



SG SERIES GAS CONVECTION OVENS

| | |
|-------------------|------|
| MODELS | SG4 |
| | SG6 |
| STACKED MODELS | SG44 |
| | SG66 |

- NOTICE -

This Manual is prepared for the use of trained Vulcan Service Technicians and should not be used by those not properly qualified.

This manual is not intended to be all encompassing. If you have not attended a Vulcan Service School for this product, you should read, in its entirety, the repair procedure you wish to perform to determine if you have the necessary tools, instruments and skills required to perform the procedure. Procedures for which you do not have the necessary tools, instruments and skills should be performed by a trained Vulcan Service Technician.

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SERVICE UPDATES

SERVICE UPDATES - SG

March 2015

Updated Photos in Data Modules

- GAS BURNER
- GAS ORIFICE
- ROLLER LATCH ASSEMBLY
- HIGH LIMIT THERMOSTAT

Updated Specifications

- SPECIFICATIONS

GENERAL

INTRODUCTION

Procedures in this manual will apply to all models unless specified. Pictures and illustrations can be of any model unless the picture or illustration needs to be model specific.

| MODELS | | | | | | |
|--------|--------------|---------------------|---------------|-------------|----------|---------------------|
| MODEL | FEATURES | | | | OPTIONS | |
| | CAVITY DEPTH | TEMPERATURE CONTROL | DOORS (50/50) | COOK TIMER | CASTERS | BLOWER 208/240/60/1 |
| SG4 | 26.5" | Solid State | Independent | 1-Hour Dial | Optional | Optional |
| SG6 | 30.5" | Solid State | Independent | 1-Hour Dial | Optional | Optional |

INSTALLATION

Refer to the Installation and Operation Manual for detailed installation instructions on single or stacked ovens.

OPERATION

Refer to the Installation and Operation Manual for specific operating instructions.

CLEANING

Refer to the Installation and Operation Manual for specific cleaning instructions.

LUBRICATION

- Cavity blower motor has sealed bearings and requires no additional lubrication.
- Huskey™ TF-1000 grease or equivalent high temperature Teflon grease.

SPECIFICATIONS

Electrical

Voltage - 120/60/1

Amps - 8.0 Amps

Input BTU Rating

Natural Gas - 60,000 BTU input at 5.0 in. W.C.

Propane Gas - 60,000 BTU input at 10.0 in. W.C.

Gas Line Pressures

Natural - Recommend (in. W.C.) 8.0, Min 6.0

Propane - Recommend (in. W.C.) 11.0, Min 11.0

Maximum 14.0 in. W.C. (Nat. or Prop.)

TOOLS

Standard

- Standard set of hand tools
- VOM with ability to measure micro amp current
VOM with minimum of NFPA-70E CAT III 600V, UL/CSA/TUV listed. Sensitivity of at least 20,000 ohms per volt. Meter leads must also be rated at CAT III 600V.
- Gear Puller to remove blower

Special

- Temperature tester (thermocouple type)
- Manometer

REMOVAL AND REPLACEMENT OF PARTS

COVERS AND PANELS



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

WARNING SHUT OFF THE GAS BEFORE SERVICING THE UNIT.

Top Front Cover

1. The top front cover is secured with four (4) screws, two on each side of cover. Remove these screws then remove the cover from the oven.

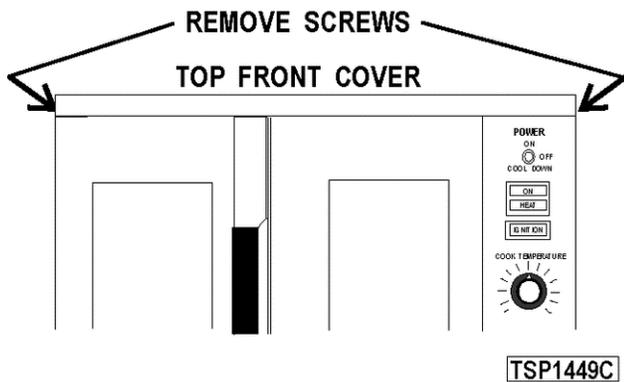


Fig. 1

2. Reverse the procedure to install.

Bottom Front Cover

1. The bottom front cover is secured with four (4) screws, two on each side of cover. Remove these screws then remove the cover from the oven.

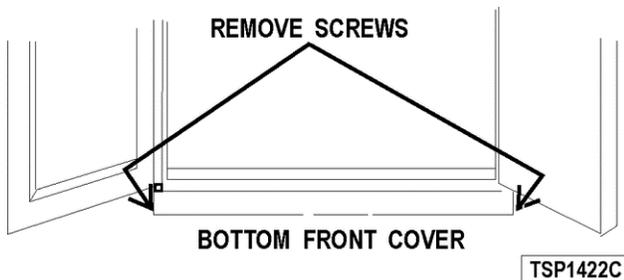


Fig. 2

2. Reverse the procedure to install.

Control Panel

1. Remove three (3) screws on the right side which secure the control panel then pull the panel away from the oven.

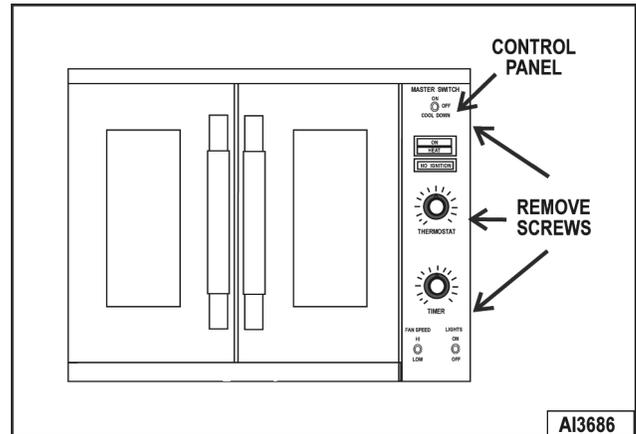


Fig. 3

NOTE: If the oven has a mechanical (KX type) thermostat, it must be removed from the control panel first, before removing the control panel.

2. Disconnect the temperature probe leads from the solid state temperature control.
3. Unplug the wire harness connector to the control panel components.
4. Reverse the procedure to install.

Right Side Panel

1. Remove the screws which secure the right side of the top front cover, bottom front cover and control panel.
2. Remove the remaining six screws securing the right side panel.

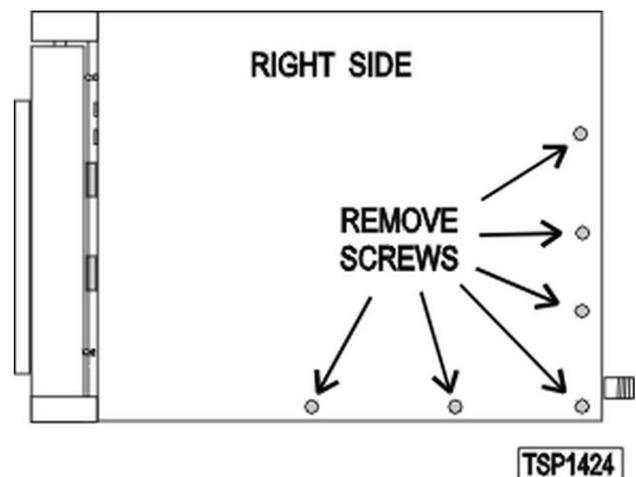


Fig. 4

3. Pull the right side panel out at the bottom then down to remove.
4. Reverse the procedure to install.

CONTROL PANEL COMPONENTS



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

Removable Components Procedure

1. Remove the CONTROL PANEL.
2. Remove the component being replaced.
3. Reverse the procedure to install the replacement component, then check oven for proper operation.

