of this manual on page 17.

1. **Daily**
   a. With a wet cloth clean the interior and exterior (outer panels) of the oven.
   b. Remove the condensate drip pan located below the door; drain, clean and allow the drip pan to air dry.
   c. After cleaning the oven interior, leave the door slightly open to allow the oven to air dry.
   d. Open the inner glass door and check both inner and outer glass for cracks or signs of loose fitting. If cracks are found, do not operate the unit until the glass is replaced.
2. **Weekly**
   a. Delime the interior per deliming procedure described in this manual on page 20.
   b. Remove all interior baffles as part of the cleaning procedure and clean the Water level probes with a non abrasive, stiff brush. Two (2) water level probes are located on the rear wall of the unit below the fan.



Liquid Level Probes.

   c. Open the inner glass door and check the light assembly for proper operation and fit.
3. **Monthly**
   a. Check the hinges and other moving parts of the inner and outer glass doors for smooth operation and signs of misalignment or wear. If the door does not move freely or sags, do not operate the unit until corrected. See Door adjustment note below.
   b. Check the door latch for smooth operation. If necessary lubricate the latch spring with a food grade PTFE lubricant.

NOTE: DOOR ADJUSTMENT
If steam or condensate is seen leaking from around the door, take the following steps:
1. Check the door gasket. Replace it if it is cracked or split.
2. Inspect the cooking chamber drain to be sure it is not blocked.
3. Adjust the latch pin as follows:
   a. Loosen the lock nut at the base of the latch pin, and turn the latch pin ¼ turn clockwise. Re-tighten the lock nut.
   b. After adjustment, run the unit in the Steam Mode to test for further steam leaks.
   c. If leakage continues, repeat the adjustment.
   d. Continue adjusting the pin clockwise until the door fits tightly enough to prevent leaks.

SETUP	EXPECTED RESULTS	PROBABLE DEFECT	TEST or COMMENTS
Measure Input voltage and amps.	Input voltage is within 10% of rated voltage and 5-7 amps.	Wrong model (voltage) installed to incoming power supply.	Notify customer
Verify gas supply Propane or Natural, and pressures.	Correct gas source and pressure.	Wrong model ordered.	Gas conversion not performed in the field.
Disconnect or turn off water supply, open door, push OFF switch.	24vac on secondary transformer. Heartbeat LED on back on control board flashes once a second.	No Line	
		Blown 10 amp fuse F1	Standard test
		24 volt control transformer	Measure 120vac in and 24vac +/- 20% vac out
		Control board or Relay board Incorrect wiring	Substitute to test Check wiring diagram
Press ON switch	LEDs on control board illuminate.	24 volt control transformer	Measure 120vac in and 24vac +/- 20% vac out
		Hi-limit (auto-reset)	Run sensor diagnostic.
		Control board or Relay board	Substitute to test
		Incorrect wiring	Check per wiring diagram
		Fill Valve	Fill valve is normally open when water is below water level sensor, 24VAC is applied to coil or valve and it opens. When water reaches the level sensor, the coil de-energizes. Run fill valve diagnostic.
		Drain valve	Without power, the valve is open, when 24VDC is applied to the coil or the valve, it energizes to prevent draining. Run drain valve diagnostic.
		Muffin Fan	Verify 24VDC across muffin fan coil.
			Substitute to test
		Incorrect Wiring	Check per wiring diagram
Press ON switch	Audible click a gas valve opens.	Door switch	Run sensor diagnostic
		Incorrect wiring	Check per wiring diagram
		Gas valve	Verify 24VAC across valve coil.
	About 20 minutes after closing the door, the oven comes to ready; the temperature indicator stops flashing.	Gas valve	Verify 24VAC across valve coil.

GAS ORIFICE SIZE CHART (ALTITUDE ABOVE SEA LEVEL IN FEET)							
Elevation	**Gas Type**	**No. Of Burners**	**Igniter Tube Orifice Size**	**Groen Part No.**	**No. Of Burners**	**Burner Orifice size**	**Groen Part No.**
up to 2000'	NG	1	0.029 (# 69)	101665	3	0.089" (# 43)	152696
2001-4000'	NG	1	0.029″ (# 69)	101665	3	0.085″ (2.15mm)	152014
4001-6000'	NG	1	0.026″ (#71)	112603	3	0.082″ (#45)	152015
6001-8000'	NG	1	0.026″ (#71)	112603	3	0.0787″(2.0 mm)	152016
8001-10000'	NG	1	0.026″ (#71)	112603	3	0.076″ (#48)	152017
up to 2000'	LP	1	0.020" (# 76)	101625	3	0.055" (# 54)	152018
2001-4000'	LP	1	0.020" (# 76)	101625	3	0.052″ (#55)	152019
4001-6000'	LP	1	0.020" (# 76)	101625	3	0.049″ (1.25mm)	152020
6001-8000'	LP	1	0.018″ (0.45mm)	152721	3	0.047″ (1.20mm)	152021
8001-10000'	LP	1	0.018″ (0.45mm)	152721	3	0.0465″ (#56)	152022

Fault Messages

No product code
The product code (gas or electric) is embedded in the ribbon cable at the controller end. The cable may be damaged or partially disconnected. Make sure the ribbon cable connector is properly seated in the mating connector on the back of the control board.

Oven too hot
The temperature inside the oven is above 550 degrees F. The temperature sensing RTD, the high limit thermistor, the control board, or the relay board has failed or because one or more gas valves are stuck open.

RTD open
The RTD temperature sensor has failed, its connector has become disconnected from the relay board (most likely), the ribbon cable has been damaged, or the control board has failed.

RTD shorted
The RTD temperature sensor has failed, its wire harness to the relay board has been pinched (most likely), or relay board has failed.

Control too hot
The temperature sensor on the control board has detected a temperature above 180 degrees F. The airflow thru the controller housing may be blocked, one or both muffin fans may have failed, or the control board has failed.

Burner not on
Relight
Ten minutes after the oven was turned on the temperature has not risen sufficiently. The pilot went out or didn't light, or the burners didn't light. The igniter may have failed, the igniter wire may be shorted, there is a problem in the gas distribution system, or the main gas valve may be shut off.

Fan not running
The cavity fan stopped running. It may be open or one of its connectors may have become disconnected.

All fills long
The water level in all three reservoirs didn't reach the water level probes within the allotted time while filling. The probes may be dirty (clean them), the level probe harness wires may have become disconnected, the water may be turned off, the fill valves may be defective or may be disconnected, or the drains are stuck open.

Fill 1 too long
The water level in the center reservoir didn't reach the center water level probes within the allotted time. See All fills long.

Fill 2 too long
The water level in the side reservoirs didn't reach the right water level probe within the allotted time. See All fills long.

All drains long
The water level in all three reservoirs didn't drop below the water level probes within the allotted time while draining. The probes may be dirty (clean them), the drains may be plugged, or the drain valves may be stuck closed.

Drain 1 too long
The water level in the center reservoir didn't drop below the center later level probe within the allotted time. See All drains long.

Drain 2 too long
The water level in the side reservoirs didn't drop below the right later level probe within the allotted time. See All drains long.

DIAGNOSTIC CHECK OF SYSTEM

1. ENTER DIAGNOSTICS

Push STEAM, COMBO, OVEN, and CLEAN all at the same time (it takes two hands).
The display says DIAGNOSTICS EXIT. Rotate the TIMER knob (the lower knob) clockwise. The names of the various diagnostic tests appear in the second line of the display. It's usually best to execute the tests in order.

2. RTD TEMP

The value shown in the red TEMPERATURE display is the temperature in degrees F measured by the RTD sensor in the oven cavity.
If the oven is at room temperature then the display will indicate approximately that temperature.
If the oven has recently been used then the indicated temperature will be considerably higher.

3. RTD VOLTAGE

This test checks for a shorted or open RTD.
The value displayed is approximately 20% of the RTD voltage in millivolts.
At room temperature the display should show approximately 110.
At 450 degrees the display should show approximately 180.
This is the normal operating range for the RTD.

If the RTD is shorted (pinched wires) the display will show a value around zero.
If the RTD is open or disconnected the value will be above 900.

4. LOCAL TEMPERATURE

This test checks for deficient airflow thru the control panel housing.
There is a temperature sensor mounted on the control board right behind the control panel.
If the cooling air flow thru the control panel housing, from bottom to top, is good then the temperature sensor should measure room temperature, approximately 70 on the display.
If the air inlet at the bottom of the housing becomes plugged or if the internal muffin fans fail then the air temperature around the control board will rise.

If it rises to 180 degrees F, the danger temperature, the display will read 138.

5. BUTTON

This test checks all the control panel buttons.
Push all the buttons, one at a time.
When the buttons are pushed the associated LED lights.
If the LED stays lit after the button is released it usually means the plastic panel overlay is keeping the button pushed in.