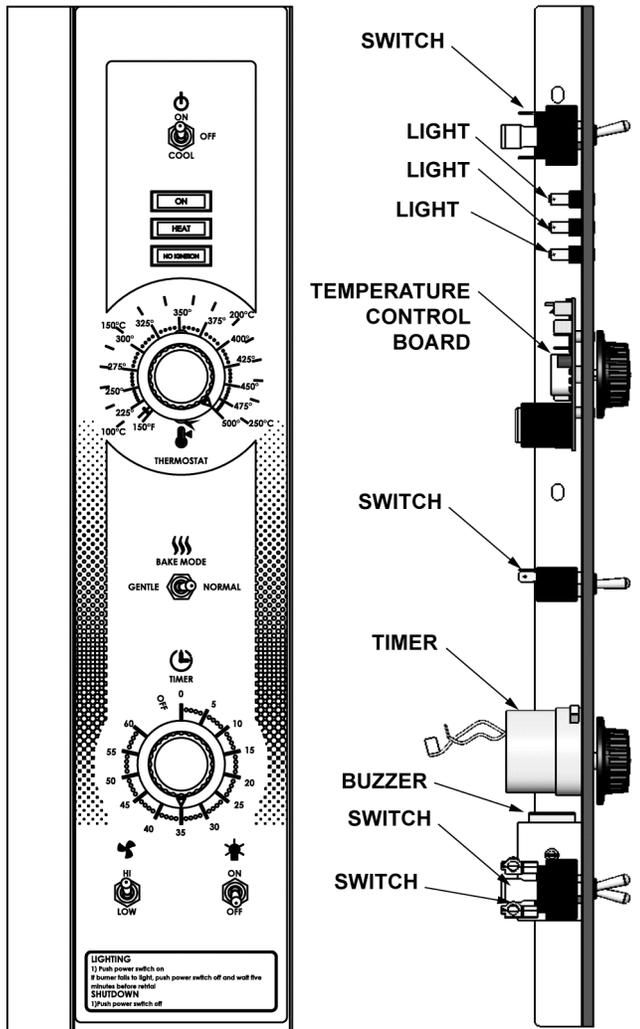


Fig. 5

COMPONENT PANEL COMPONENTS



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

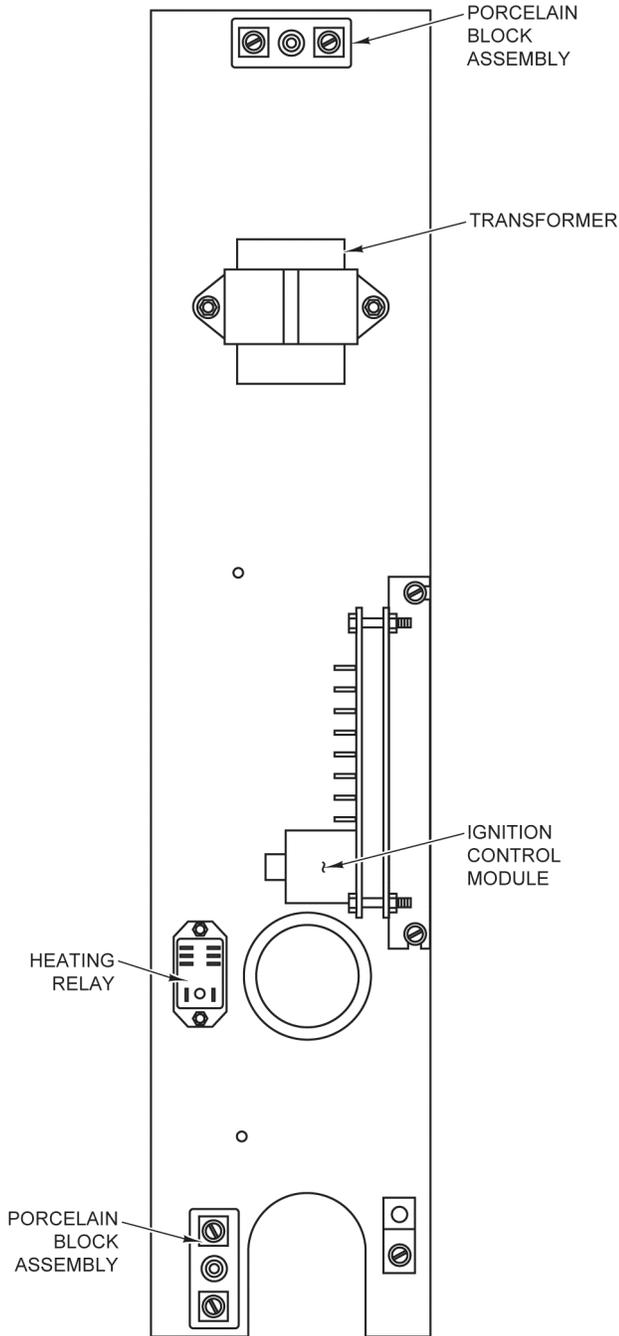
Removable Components Procedure

1. Remove the as outlined RIGHT SIDE PANEL.

NOTE: If right side panel is not accessible, this component can be serviced by removing the CONTROL PANEL.

2. Disconnect the wire leads to the component being replaced.
3. Remove the component.
4. Reverse the procedure to install the replacement component and check oven for proper operation.

COMPONENT PANEL



SG4 - SG6 AI3688
Fig. 6

TEMPERATURE PROBE



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Remove the RIGHT SIDE PANEL.

NOTE: If right side panel is not accessible, this component can be serviced by removing the CONTROL PANEL.

2. Disconnect the probe leads from the solid state temperature control.
3. Remove the racks and right rack support.
4. Remove the probe guard.



Fig. 7

5. Remove probe by pushing it through the oven wall and into the control panel area.

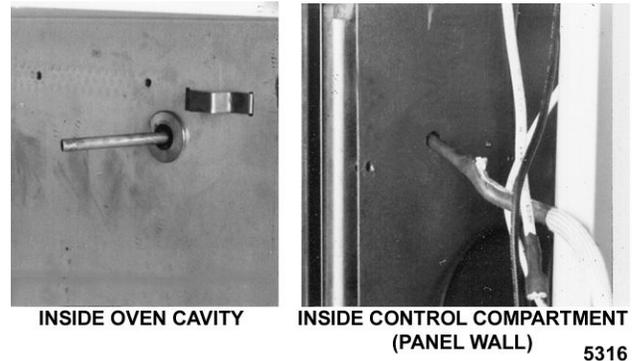


Fig. 8

NOTE: The hole in the oven cavity wall does not line up straight with the oven cavity outer shell, therefore the probe must be removed at an angle.

6. Reverse the procedure to install the replacement probe.
7. Adjust the temperature control as outlined under SOLID STATE TEMPERATURE CONTROL CALIBRATION.

GAS BURNER



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

WARNING SHUT OFF THE GAS BEFORE SERVICING THE UNIT.

1. Remove the BOTTOM FRONT COVER.

- Disconnect the ignition cable and the flame sense lead wire.

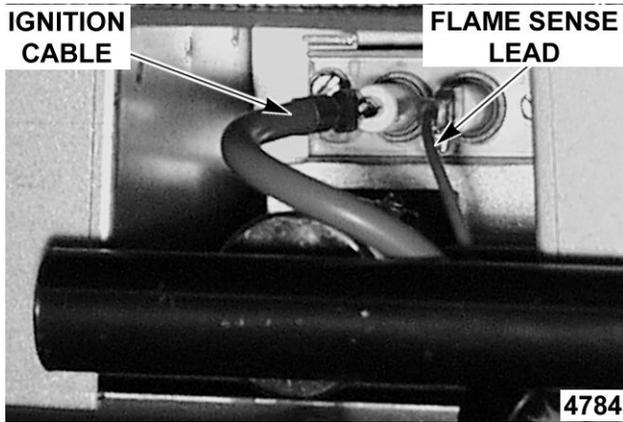


Fig. 9

- Disconnect the ignition cable and the flame sense lead wire.

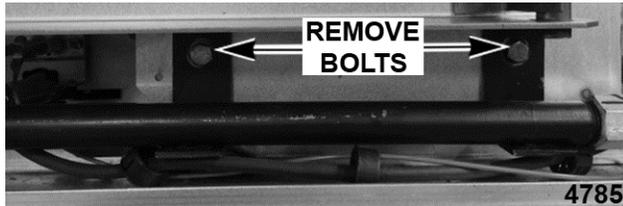


Fig. 10

- Remove the screws securing the burner cover then lift out.

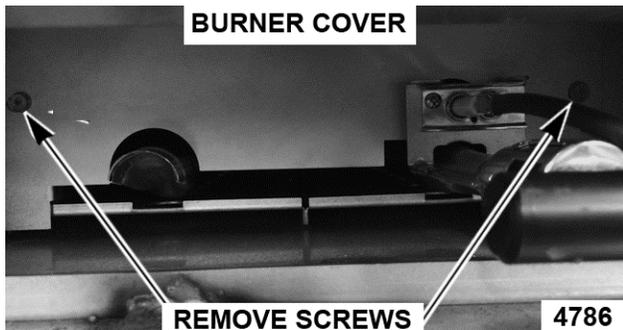


Fig. 11

- Grasp the burner and lift out.

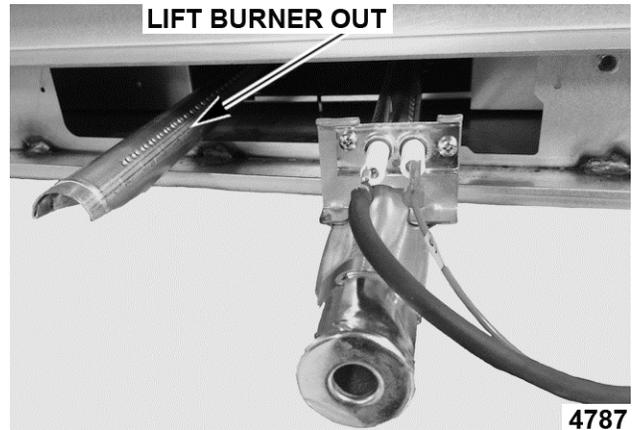


Fig. 12

- Reverse procedure to install the replacement burner.

NOTE: Ensure that burner positioning bracket (U shaped end) is inserted into slot at the rear of the burner chamber.

- Check for proper operation.

GAS ORIFICE



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

WARNING SHUT OFF THE GAS BEFORE SERVICING THE UNIT.

- Remove the BOTTOM FRONT COVER.
- Remove the bolts securing the gas manifold to the oven and place the manifold to the side.

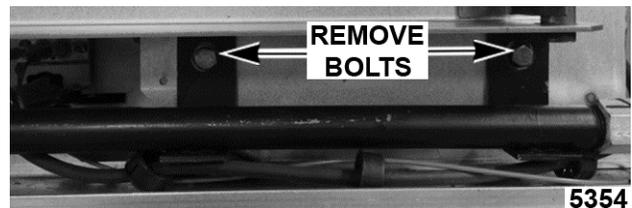


Fig. 13

- Remove the gas orifice from the spud on the manifold and replace with the correct orifice for the given altitude.

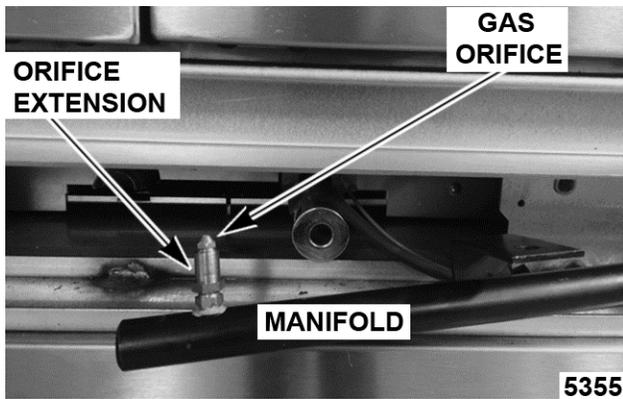


Fig. 14

- Reverse procedure to install and check for proper operation.

GAS SOLENOID VALVE



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

WARNING SHUT OFF THE GAS BEFORE SERVICING THE UNIT.

WARNING All gas joints disturbed during servicing must be checked for leaks. Check with a soap and water solution (bubbles). Do not use an open flame.

- Remove the Control Panel and the RIGHT SIDE PANEL.

NOTE: If is right side panel not accessible, this component can be serviced by removing the CONTROL PANEL.

- Disconnect the lead wires.
- Disconnect the compression fittings to the valve.

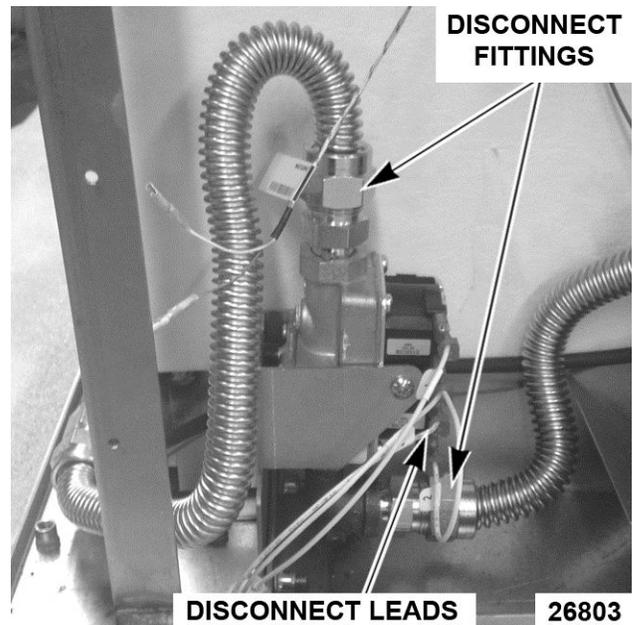


Fig. 15

- Loosen the bolts securing the valve and bracket assembly then remove the screws securing the valve to the bracket.

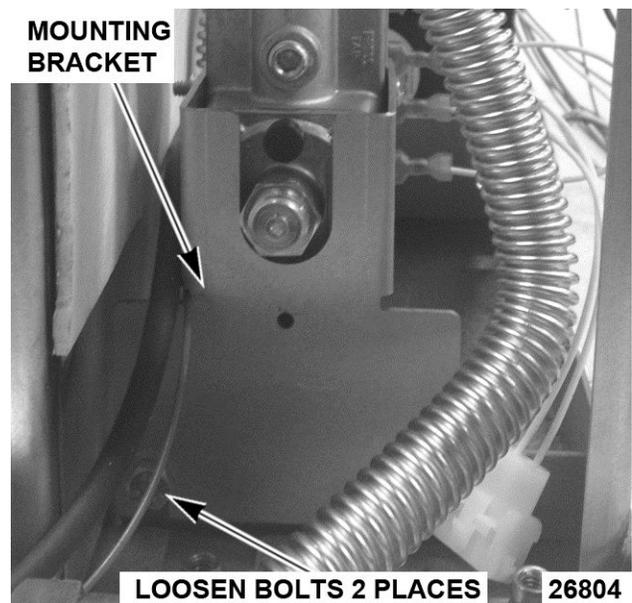


Fig. 16

- Verify new gas valve is configured for the proper gas type.

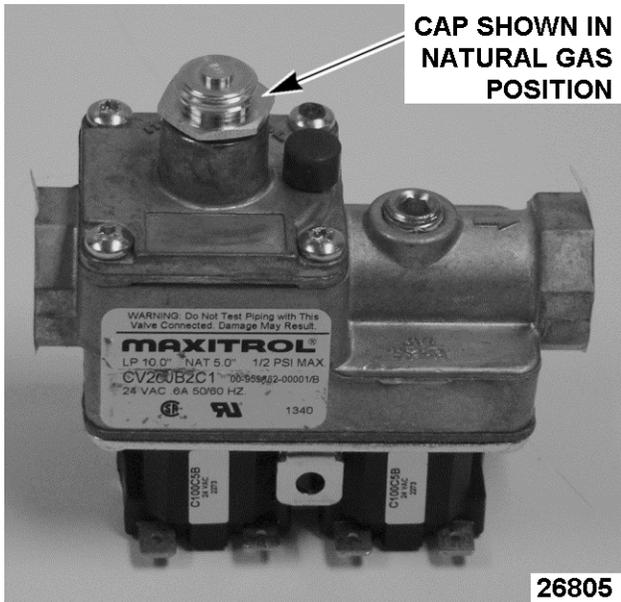


Fig. 17

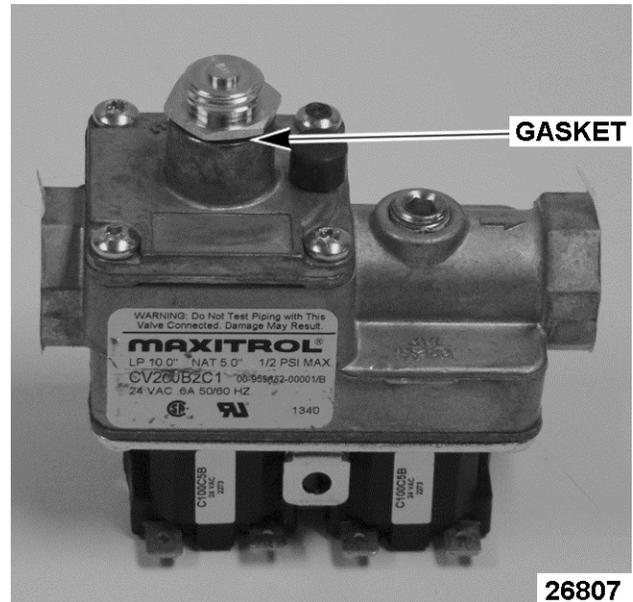


Fig. 19

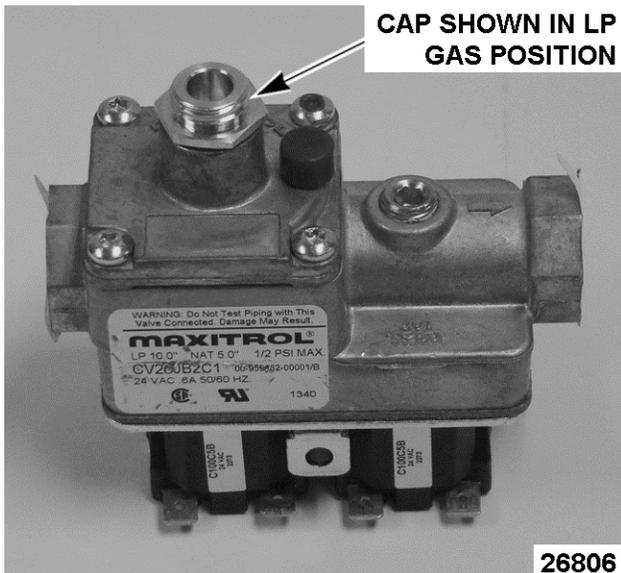


Fig. 18

- A. To change gas type unscrew and reverse cap to show the proper gas type.
- 1) Make sure gasket is positioned between cap and valve body.

6. Reverse the procedure to install the replacement gas valve.
7. Check pressure as outlined under GAS VALVE PRESSURE CHECK.

IGNITION CONTROL MODULE



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

WARNING SHUT OFF THE GAS BEFORE SERVICING THE UNIT.

1. Remove the RIGHT SIDE PANEL.

NOTE: If right side panel is not accessible, this component can be serviced by removing the CONTROL PANEL.

2. Loosen the screws securing the mounting bracket to the component panel and remove the bracket.

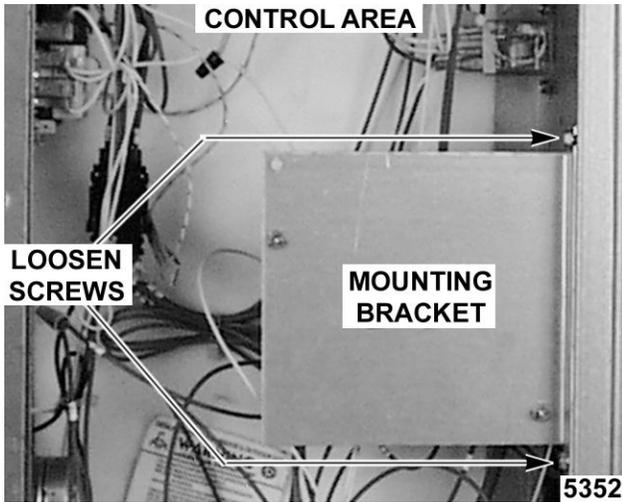


Fig. 20

3. Disconnect the lead wires and igniter cable from the ignition module board.

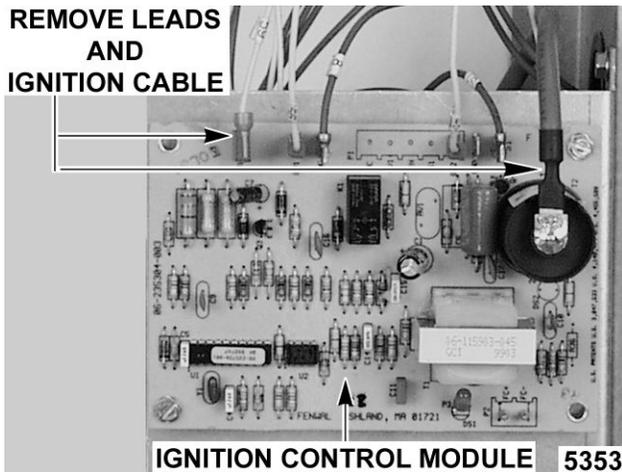


Fig. 21

4. Remove the ignition module board from the mounting bracket.
5. Reverse the procedure to install the replacement ignition module board.