The START button also tests the beeper.
The CANCEL button turns off the backlight on the text display.

6. FIRMWARE

This test displays the current firmware version in the TEMPERATURE display. It should be 2.28 or greater.

7. SHUTDOWN

This test checks the latching relay circuitry on the relay board.
Turn the oven on by pushing the ON switch.
Push START to unlatch the relay and listen for the faint click as the relay and pilot valve release.
Push START again and notice that there is no click this time since the relay is already released. Push the ON switch and listen for the faint click as the relay and valve pull in.
Leave the power switch on.

8. LIGHT

This test checks the lights in the door.
Push START.
All the lights in the door should light.
Replace the ones that are burned out.

9. MUFFIN FAN

This test checks both muffin fans on the right side of the oven.
Push START.
Both muffin fans should operate.
If not check the connections and replace the inoperative fan.

10. FAN HI

This test checks the cavity fan at high speed.
Push START.
The fan should run at high speed.
If it doesn't check the connections and the fan motor.

11. FAN LO

This test checks the cavity fan at low speed.
It is similar to the previous test.

12. STEAM VALVE 1
This test checks the steam-water inlet valve for the center reservoir.
Push START. Water should flow into the center reservoir.
Release START. Water should stop flowing.
If not then check the connections, water valve, and water supply to the oven.

13. STEAM VALVE 2
This test checks the steam-water valves for the outer two reservoirs.
Push START. Water should flow into the outer two reservoirs.
Release START. Water should stop flowing.
If not then check the connections, water valve, and water supply to the oven.

14. SPRAY VALVE
This test checks the condensate-spray valve.
Push START. The condensate spray hose at the drain box should jump a bit when water starts.
After a few seconds water should flow out of the drain hose.
Release START. The water should stop.
If not check the connections, water valve, and water supply to the oven.

15. RINSE VALVE
This test checks the rinse-water valve.
Close the oven door (the rinse valve won't open if the door is open).
Push START. The rinse nozzle in the back of the oven cavity should spray water all over the cavity.
Release START. The water should stop. If not check the connections, water valve, and water supply to the oven.

16. DRAIN VALVE 1
This test checks the drain valve for the center reservoir.
Push START.
Check that the plunger on the center drain valve rises.
If there is water in the center reservoir it should begin to drain out.
Release START. The plunger should drop back down.
If not check the connections and the drain valve.

17. DRAIN VALVE 2
This test checks the drain valves for the outer two reservoirs.
Push START.
Check that the plunger on the outer two drain valves rises.
If there is water in the any of the outer reservoirs it should begin to drain out.
Release START. The plunger should drop back down.
If not check the connections and the drain valve.

18. MAIN VALVE
This test checks the igniter, the pilot and pilot valve, the flame sensor, the main gas valve and the center burner.
Make sure the POWER switch is on. Push ON if necessary.
Look at the burner assembly and verify that the pilot is on.
If not then check the LED on the igniter.
If it is flashing then turn the power off for a few seconds and back on again.
Check for pilot.

Push START. The main gas valve will click and the main burner will light.
Have an assistant look at the burner to verify.
If not check the connections, igniter, and gas supply to the oven.

19. AUXILIARY VALVES
This test checks the two auxiliary gas valves and the two side burners.
Push START. The auxiliary gas valves will click and the main burners will light.
Have an assistant look at the burner to verify.
If not check the connections, igniter, and gas supply to the oven.

20. PRODUCT CODE
This test checks the product code jumper in the ribbon cable connector to the control board. The red display should show 001 for the gas oven.
If this is not the case check that the proper ribbon cable has been installed and that all connecters are pushed in firmly.
If necessary replace the ribbon cable.

21. SENSORS
This test checks the two water level sensors, the door sensor, the high-limit sensor, the fan current sensor, and the latching relay.
The chart shown below represents the horizontal segments in the TEMPERATURE display. When a bar is on it indicates that the

corresponding sensor is on.

Level 1	Hi Limit	Power On
Level 2	Fan Current	
Door		

During this test various push buttons operate valves and the fan motor.

START controls the water inlet valve for the center reservoir.
CANCEL controls the inlet valves for the two side reservoirs.
MOISTURE LEVEL HI controls the center reservoir drain valve.
MOISTURE LEVEL LO controls the drain valves for the two side reservoirs.
All four of these are push-on/push-off.

The **FAN SPEED HI** and **FAN SPEED LO** push buttons control the cavity fan motor.
These two are momentary.

a. Begin the test with all valves closed, that is, with the corresponding LEDs off.

   i. Push START to begin filling the center reservoir.
   ii. In about a minute the water level will rise and contact the center water level probe.
   iii. The Level 1 bar will turn on.
   iv. Push START again to turn off the water inlet valve.
   v. Push MOISTURE LEVEL HI to open the center drain valve.
   vi. In less than a minute the Level 1 bar will turn off.
   vii. If not check the connections and clean the level probe.

b. Repeat the test in the two outer reservoirs using the CANCEL and MOISTURE LEVEL LO push buttons.

c. Open the door. The Door bar should light.
   Close the door. The bar should go out.
   If not check the connections, the magnet in the door, the door alignment, and the door sensor inside the control panel housing.

d. The power switch should be on and the Power On bar should be lit.
   If not then push the ON switch.

e. On the Relay board unplug the Hi Limit connector (two white wires in a small 4-pin connector) from J8 (near the center of the board).
   i. Use a small screwdriver and short the center and right pins of J8 together.
   ii. The Hi Limit bar should light and the Power On bar should go out.
   iii. Remove the screwdriver.
   iv. The Hi Limit bar should go out.
   v. IMPORTANT: replace the Hi Limit connector on J8.
   vi. Push the FAN SPEED HI button.
   vii. The Fan Current bar should light.
   viii. Release HI and push LO.
   ix. The bar should light again.
   x. Release the button.
   xi. The bar should go out.
   xii. If not then check the connections and the fan motor.

22. TEMP KNOB
This test checks the temperature knob (the upper knob).
Turn it clockwise.
The TEMPERATURE display should increase in five degree steps from 200 to 450.

23. ALL ON
This test checks everything lights up.
Look at all LEDS, seven-segment displays and decimal points.
Everything should be lit. If not then replace the control board.

24. EXIT
This is the way out of the diagnostics.
Push START.
The control board resumes normal operation

5.1 General Information

This section provides common removal and install procedures for parts in more than one mode of the Tri-Res. When Part Numbers differ by Tri-Res Model, the Part Numbers are not given in this section.

The following procedures are based upon having access to the Tri-Res on all four side. If the Tri-Res is installed between other appliances and there is not enough room on the sides for access, the Tri-Res must be pulled out from its position to gain proper access.

Care should be taken in moving the Tri-Res so as not to stress or pull on the electrical, gas, and water connections.

WARNING

After servicing gas piping on gas models, check for gas leaks before putting unit back in service.

5.2 Cavity Compartment Side Panels

For Part Number see Parts Identification Section.

Removal

1. With a flat blade screw driver remove the two 10-32 screws on the lower edge of the panel and two at the back edge. The panel is retained to the steamer by these four screws.

2. Once the screws are removed, the panel can be pulled forward about 1 inch, then raised above the top panel overhang.

5.3 Top Cover

For Part Number see Parts Identification Section.

Note: Under normal conditions the top cover should never have to be removed. The most likely reason for removing it is if the panel itself has been damaged by a falling object.

1. Remove right side and left side panels and upper rear panel.
2. Slide the cover forward until clear of the front overhang, and lift off.

5.4 Tri-Res Control PC Board P/N 160650

WARNING

Disconnect the steamer from electric power before beginning any service procedures.

1. Remove the four screws from the right side panel. Once the screws are removed, the panel can be pulled forward about 1 inch, then raised above the top panel overhang and removed.
2. Remove control board housing by removing six nuts from rear of housing.
3. Unplug the ribbon connectors.
4. Remove the knobs.
5. Using a 5/16" socket, remove the ten 6/32" lock nuts and remove the board from ten studs on the front panel. Be careful not to lose the metal washers below the panel.

Installation
4. Position the board on ten studs.
5. Install 6/32" lock nuts with washers. Use a 5/16" socket to tighten them in place.
6. Insert ribbon jack. Press firmly to make sure the jack is fully seated on the board.
7. Replace the knobs.
8. Replace the control board housing and six nuts behind the housing, tighten.
9. Replace the side panel and screws, tighten.

5.5 Relay Board P/N 160651

Removal
1. Unplug all connectors.
2. Using 5/16" socket remove four 6/32" lock nuts and remove the board from four studs on the high voltage panel.