SPARK IGNITER AND FLAME SENSE



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

WARNING SHUT OFF THE GAS BEFORE SERVICING THE UNIT.

1. Remove the gas burner as outlined under GAS BURNER.

2. Remove the screws securing the ignitor and flame sense to burner then remove the assembly.

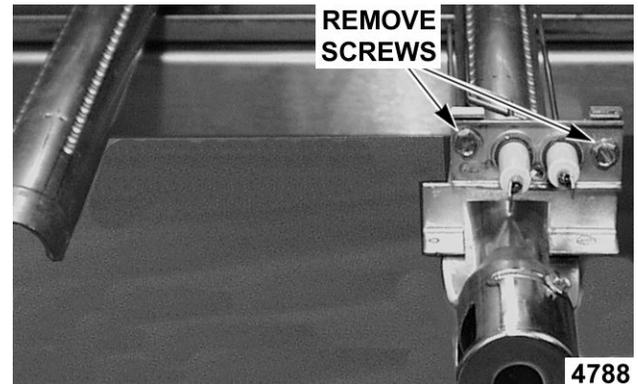


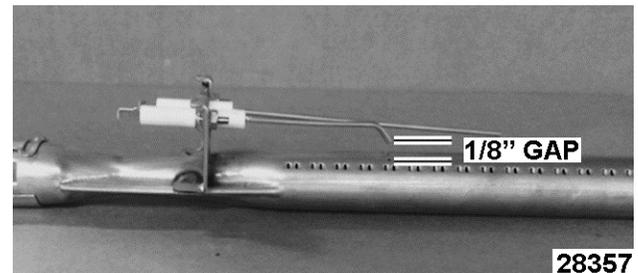
Fig. 22

3. Reverse the procedure to install the assembly and check for proper operation.

NOTE: Check to ensure the spark gap distance is approximately 1/8". If the gap appears to be excessive or poor sparking is occurring then adjust.



PREVIOUS PRODUCTION SHOWN



CURRENT PRODUCTION SHOWN

BLOWER AND MOTOR



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

WARNING SHUT OFF THE GAS BEFORE SERVICING THE UNIT.

1. Take out the racks and rack supports.

2. Remove screws securing the “snorkel” and remove the snorkel.

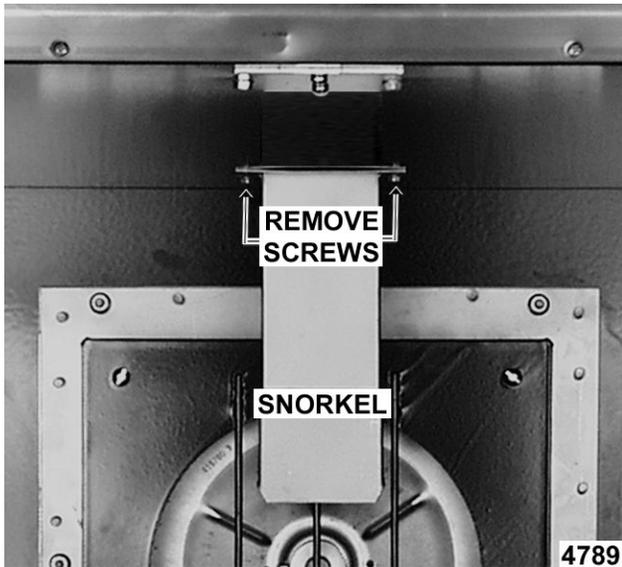


Fig. 25

3. Remove screws securing baffle panel and remove the panel.

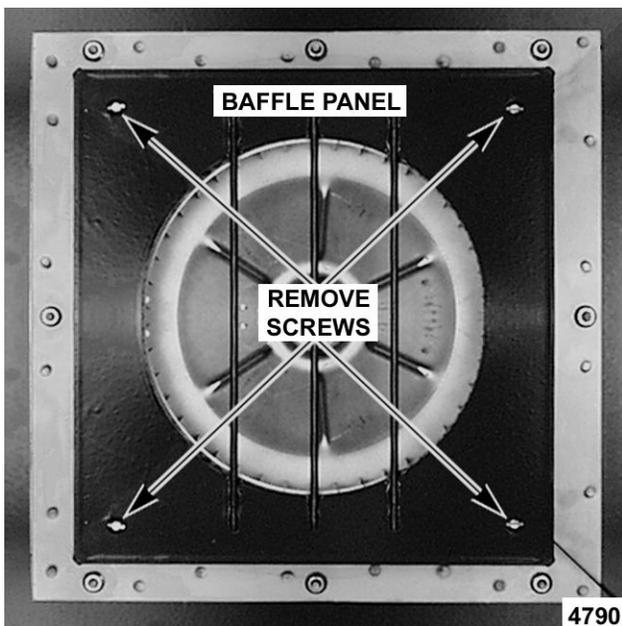


Fig. 26

4. If replacing:
 - A. **Blower Only** - Loosen set screws on blower hub and using a bearing puller, remove blower from motor shaft.
 - 1) Reverse procedure to install and adjust blower position as outlined under BLOWER ADJUSTMENT.
 - B. **Motor** - perform step 4A and continue procedure.

5. Remove the screws securing the air baffle to the rear wall at the lower right hand corner.

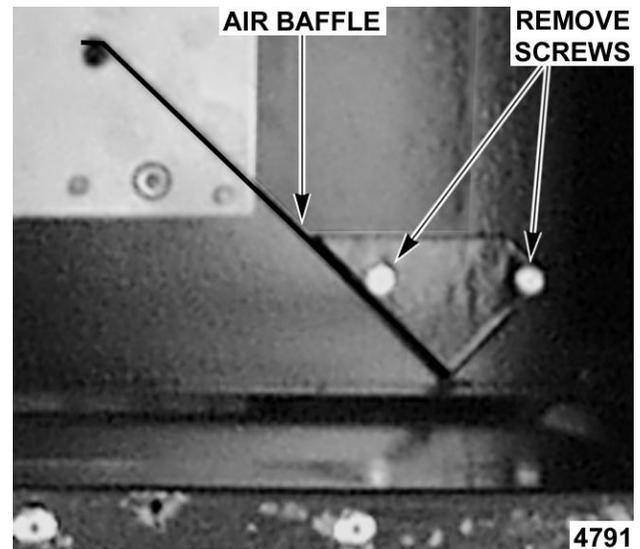


Fig. 27

6. Remove the nuts that secure the motor mounting plate to the rear wall.

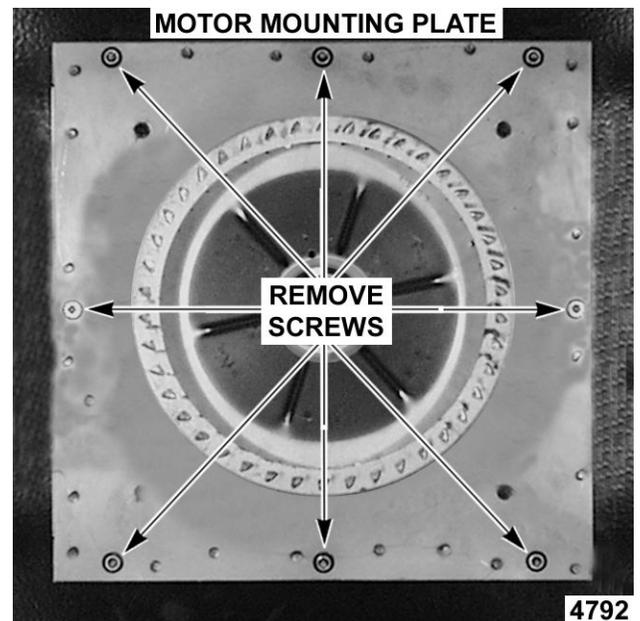


Fig. 28

7. Place a piece of cardboard on the bottom of the oven cavity to protect its surface from any damage during motor assembly removal.
8. Pull the motor assembly into the oven cavity and place it on the cardboard.
9. Remove the junction box cover from the motor, disconnect lead wires and remove the conduit.
10. Remove motor mounting bolts and flat washers then lift the motor from the mounting plate.

11. Position the replacement motor on the motor mounting plate and install mounting bolts and washers. **Hand tighten mounting bolts only.**
12. Reconnect lead wires at the motor, replace conduit and junction box cover.

NOTE: Check data plate on motor for wiring schematic. The motor must rotate clockwise when viewed from the shaft end.