Installation
3. Position the board on four studs on the high voltage panel.
4. Install 6/32" lock nuts onto the studs and tighten in place using a 5/16" socket.
5. Insert all jacks in the same connector locations as per removal. Press firmly to make sure each jack is fully seated on the board.

5.6 Reservoir Drain Valves P/N 152915

Note: When the steam reservoir drain valves are deenergized or OPEN), the silicone hose can be freely threaded through the valve is located to the right of the steamer cavity.

Removal
1. Turn off power and disconnect Tri-Res from branch circuit. Remove right side panel. Let Tri-Res drain completely.
2. Using spring clamp pliers, disconnect ONE END of the silicone drain hose by loosening the drain fitting coming from the cavity drain. Remove clamp.
3. Unplug the valve electrical wires.
4. With a 5/16 inch nutdriver, remove the two 10-32 screws holding the drain valve to the bracket on the Tri-Res base.
5. Remove the two 10-32 screws and remove the valve from the bracket.
6. Loosen the clamp and remove the other end of the silicone hose from the drain box. Inspect the hose for any damage or lime buildup. Clean or replace the hose if required, then reattach to the steam reservoir drain fitting.

Installation
7. Attach new drain valve to valve bracket. Slide the silicone hose through the drain valve housing and install hose clamp over the exposed end of the hose. Check that the hose is straight and not twisted.
8. Fit the exposed end of the silicone hose onto the elbow of the cavity drain. Using spring clamp pliers, position and tighten the hose clamp.
9. Plug the electrical leads of the valve into the wiring harness. Connect Tri-Res to branch circuit, and turn on power.

Testing
Operate Tri-Res sensor diagnostics. Check for leaks and observe if drain valve fully closes. Turn off Tri-Res and observe that drain valve opens and the steam reservoir drains.
10. Reinstall right side panel.

5.7 Door Removal/Installation/Alignment

For Part Number see Parts Identification Section.

Removal
1. To remove the door, turn off the Tri-Res power and allow the Tri-Res to cool. Then open the door and, while supporting the weight of the door, remove hinge pin or remove door-to-hinge bolts.
2. Place the door on a flat, clean table or similar support, with gasket facing up. Be careful not to scratch door surface.
3. Inspect door gasket for signs of cuts, or other defects which may impair its function. Replace if necessary.

NOTE: Gasket not covered under terms of warranty.

Installation
4. To install the door, apply NEVER-SEEZ lubricant to hinge pin. Align door with and insert hinge pin, or apply Locktite 242 to the door-to-hinge bolts, then install door and mounting bolts. Snug bolts only. Do NOT tighten mounting bolts at this time.

Alignment
5. Place a piece of masking tape over the door latch pin (bullet) hole in the door.

6. Close the door until the latch pin just penetrates the masking tape. Make sure the door pin contacts only the door latch spring.
7. If door pin does not strike the center of the masking tape or spring hole in the U-channel, loosen the hinge-to-oven bolts and align the door to the door pin. Tighten-to-oven mounting bolts.
8. You should be able to pull a dollar bill or comparable piece of paper with some effort, from between the gasket and Tri-Res cavity with the door closed. To adjust the hinge side, loosen the door-to-hinge bolts and align the door gasket with the oven cavity. Tighten the door-to-hinge mounting bolts.
9. Operate Tri-Res and check for leaks.

5.8 Door Switch P/N 096857

Note: One normally open door switch is factory-installed on one side of the control panel housing. It is activated (that is, closed) by the proximity of the door magnet.

1. Remove the side panel and the control panel housing for access to the door switch that is to be replaced.
2. Unplug the door switch from the Tri-Res harness.
3. The switch is held in place with two small 4-40 screws. With a slotted screwdriver, remove these screws and the switch may be removed.
4. To install the switch use the two 4-40 screws and a screwdriver with a screwstarter features.
5. Connect switch leads to steamer harness.
6. Replace control panel housing and side panel.
7. Test Tri-Res operation.

5.9 Door Gasket

For Part Number see Parts Identification Section.

NOTE: Door Gasket not covered under terms of warranty

Removal

1. Turn off Tri-Res power and allow to cool.
2. Remove the door using one of the following two methods:
a) Support the door and remove hinge pin or
b) Support weight of the door and remove the two door-to-hinge bolts.
3. Place the door on flat, clean, smooth table or similar support with handle hanging over edge. Be careful not to scratch the door.
4. Remove four (or eight) 8-32 truss head screws and remove inner door panel.
5. Remove and discard door gasket.
6. Clean back of the inner door panel. Be sure old sealant is completely removed.

Installation

1. Install new door gasket around inner panel as shown in the illustration. Be sure the inner door panel flange is full inserted into the door gasket groove.
2. Apply a high temperature silicone sealant, such as GE RTV 159 or equivalent, to the four door spacers.
3. Apply Locktite 242 to inner door panel mounting screws.
4. Install inner door panel and door gasket on the door spacers, and tighten mounting screws.
5. Align door with hinge and insert hinge pin OR apply Locktite 242 to the door-to-hinge bolts, then install door and mounting bolts. Do NOT tighten mounting bolts at this time.
6. Align door to Tri-Res and tighten bolts.

Please refer to 4.8 for alignment procedure.

5.10 Water Level Probe

Removal

1. Turn off the Tri-Res power and disconnect the Tri-Res from the branch circuit.
2. Remove the rear cover from the Tri-Res.
3. Disconnect the water level probe harness wire.
4. Loosen and remove the hex locking nut and washer.
5. Remove the probe.

Installation

6. Insert the new water level probe.
7. From the outside, put on any washer and locking nut. Tighten nut finger tight and then another 1/4 turn to prevent any water leaks.
8. Attach the harness wire.
9. Turn on the branch circuit power supply.
10. Turn ON the Tri-Res and test.

5.11 Burner

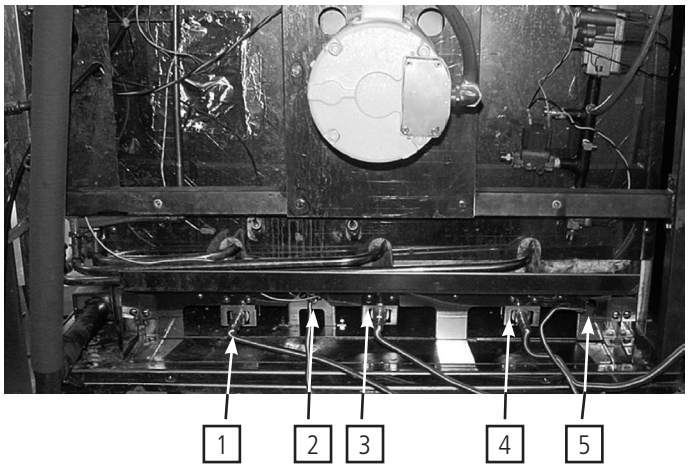
The entire combustion chamber is constructed as a slide out drawer to remove, follow the instructions below.

NOTE
Shut off power and gas supply before removing!!!!!

Removal

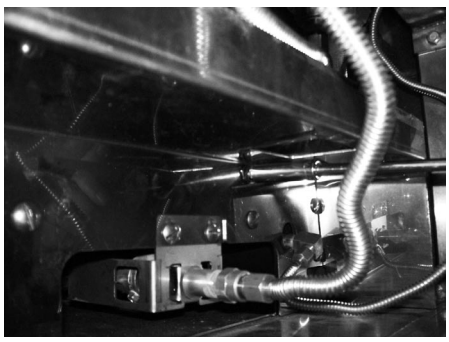
1a. Disconnect the flexible gas lines and moving them out of the way.

See Below;
#1 – Burner Supply Line
#2 – Pilot Supply Line
#3 – Burner Supply Line
#4 – Burner Supply Line
#5 - Runner Tube Supply Line



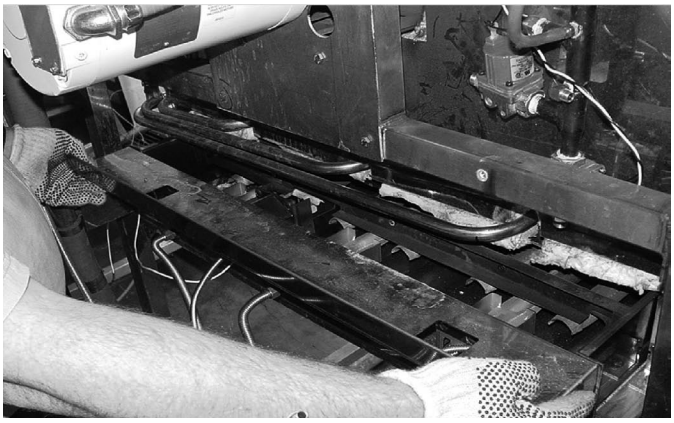
1b. Disconnect power and gas supplied to the unit.

2. Remove the left side panel by removing the three exterior screws.



3a. Remove the side access plate by removing the two 10x32 nuts.

3b. Remove the four (4) bolts that attach the damper and combustion chamber plate and pull out the drawer.



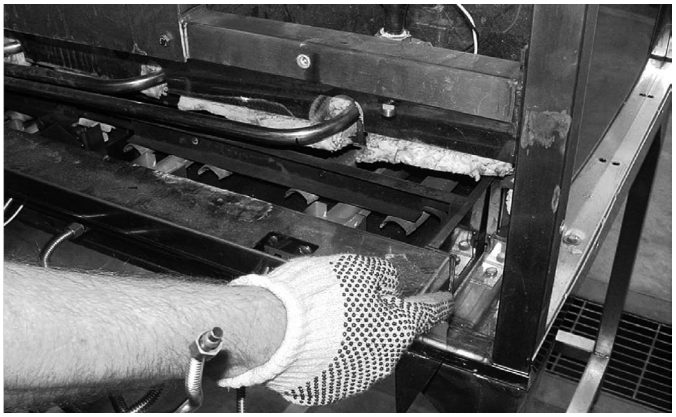
4. Unplug the HSI and flame sensor.

5. Remove the 5-1/4" screws on the holding plate near the ignition tube and the two on the bottom of the holding plate.
6. Loosen the 3/4" compression fitting on the ignition tube and move it toward the base.
7. Slide the burner out the left side of the unit.

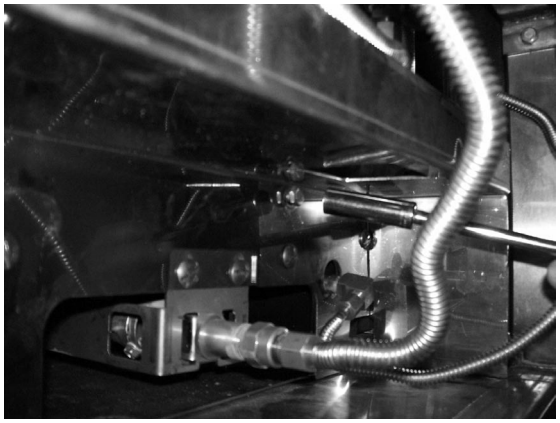
Installation

1. Slide the new burner into the left side of the unit.

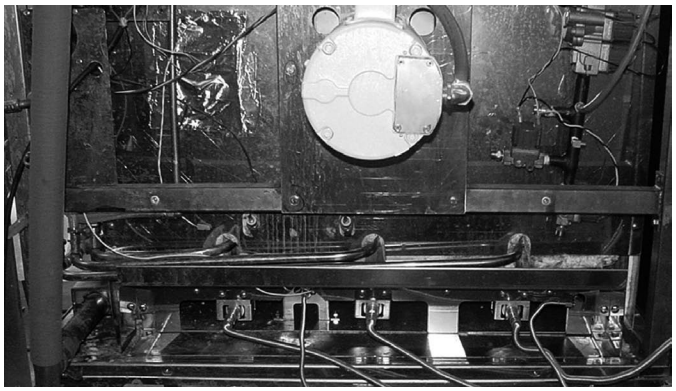
2. Attach the ignition tube and tighten the 3/4" compression fitting.



3. Install the 5-1/4" screws into the holding plate.



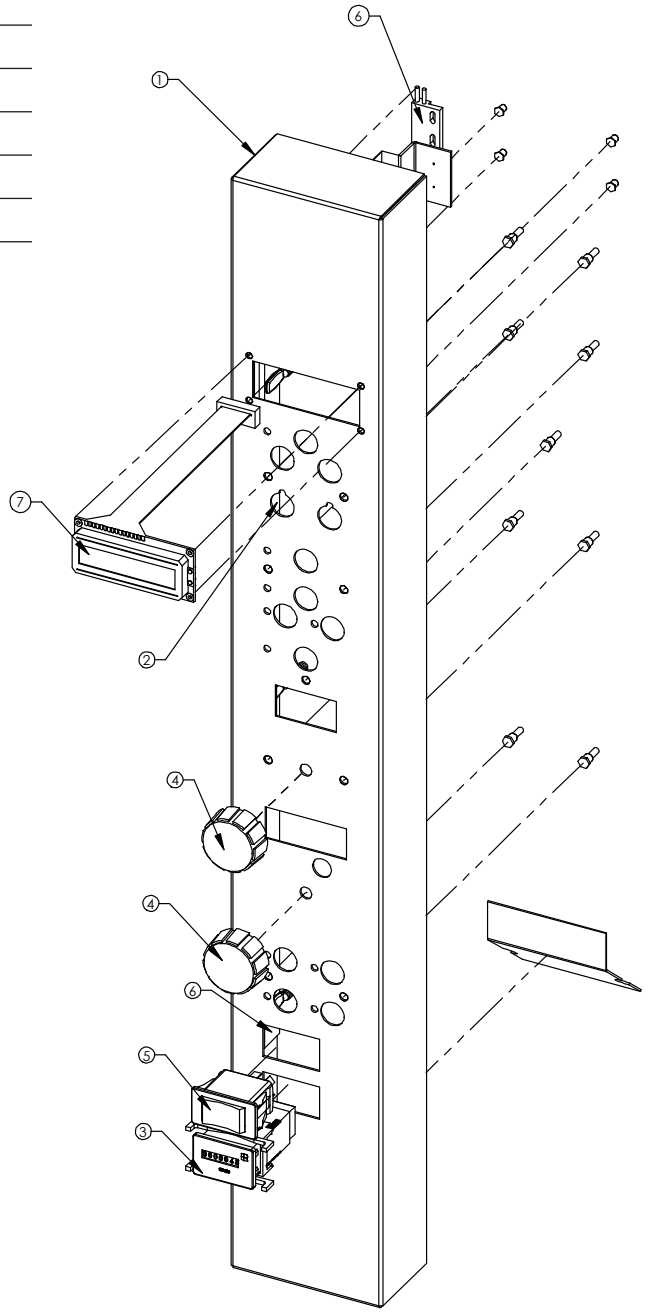
4. Plug in the HSI and flame sensor.



5. Turn on gas supply and power to the unit.
6. **NOTE:** The ignition tube does not receive gas until the burners are active.
7. Install the side access plate with 2 10x32 nuts.
8. Re-install the left side panel with the three exterior screws.