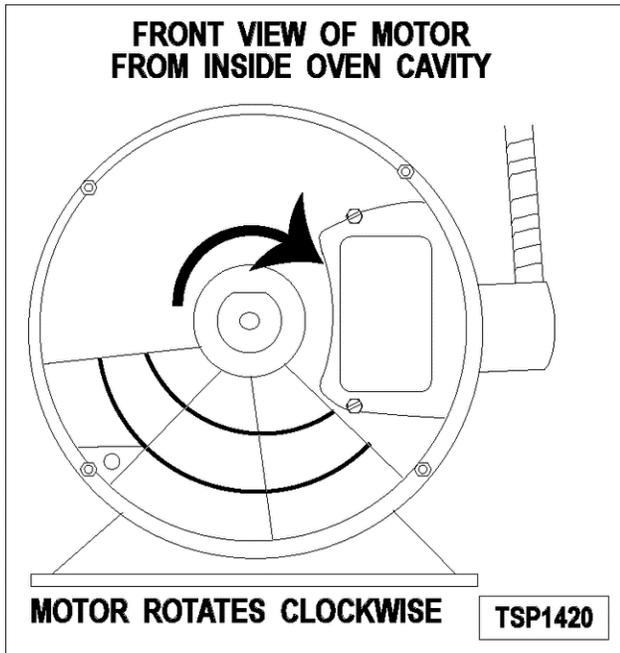


Fig. 29

13. Slide blower onto motor shaft until hub is flush with end of shaft then tighten set screws.
14. Adjust motor position until blower is parallel to motor mounting plate as outlined under BLOWER ADJUSTMENT.
15. Position motor mounting plate on the rear wall and secure with nuts and washers.
16. Replace the baffle panel and “snorkel”.
17. Replace the air baffle on the rear wall at the lower right hand corner.
18. Remove cardboard from the bottom of the oven cavity.
19. Install rack guides and racks.
20. Check oven for proper operation.

OVEN DOORS AND BEARINGS (INDEPENDENT DOORS)



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Remove the TOP FRONT COVER and BOTTOM FRONT COVER.
2. Remove the door switch lever.

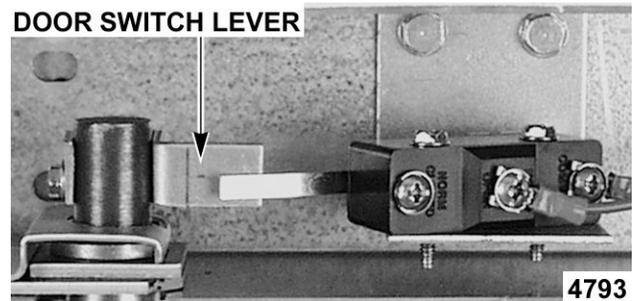


Fig. 30

3. Remove the lower door seal strip to expose the mounting screws of the door assembly.
4. Remove the two (2) lower sill bolts by the lower door shaft and the four (4) counter-sunk screws from the lower sill.

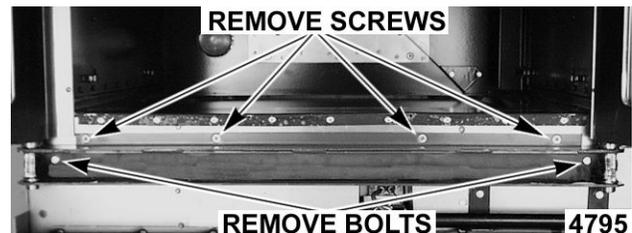


Fig. 31

NOTE: The door assembly is heavy and will drop down once the last screw is removed. If removing door assembly with-out assistance, the ignition cable, flame sense lead and gas manifold should also be removed to avoid damage to these components.

5. Tilt the top of the door slightly forward and lift the door up until the bottom of the door shaft clears the opening in the sill.
6. Lay the door flat to prevent damage.
7. The top and bottom bearings are now accessible for inspection and/or replacement if needed.
 - A. If bearings are OK, proceed to step 8.
 - B. If replacing the top bearing, remove the top bearing retainer and top bearing.

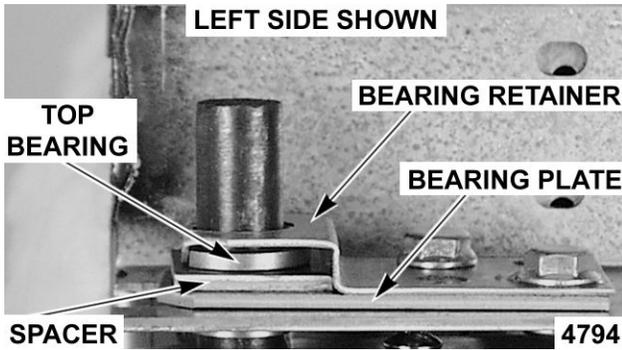


Fig. 32

- C. If replacing the bottom bearing, remove it from the door shaft or the lower sill opening.
- 8. Reverse procedure to install door assembly and check for proper adjustment as outlined under DOOR ADJUSTMENT and DOOR SWITCH ADJUSTMENT.

ROLLER LATCH ASSEMBLY (INDEPENDENT DOORS)



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

- 1. Remove the screws that attach roller latch assembly to door.

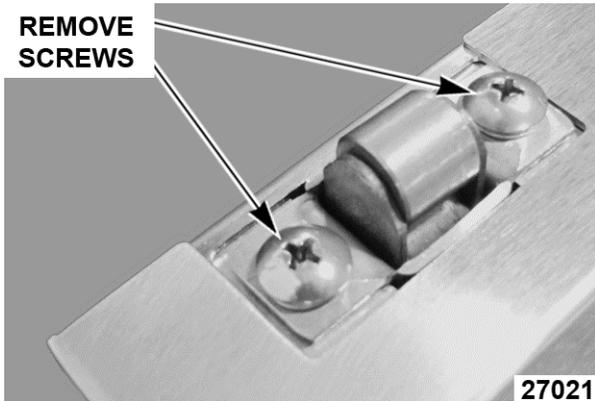


Fig. 33

- 2. Reverse procedure to install.

DOOR WINDOW



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

- 1. Remove the screws at the top and bottom of door.

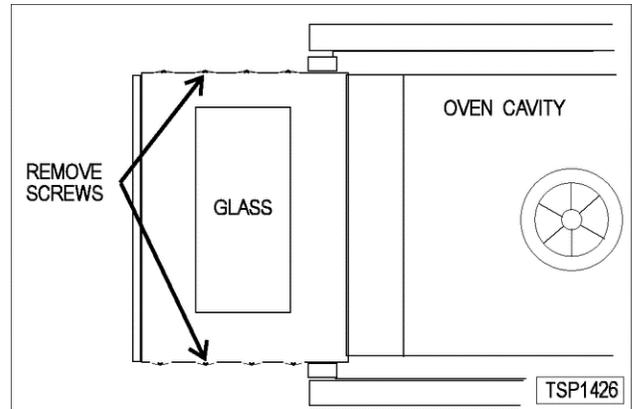


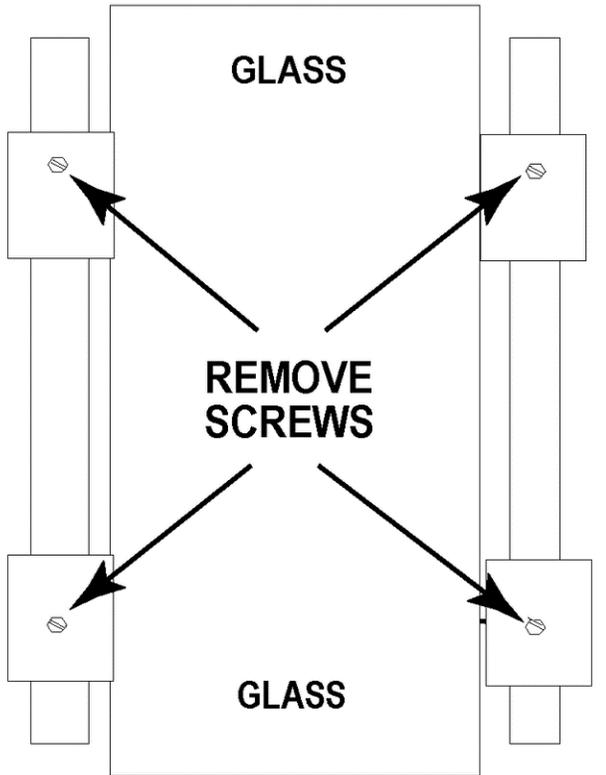
Fig. 34

- 2. Independent doors:
 - A. Remove the door handle then remove the outer door panel.
 - B. Lift out the inner door panel and window assembly.

NOTE: Left door only - remove door seal from the inside edge of the door.

- 3. Simultaneous doors:
 - A. If replacing window on the left door, remove the handle from the front of the door then remove door seal from the inside edge of the door.
 - 1) Lift out the inner door panel and window assembly.
 - 2) If replacing window on the right door, remove the screws along the inside edge (if applicable) of the door then remove the inner door panel and window assembly.
- 4. Remove the screws securing the window “tabs” to the door bracket and lift the window assembly out from the door frame.

INNER DOOR PANEL ASSEMBLY



TSP1427

Fig. 35

- Reverse procedure to install the replacement window.

DOOR SWITCH



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

- Remove the TOP FRONT COVER.
- Disconnect the lead wires to the door switch.
- Remove the switch.

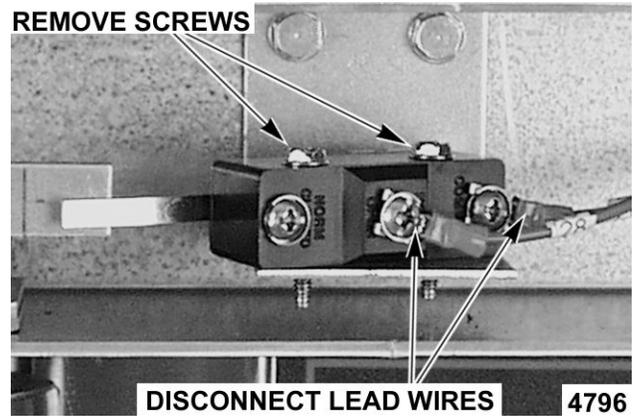


Fig. 36

- Reverse procedure to install the replacement switch and check for proper adjustment as outlined under DOOR SWITCH ADJUSTMENT.