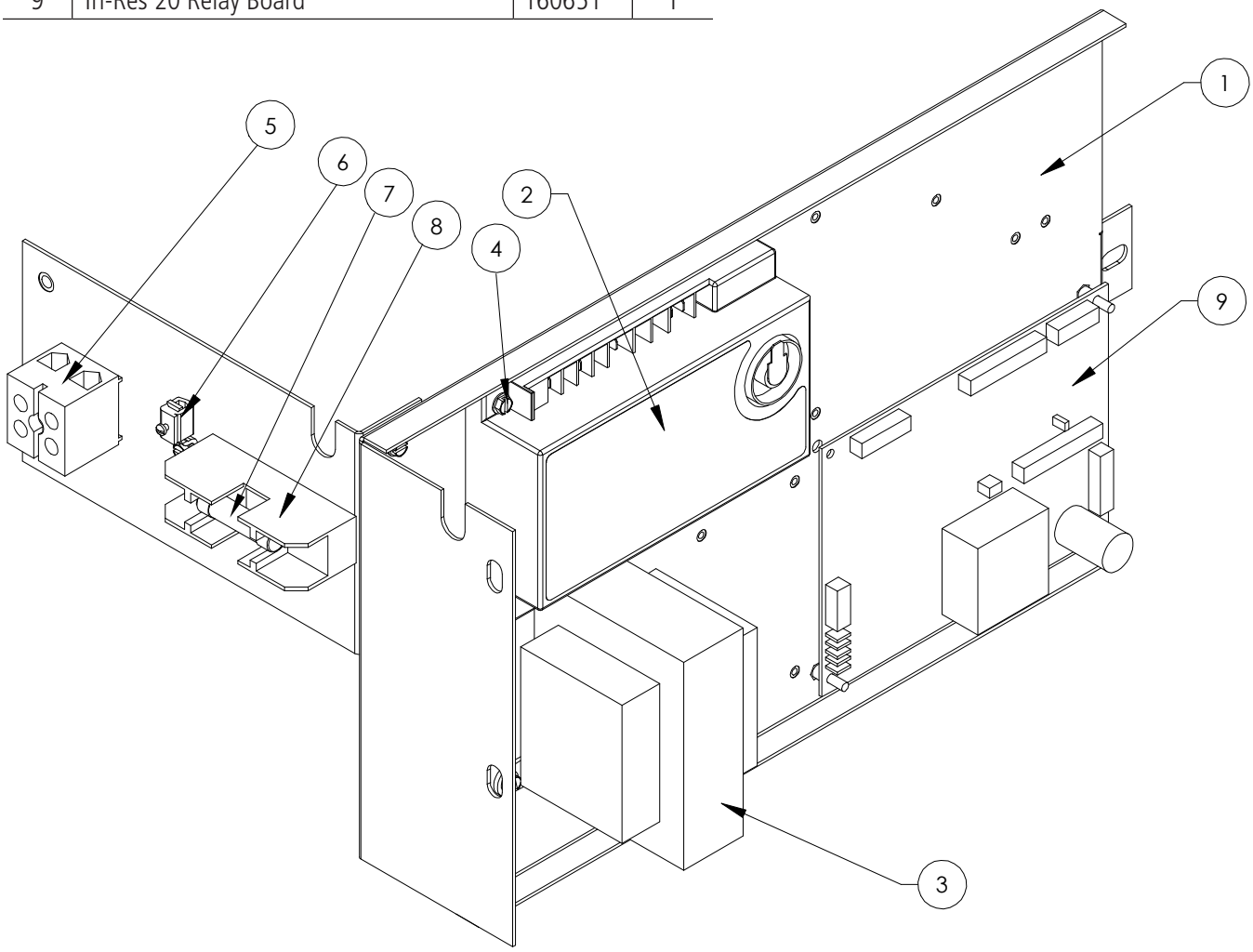
6.1 Control Panel Sub- Assembly

No.	Description	Part No.	Qty.
1	Panel, Control, Tri-Res	151109	1
2	Control Panel Mounting Bracket Assembly	152992	2
3	Hour Meter, Redington,	149295	1
4	Knob, 1.5 Dia	160921	2
5	Rocker Switch	160920	1
6	Switch, Door	096857	1
7	Control Panel Display	152904	1
8	Control Board, Tri-Res (not shown)	160650	1
9	Overlay, Front Panel Tri-Res (not shown)	160652	1
10	Gasket, Control Panel (not shown)	152998	1



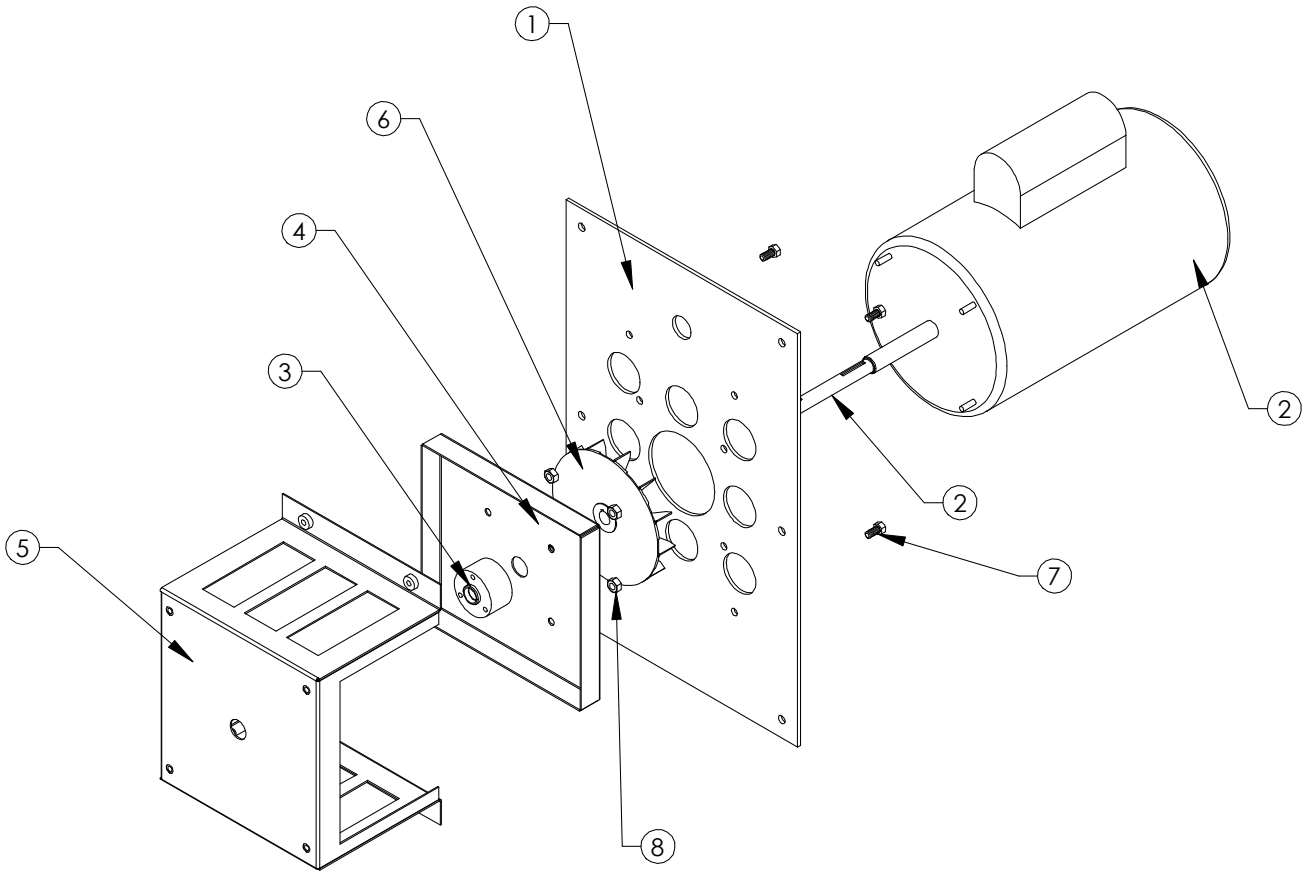
6.2 High Voltage Panel Assembly - Gas

No.	Description	Part No.	Qty.
1	Weldment, Electrical Panel, High Voltage	152602	1
2	Module, Ignition, HSI	140184	1
3	Transformer, 75VAC	121716	1
4	Screw Hex Slotted HD 8-32x.375	069789	8
5	2 Pole Terminal Block	152641	1
6	Ground Lug	119829	1
7	Fuse	152012	1
8	Fuse Block	77840	1
9	Tri-Res 20 Relay Board	160651	1



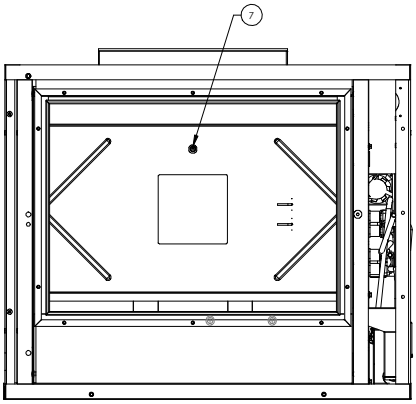
6.3 Assembly Motor Mount

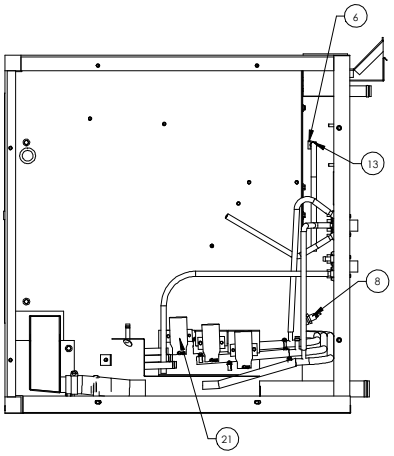
No.	Description	Part No.	Qty.
1	Motor Mounting Plate	152825	1
2	Lesson 1/2 HP Motor	152637	1
3	Motor Seal Assembly	071299	1
4	Motor Mount Insulation Plate	152826	1
5	Motor Mount Standoff Assembly	152827	1
6	5" O.D. Fan	152640	1
7	Screw, Hex Head Cap, 1/4"-20	005608	4
8	Nut, Hex Keps 1/2"-20	012940	4