HIGH LIMIT THERMOSTAT



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

- Take out racks from the oven.
- Remove the high limit thermostat cover/mounting plate from inside the oven cavity at the top.

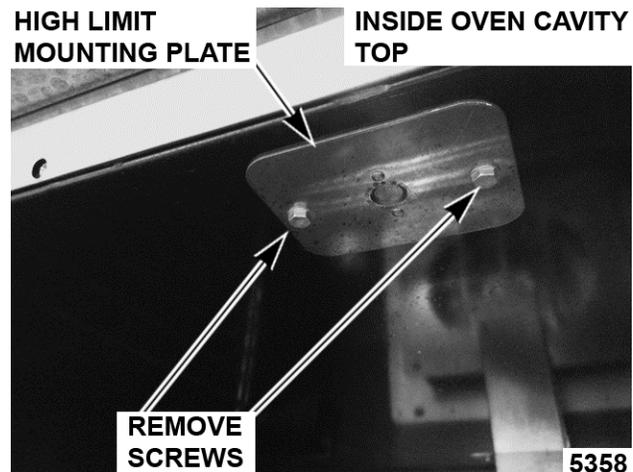


Fig. 37

- Disconnect lead wires from high limit thermostat then remove high limit thermostat from cover/ mounting plate.

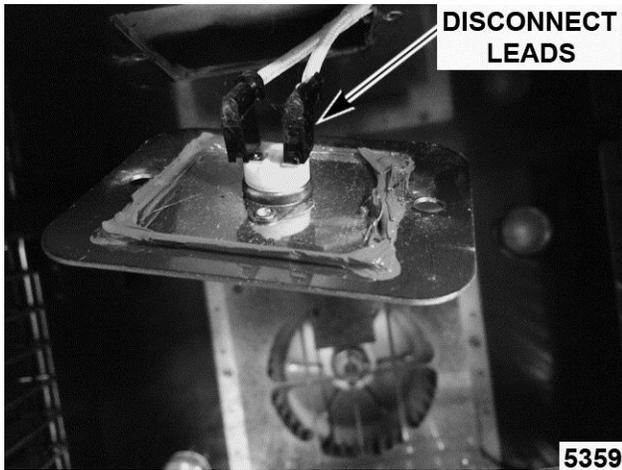


Fig. 38

NOTE: Remove the old RTV from the cover and mating surfaces inside the oven cavity and apply new RTV before installing.

- Reverse procedure to install.

INTERIOR LIGHTS



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

Lamp

- Remove the racks.
- Unscrew the glass lens for the light being replaced then unscrew the bulb.

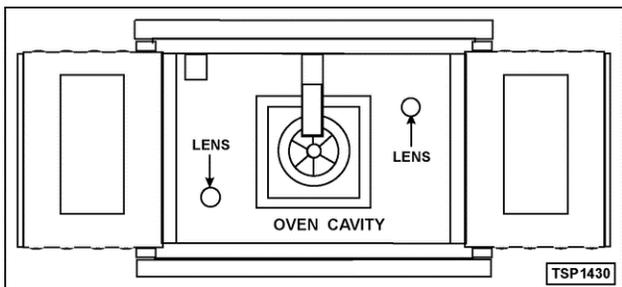


Fig. 39

- Replace bulb then reverse the procedure to install.



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

Lamp Assembly

- Remove the lens and bulb.
- Remove the springs from the retaining tabs (2 places) on the socket.

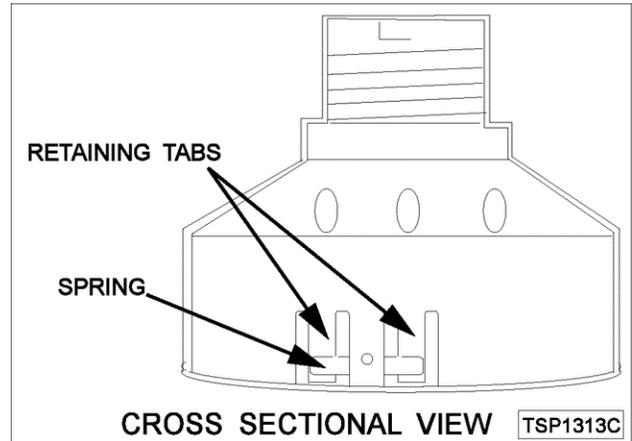


Fig. 40

- Depress the retaining tabs and pull the socket out from the oven, far enough to disconnect the lead wires.
- Remove the socket from the oven.
- Attach the lead wires to the replacement socket.
- Insert the socket into the hole in the oven and push until the socket is held in place by the retaining tabs.
- Install the light bulb and lens.
- Check for proper operation.

COOLING FAN



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

- Remove the RIGHT SIDE PANEL.

NOTE: If right side panel is not accessible, this component can be serviced by removing the CONTROL PANEL.

- Disconnect the lead wires to the fan motor by removing wire nuts.
- Remove the screws securing the air deflector to the fan then loosen the tab screw holding the fan to the component panel. Rotate the tab so that the fan will clear and remove the fan.

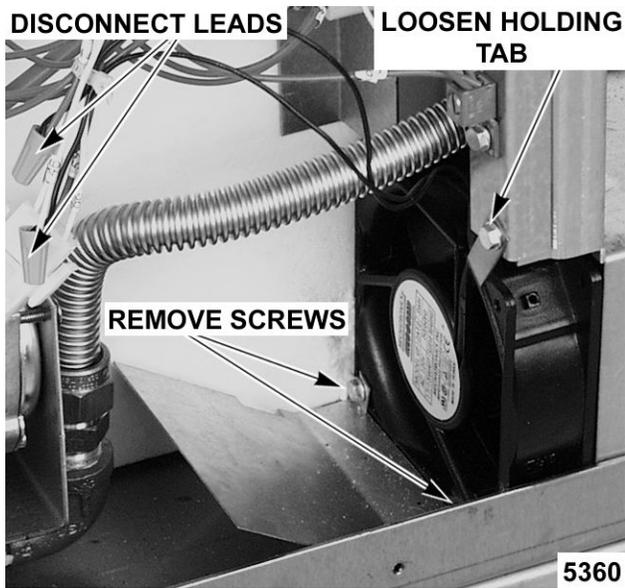


Fig. 41

4. Reverse the procedure to install the replacement fan and check for proper operation.

NOTE: The fan must be installed so air is pulled from the rear of the oven and blown into the control area. The arrow on the fan body indicates “air flow” direction and should be pointing toward the controls.

NOTE: Ensure fan is seated “squarely” against the air tube and the oven bottom.

NOTE: The air deflector should be angled upwards at approximately 30 degrees to properly direct the air flow.

SERVICE PROCEDURES AND ADJUSTMENTS



WARNING Certain procedures in this section require electrical test or measurements while power is applied to the machine. Exercise extreme caution at all times and follow Arc Flash procedures. If test points are not easily accessible, disconnect power and follow Lockout/Tagout procedures, attach test equipment and reapply power to test.

SOLID STATE TEMPERATURE CONTROL CALIBRATION

1. Place a thermocouple in the geometric center of the oven cavity.
2. Set the ON-OFF-COOL DOWN switch to ON.
3. Set the NORMAL - GENTLE BAKE switch to NORMAL.
4. Set the temperature control dial to 350°F.
5. Allow the oven temperature to stabilize (normally 3 cycles).
6. Record the temperature at which the Heat lamp goes OFF and comes ON for at least two complete heating cycles.
7. Calculate the differential by subtracting the temperature indicated when the lamp goes out from the temperature indicated when the lamp comes on.

Differential = Heat lamp OFF - Heat lamp ON

Example: 360° (lamp off) - 340° (lamp on) = 20°

- A. The differential calculated should be **less** than 20°F.
 - 1) If the differential is **less** than 20°F, the temperature control circuit is functioning properly.
 - a. Proceed to Step 8.
 - 2) If the differential is **more** than 20°F:
 - a. Check the temperature probe as outlined under TEMPERATURE PROBE TEST.
 - b. If the probe is functioning properly then temperature control is malfunctioning.
 - a) Install a replacement temperature control and check calibration.

8. Calculate the average temperature by adding the temperature indicated when the lamp goes out to the temperature indicated when the lamp comes on and dividing this answer by 2.

[Temp. (lamp off) + Temp. (lamp on)] ÷ 2 = Average Temp. Example: (360° + 340°) ÷ 2 = 350°

- A. If the average temperature is **less** than 10°F from the dial setting, the thermostat is properly calibrated.
- B. If the average temperature is **more** than 10°F from the dial setting, the thermostat calibration must be adjusted.
 - 1) Loosen the temperature control knob set screw and remove the knob from the stem.
 - 2) Access the adjustment potentiometer located at the 3 o'clock position.
 - a. Turn clockwise to increase, counterclockwise to decrease temperature
 - b. Repeat the average temperature calculation in Step 8.

NOTE: Allow the oven to cycle at least two times between adjustments before performing the calculation.

- C. If the above adjustment cannot be obtained, replace the temperature control and check calibration.
 - a) If the average temperature still differs **more** than 10°F from the dial setting, adjust the thermostat calibration until the average temperature is within tolerance.

SOLID STATE TEMPERATURE CONTROL TEST



WARNING Certain procedures in this section require electrical test or measurements while power is applied to the machine. Exercise extreme caution at all times and follow Arc Flash procedures. If test points are not easily accessible, disconnect power and follow Lockout/Tagout procedures, attach test equipment and reapply power to test.