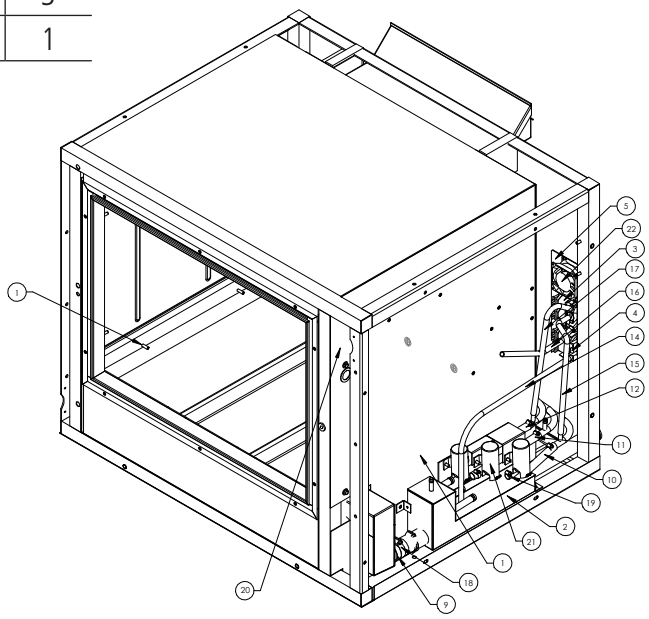


6.4 Water System Assembly

No.	Description	Part No.	Qty.
1	Insulation Assembly	152942	1
2	Weldment, Box, Drain	152877	1
3	Valve-Water Feed 3/4 R	090827	1
4	Valve-Water Feed 3/4 R	071235	1
5	Water Valve Mounting Bracket	152554	1
6	Fitting Compression	057218	1
7	Spray Nozzle	154335	1
8	Probe, 2-1/16" Water Level	141285	2
9	Hose, Silicone, 7.5" Long, 0.1" Thk, 0.75" OD	152946	1
10	Hose, Silicone, 9.5" Long, 0.0625" Thk, 0.75 OD	152947	1
11	Hose, Silicone, 9." Long, 0.0625" Thk, 0.75 OD	152949	1
12	Hose, Silicone, 8.625" Long, 0.0625" Thk, 0.75 OD	152949	1
13	Copper Wash Line 23.75" Long, 0.0625" Thk, 0.5 OD	152950	1
14	Hose, Silicone, 23.625" Long, 0.0625" Thk, 0.5 OD	152951	1
15	Hose, Silicone, 15.5" Long, 0.0625" Thk, 0.5 OD	152952	1
16	Hose, Silicone, 11.5" Long, 0.0625" Thk, 0.5 OD	152953	1
17	Hose, Silicone, 15.625" Long, 0.0625" Thk, 0.5 OD	152954	1
18	Clamp Hose 2 1/4 Dia.	073259	2
19	Clamp Hose Low Pressure	093482	6
20	Fan, 24VDC Muffin 80MM	153505	1
21	Valve-Drain 5/8 ID	152915	3
22	Fan, 24VDC Muffin 80MM	153505	1

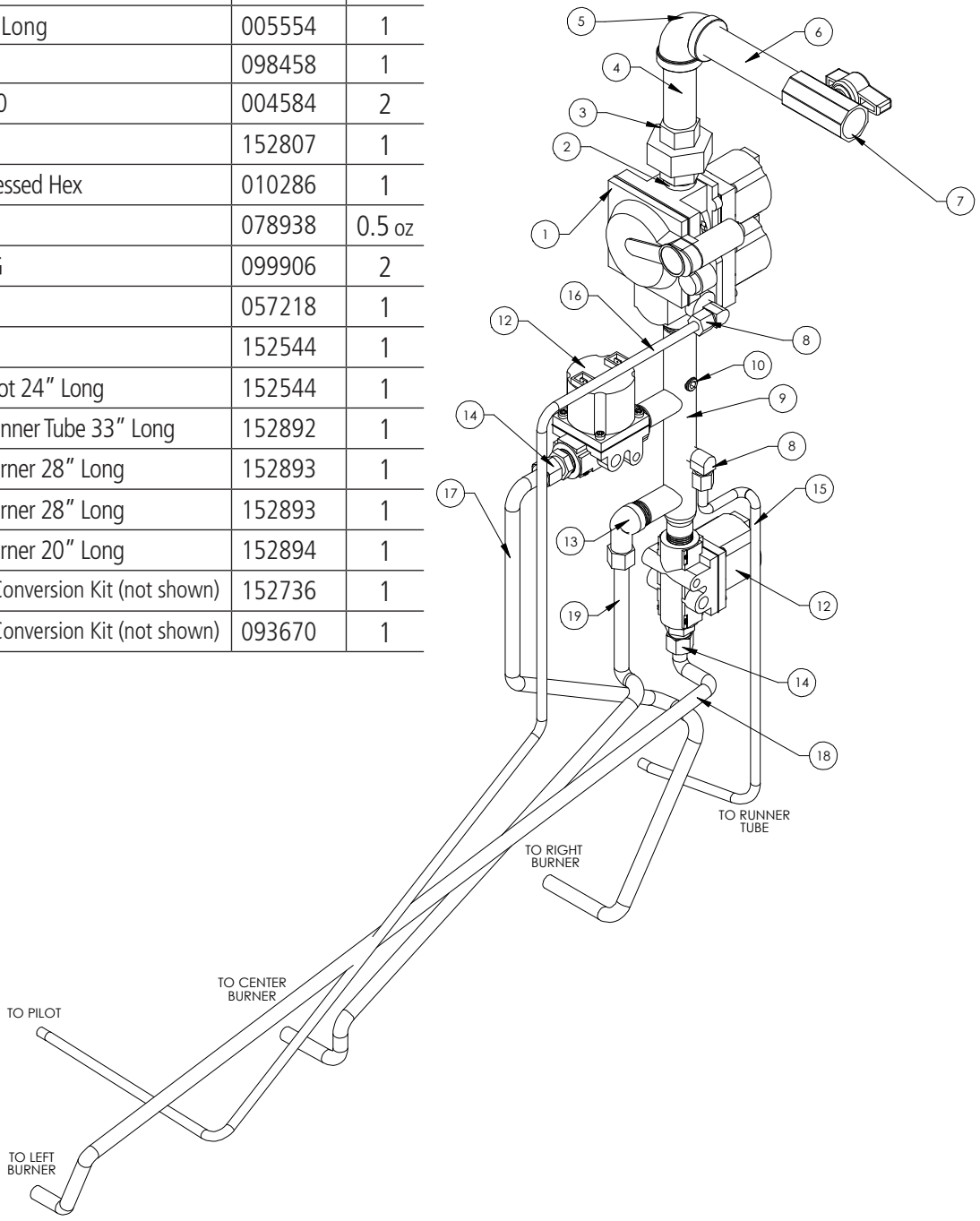






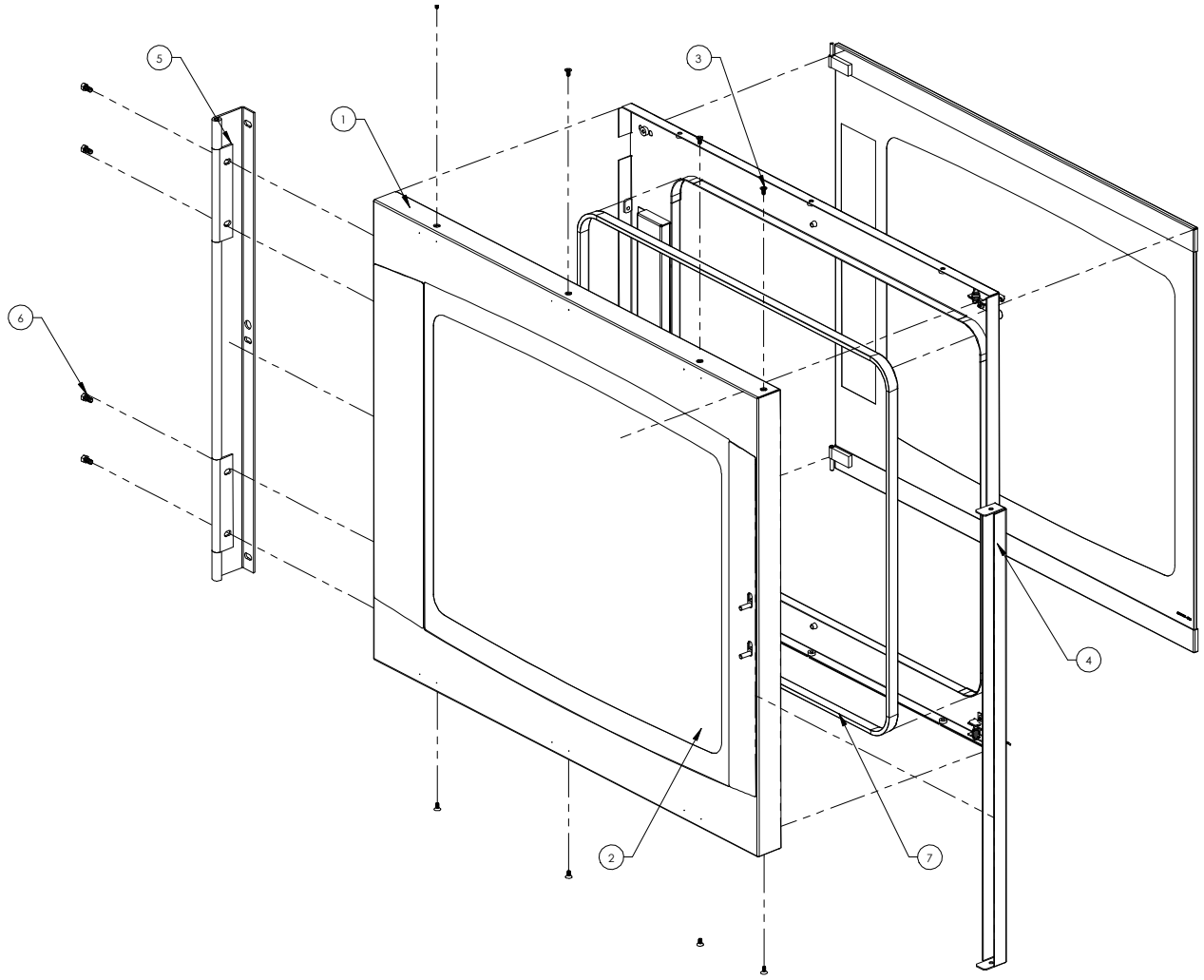
6.5 Gas Valve and Piping Assembly

No.	Description	Part No.	Qty.
1	Valve Gas Johnson Controls NAT	098443	1
2	Nipple, 1/2 NPT x Close	008877	1
3	Union 3/8 NPT	005686	1
4	Nipple, 1/2" NPT x 3" Long	005553	1
5	Elbow 90 DEG 1/2" NPT	008747	1
6	Nipple, 1/2" NPT x 4" Long	005554	1
7	Valve, Gas 1/2"	098458	1
8	Fitting Compression 90	004584	2
9	Manifold, Gas, 3-Burner	152807	1
10	Plug Pipe 1/8" NPT Recessed Hex	010286	1
11	Pipe Dope	078938	0.5 oz
12	Valve Gas 24 Volt HY-6G	099906	2
13	Fitting Compression	057218	1
14	Connector Male 3/8"	152544	1
15	Hose, Flex, 1/4 - Line, Pilot 24" Long	152544	1
16	Hose, Flex, 1/4 - Line, Runner Tube 33" Long	152892	1
17	Hose, Flex, 3/8 - Line, Burner 28" Long	152893	1
18	Hose, Flex, 3/8 - Line, Burner 28" Long	152893	1
19	Hose, Flex, 3/8 - Line, Burner 20" Long	152894	1
20	Natural to Propane Gas Conversion Kit (not shown)	152736	1
21	Propane to Natural Gas Conversion Kit (not shown)	093670	1



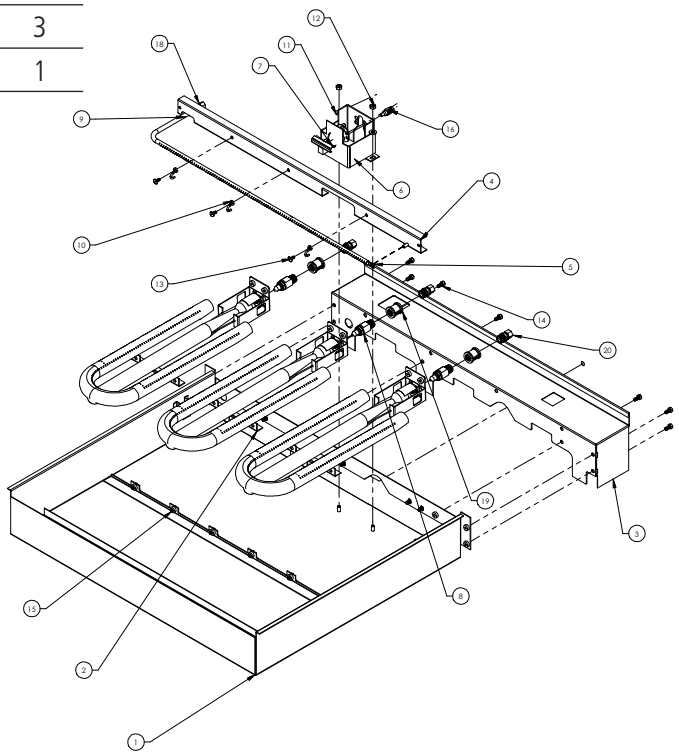
6.6 Door Assembly

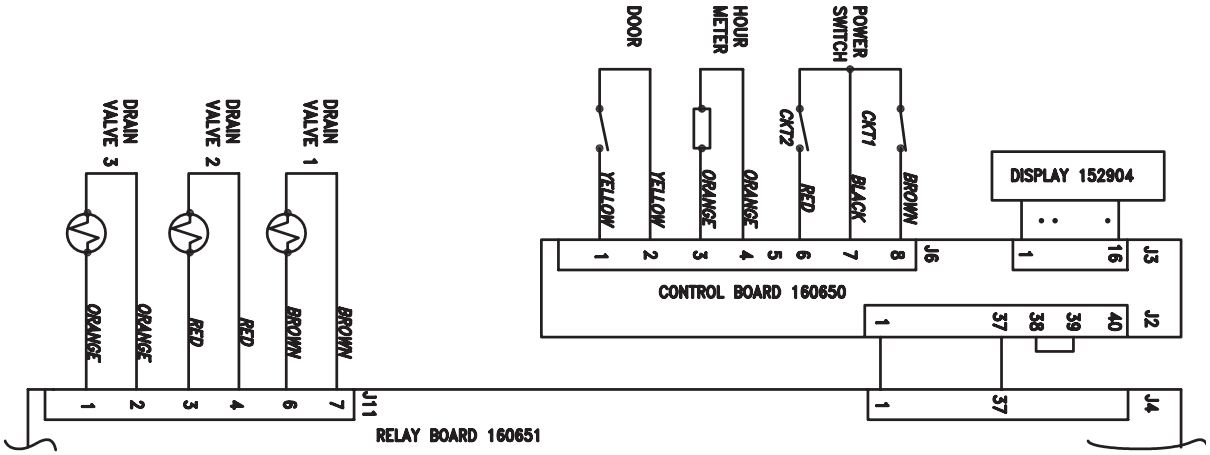
No.	Description	Part No.	Qty.
1	Assembly Door Front Single Point Latch	152921	1
2	Assembly Panel, Back	151040	1
3	Screw Flat HD #10-32 x 3/8" LG	069723	8
4	Assembly, Bracket, Single Point, Latch, Door	152924	1
5	Hinge, Door, Tri-Res 20G	152007	1
6	Screw, Hex Head Cap, 1/4"-20	005608	4
7	Gasket Door Inner	151045	1