1. Remove the RIGHT SIDE PANEL.

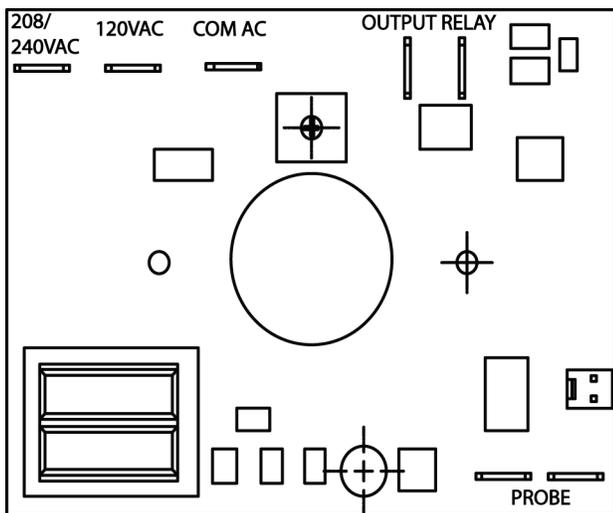
NOTE: If right side panel is not accessible, this component can be serviced by removing CONTROL PANEL.

2. Place a thermocouple in the geometric center of the oven cavity.

NOTE: Oven temperature must be below 450°F.

NOTE: If oven is equipped with "Cook and Hold" option, set to Cook (normal cooking) before continuing.

3. Set the temperature control to the maximum setting.
4. Check machine data plate for correct voltage to oven. Refer to diagram below for proper terminal locations and voltages before checking the control. Use the correct terminals for the corresponding voltage.
5. Turn the power switch to ON.



AI3754

Fig. 42

6. Check for proper voltage across terminals COM AC to 120VAC or COM AC to 208-240VAC for power to the control.
 - A. If correct, proceed to step 7.
 - B. If incorrect, problem is **not** with the temperature control. See TROUBLESHOOTING.
7. Check relay voltages on the board:
 - A. For 120VAC controls - check across OUTPUT RELAY terminal (left side) to 120VAC terminal for input to the internal relay. Check across OUTPUT RELAY terminal (right side) to 120 VAC for output from the internal relay.
 - B. For 208-240VAC controls - check across OUTPUT RELAY terminal (left side) to 208-240VAC terminal for input to the internal relay. Check across OUTPUT RELAY terminal (right side) to 208-240VAC for output from the internal relay.
 - 1) If input voltage to the internal relay is correct, proceed to step 8. If input voltage to the internal relay is not present, problem is not with the temperature control. See TROUBLESHOOTING.
 - 2) If output voltage from the internal relay is correct proceed to step 8. If output voltage from the internal relay is not correct, check temperature probe as outlined under TEMPERATURE PROBE TEST.
8. Set the temperature control to the minimum setting.

NOTE: Oven temperature **must** be above 300°F.

9. Check for zero (0) volts AC across terminals OUTPUT RELAY terminal (right side) to 120VAC or OUTPUT RELAY terminal (right side) to 208-240VAC for no output from the internal relay.
 - A. If correct, temperature control is functioning properly.
 - B. If incorrect, check temperature probe as outlined under TEMPERATURE PROBE TEST.
 - 1) If temperature probe is OK:
 - a. Turn the power switch OFF.



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

- b. Replace the temperature control and check calibration as outlined under SOILD STATE TEMPERATURE CONTROL CALIBRATION.

TEMPERATURE PROBE TEST



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

NOTE: The temperature probe used in conjunction with the Solid State Temperature control is an RTD (resistance temperature detector) of the Thermistor type. As temperature increases the resistance value decreases.

1. Remove the RIGHT SIDE PANEL.

NOTE: If right side panel is not accessible, this component can be serviced by removing the CONTROL PANEL.

2. Place a shielded thermocouple in the geometric center of the oven cavity and determine the temperature in the oven cavity.
3. Remove the probe lead wires from the solid state temperature control.
4. Test the probe with an ohmmeter.
 - A. If the measured resistance values are inside the given tolerance then the probe is functioning properly.
 - B. If the measured resistance values are outside the given tolerance then replace the probe and retest.
 - 1) Check oven for proper operation.

5. Reverse procedure to install.

| TEMP (°F) | OHMS* | TEMP (°F) | OHMS* |
|-----------|--------|-----------|-------|
| 77 | 90,000 | 360 | 822 |
| 240 | 4,077 | 380 | 656 |
| 260 | 3,016 | 400 | 529 |
| 280 | 2,266 | 425 | 424 |
| 300 | 1,726 | 450 | 334 |

| TEMP (°F) | OHMS* | TEMP (°F) | OHMS* |
|-----------|-------|-----------|-------|
| 320 | 1,332 | 475 | 266 |
| 340 | 1,041 | | |

(*) Resistance in ohms ± 10%

GAS VALVE PRESSURE CHECK



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Turn gas supply off at manual shutoff valve.
2. Remove the RIGHT SIDE PANEL.

NOTE: If right side panel is not accessible, this component can be serviced by removing the CONTROL PANEL.

3. Remove the plug from the manifold pressure port.

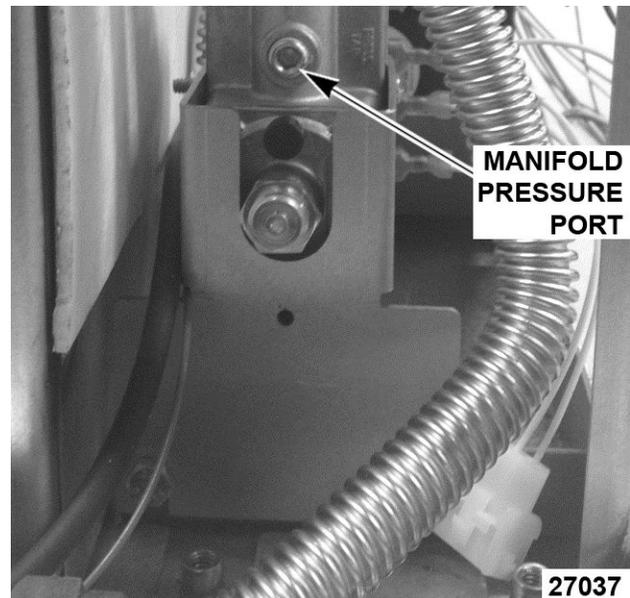


Fig. 43

4. Install hose barb adapter and attach manometer tube.
5. Turn gas supply to the oven back on.
6. Plug the unit in and turn the power switch ON.
7. Set the temperature control to its highest setting and allow burner to ignite.

NOTE: The burner must be lit during test.

NOTE: Accurate gas pressure readings can only be made with the gas on and the burner lit.

| GAS TYPE | PRESSURE READINGS (IN W.C.) | | | |
|----------|-----------------------------|-------------|------|------|
| | MANIFOLD | LINE | | |
| | | RECOMMENDED | MIN | MAX |
| Natural | 5.0 | 8.0 | 6.0 | 14.0 |
| Propane | 10.0 | 11.0 | 11.0 | |

NOTE: If the incoming line pressure to the valve is **less** than the minimum stated, then the manifold pressure will not be maintained

VERIFICATION OF SPARK AT IGNITOR



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

WARNING SHUT OFF THE GAS BEFORE SERVICING THE UNIT.

1. Remove the BOTTOM FRONT COVER.
2. Disconnect the high voltage "ignition cable" from the spark ignitor.

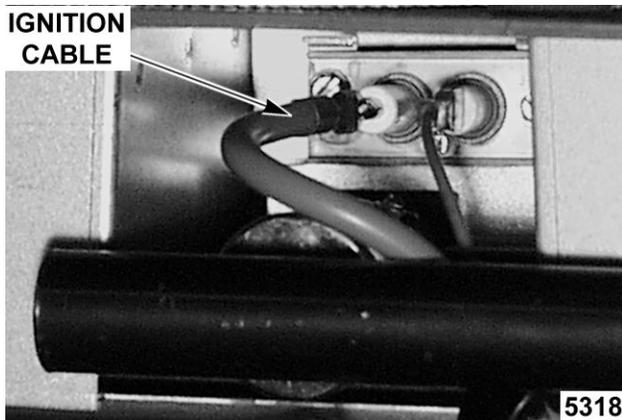


Fig. 44

WARNING DO NOT HOLD THE WIRE WITH YOUR HANDS FOR THIS TEST. THE MANUAL GAS VALVE MUST BE CLOSED.

3. Clamp the ignition cable in a manner that will position the end of the cable 3/16" from the oven frame (bare metal surface).

NOTE: It is critical that the cable be held 3/16" away from the surface of the oven frame or sparking may not occur even though the sparking circuit is functioning properly.

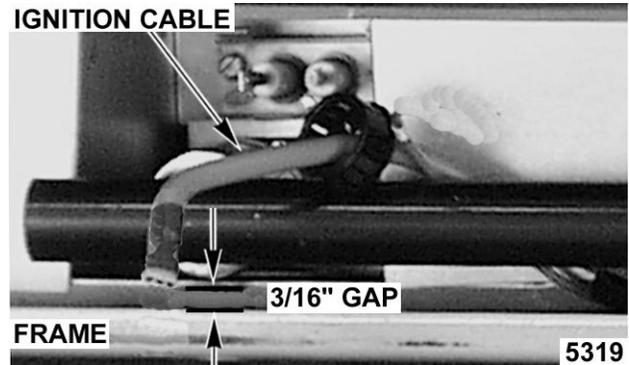


Fig. 45

4. Plug the oven in and set the temperature control to the maximum setting.
5. Turn the power switch ON.
6. Sparking should occur after a 4 second delay, for a duration of 7 seconds then repeat twice after a 15 second purge time. Arching from the ignition cable to the oven frame should be observed.