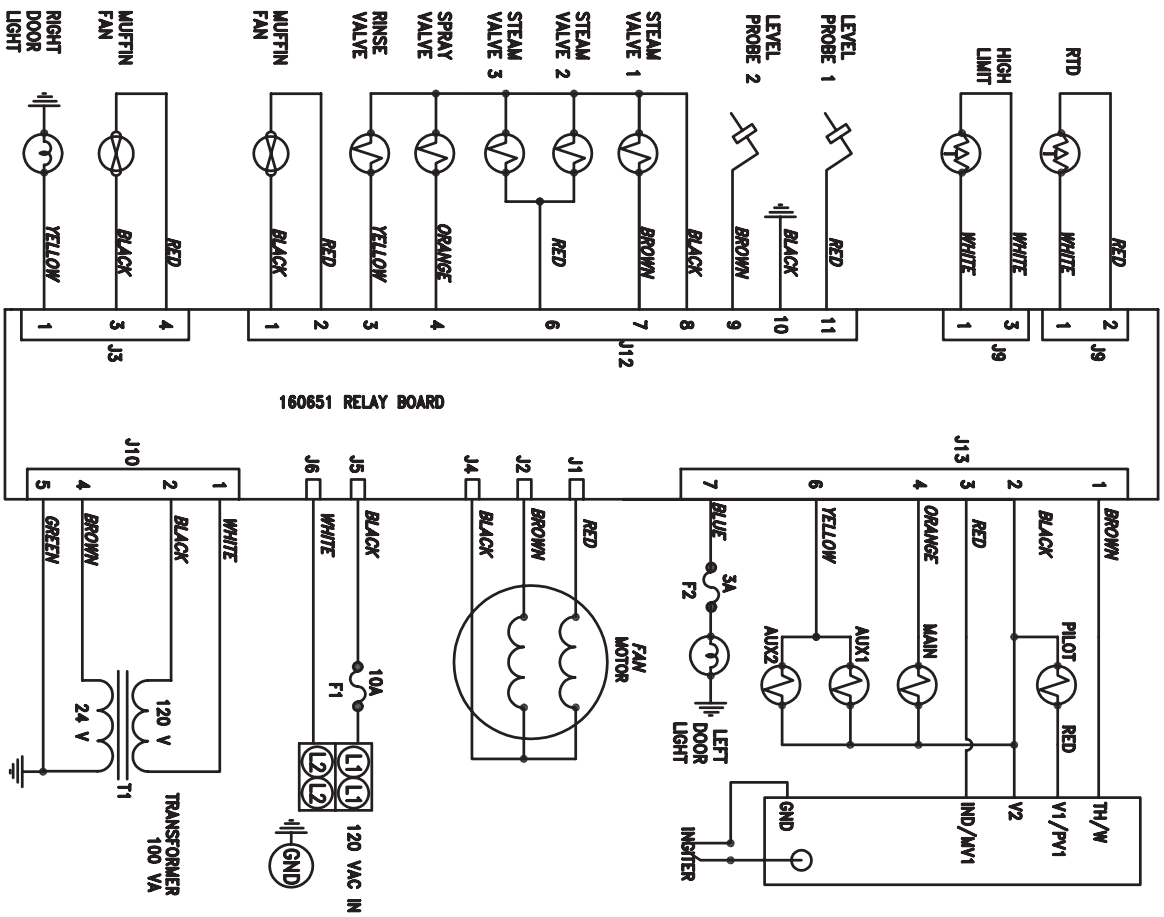


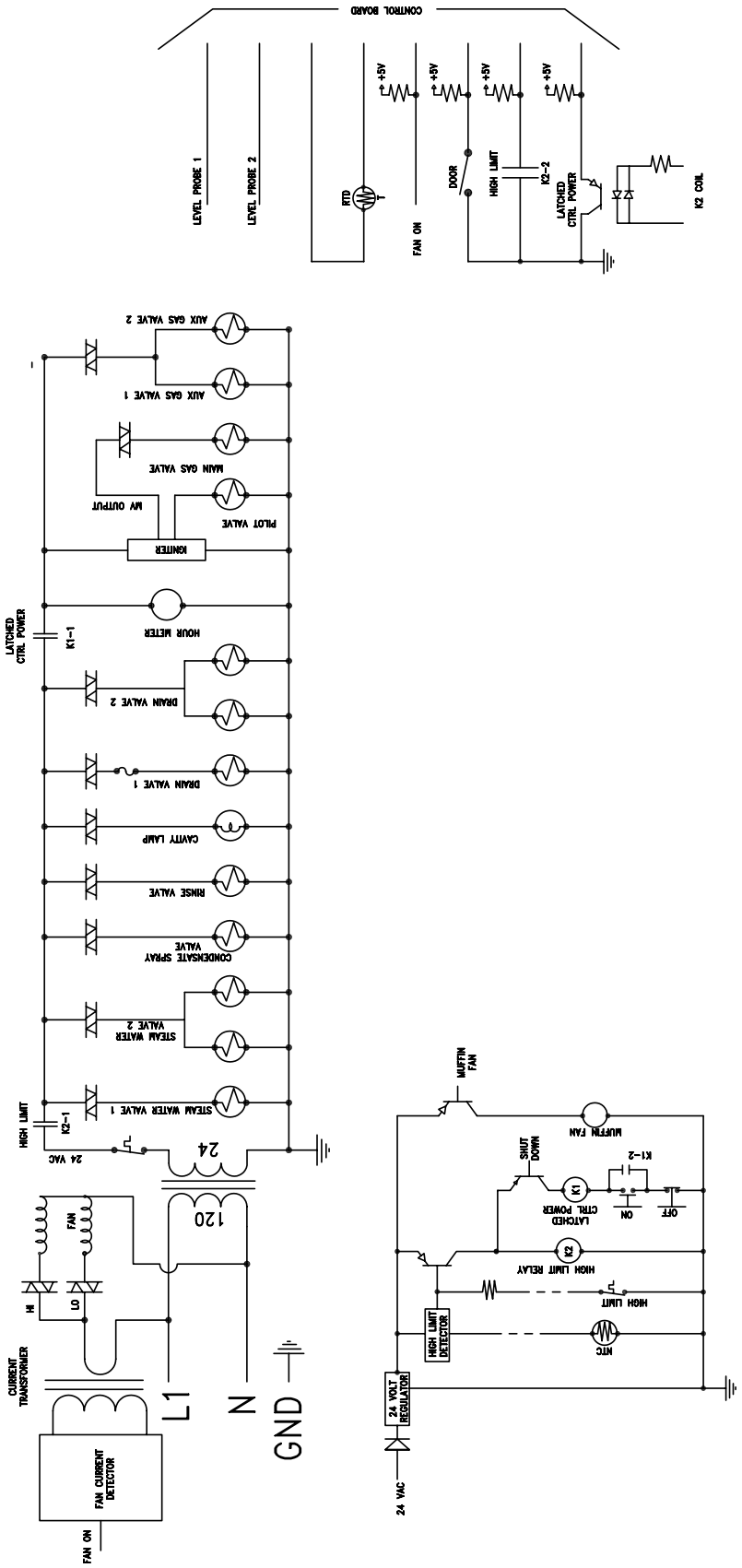
6.7 Gas Valve and Piping Assembly

No.	Description	Part No.	Qty.
1	Weldment, Chmbr, Combustion	152804	1
2	Assy-U-Burner, Low Profile	152832	3
3	Plate, Damper, Rear, UCS Oven	152810	1
4	Weldment, Brkt, Tube, Ignition	152698	1
5	Tube, Ignition, U-Burner	152695	1
6	Weldment, Bracket, Pilot	152849	1
7	Pilot, Ignitor, Low Profile	152693	1
8	Orifice Connector Assy	See p.24	3
9	Orifice, Igniter Tube #39	See p.24	1
10	Clamp, Igniter Tube	085107	3
11	Washer, Plain, 1/4	005472	8
12	Nut, Hex Head 1/4"-20	005601	2
13	Screw Truss Head	072189	3
14	Screw, Hex Head Cap, 1/4"- 20	005608	13
15	Screw Truss Head	012700	6
16	Orifice Spud Nat Gas (.025)	152006	1
17	Coupling Full 1/8 NPT	059908	1
18	Connector, 1/4 Tube to 1/8 NPT	056899	1
19	Coupling Full 3/8 NPT	059908	3
20	Connector Male 3/8	050879	3
21	Tri-Res Ignition Wire Sleeving	152011	1




DOOR
HOUR METER
POWER SWITCH
DRAIN VALVE 3
DRAIN VALVE 2
DRAIN VALVE 1
DISPLAY 152904
CONTROL BOARD 160650
RELAY BOARD 160651
J6
J3
J2
J4
J11
YELLOW
ORANGE
RED
BLACK
BROWN


RIGHT DOOR LIGHT
MUFFIN FAN
RINSE VALVE
SPRAY VALVE
STEAM VALVE 3
STEAM VALVE 2
STEAM VALVE 1
LEVEL PROBE 2
LEVEL PROBE 1
HIGH LIMIT
RTD
160651 RELAY BOARD
J3
J12
J9
J10
J6
J5
J4
J2
J1
J13
FAN MOTOR
LEFT DOOR LIGHT
AUX2
AUX1
MAIN
PILOT
3A
F2
10A
F1
24 V
120 V
T1
TRANSFORMER 100 VA
120 VAC IN
GND
IGNITER
TH/W
V1/PV1
V2
IND/MV1
YELLOW
BLACK
RED
WHITE
BROWN
ORANGE
GREEN
BLUE


CONTROL BOARD
+5V
+5V
+5V
+5V
LEVEL PROBE 1
LEVEL PROBE 2
RTD
DOOR
HIGH LIMIT
K2-2
LATCHED CTRL POWER
K2 COIL
FAN ON
AUX GAS VALVE 2
AUX GAS VALVE 1
MAIN GAS VALVE
MV OUTPUT
PILOT VALVE
IGNITER
HOUR METER
LATCHED CTRL POWER
K1-1
DRAIN VALVE 2
DRAIN VALVE 1
CAVITY LAMP
RINSE VALVE
CONDENSATE SPRAY VALVE
STEAM WATER VALVE 2
STEAM WATER VALVE 1
HIGH LIMIT
K2-1
24 VAC
24
120
FAN
HI
LO
CURRENT TRANSFORMER
FAN CURRENT DETECTOR
FAN ON
L1
N
GND
MUFFIN FAN
MUFFIN FAN
SHUT DOWN
K1-2
K1
LATCHED CTRL POWER
ON
OFF
K2
HIGH LIMIT RELAY
HIGH LIMIT
HIGH LIMIT DETECTOR
NTC
24 VOLT REGULATOR
24 VAC

Notes

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