DOOR SWITCH ADJUSTMENT



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Remove the Top Front Cover.
2. Door operation:
 - A. **Independent doors** - The switch actuator should be operated by the switch lever when the right door is between 1" and 1 1/2" from being closed.
 - B. **Simultaneous doors** - The switch actuator should be operated by the switch lever when the right door is 1/2" from being closed.
3. If adjustment is necessary, bend the switch actuator to obtain the proper setting.

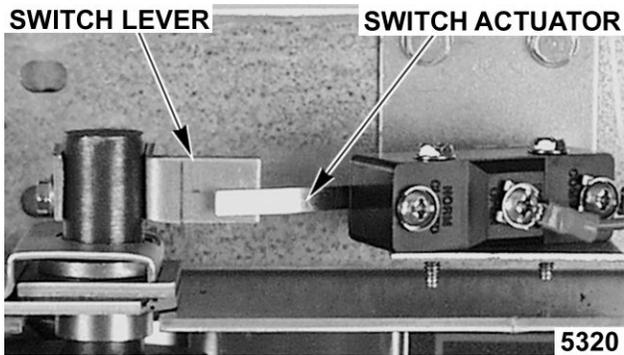


Fig. 46

4. Install the top front cover.
5. Apply power to the oven and check for proper operation.

BLOWER ADJUSTMENT



⚠ WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

⚠ WARNING SHUT OFF THE GAS BEFORE SERVICING THE UNIT.

1. Remove the blower motor and mounting assembly by following steps 1 through 8 as outlined under BLOWER AND MOTOR.
2. Loosen the motor mounting bolts.
3. Adjust the motor position until the blower is parallel to and 1/4 inch away from the motor mounting plate. Check for squareness of the blower to the motor mounting plate at the top, bottom, left and right of the blower.
 - A. If the blower is square then tighten motor mounting bolts and proceed to Step 4.
 - B. If the blower is not square continue adjusting until proper spacing is achieved then tighten motor mounting bolts.

NOTE: If necessary, place shims between motor and frame.

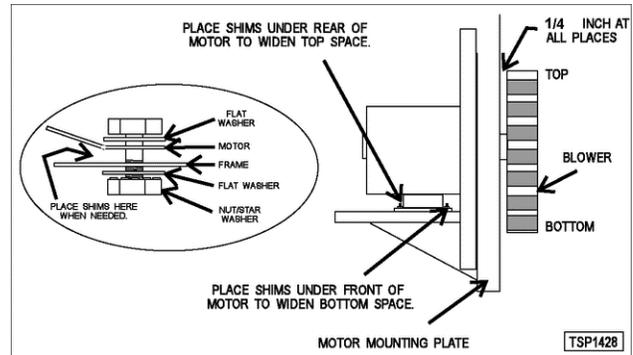


Fig. 47

4. Reverse the procedure to install.

DOOR ADJUSTMENT



⚠ WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Check the doors to make sure they have an equal gap between them and that the vertical edge of the door is parallel to the vertical door seal. If the doors are not positioned in this manner, adjust the doors as described.

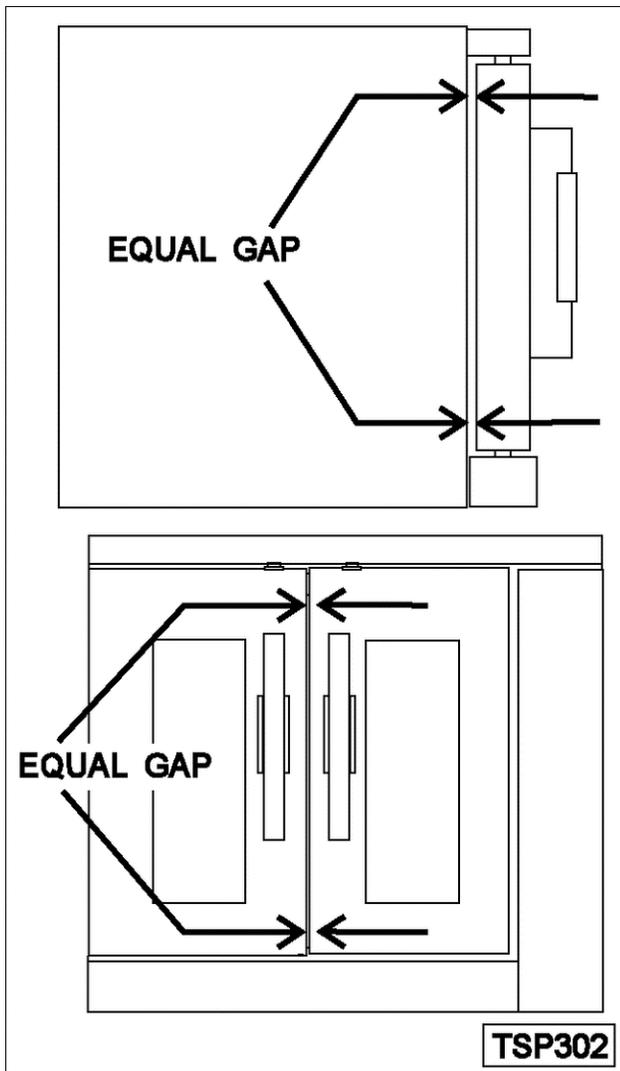


Fig. 48

2. Remove the TOP FRONT COVER.
3. Loosen the screws that secure the upper door bearings and related hardware, just enough to allow door movement.

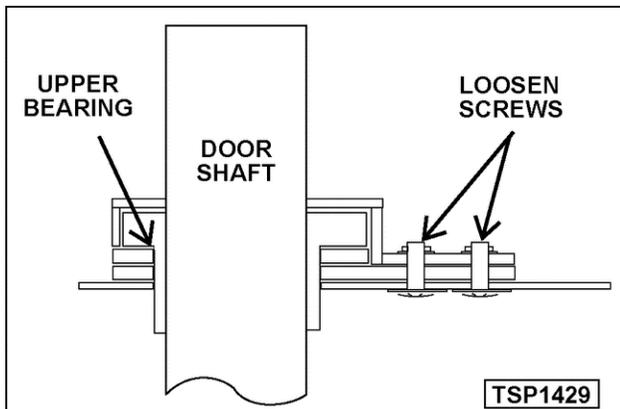


Fig. 49

4. Move the door until proper alignment is achieved then tighten the screws on the upper door bearing hardware.
5. Repeat step 3 and 4 on the opposite door, if necessary.

DOOR STRIKE ADJUSTMENT (INDEPENDENT DOORS)

NOTE: For units with serial number starting with 48 made after 8/12/07 and serial number starting with 54 made after 8/26/07.



WARNING Disconnect the electrical power to the machine and follow lockout / tagout procedures.

1. Remove TOP FRONT COVER.
2. Open the doors and inspect door strike for proper shape.
 - A. Replace if bent. Do not bend strike plate.
 - B. If adjustment is necessary, loosen fasteners, close doors and insure contact between door inner surface and upper horizontal seal. Slide door strike plate until contact with roller latch is made. Tighten strike plate fasteners.

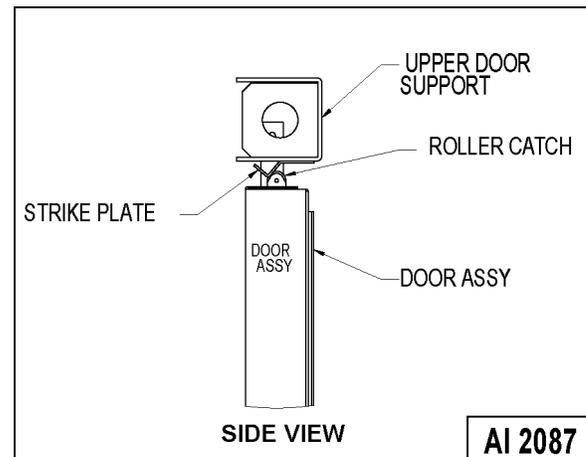


Fig. 50

3. Open and close the doors several times while observing the roller latch and strike plate operation.
 - A. Replace roller latch if malfunctioning as outlined under ROLLER LATCH ASSEMBLY (INDEPENDENT DOORS) and adjust as outlined in this procedure.

4. Each oven door should open with a force of 8 to 25 pounds when pulled at the handle. The adjustments must allow the doors to remain closed during normal operation and allow opening without exertion by the user.

ELECTRICAL OPERATION

COMPONENT FUNCTION

| | |
|--|--|
| Power Switch (S1) . . . | Determines the mode of operation; ON, OFF, or COOL DOWN. |
| Oven Light Switch (S2) | Controls the oven cavity lights. |
| Fan Speed Switch Hi/ Low (S3) | Controls blower motor speed between Hi and Low settings. |
| Bake Mode Switch (S4) | Selects the cooking mode of the oven between Normal and Gentle Bake. Controls call for heat 100% for Normal 75% for Gentle Bake. |
| Buzzer | Signals the end of a cook cycle. |
| Timer | Counts the time of the product and signals the buzzer at the end of the cycle. |
| Door Switch | Allows the oven to operate when the doors are closed but stops the oven from operating when the doors are opened. |
| Blower Motor | Operates the oven cavity blower (convection fan). Also, an internal centrifugal switch on the motor is utilized to allow the connection of power to the heat relay (R3) when the motor is at operating speed. |
| Transformer (T1) | Provides 24VAC power to the ignition control module and heating circuit. |
| Solid State Temperature Control . . . | Monitors temperature sensor and regulates the oven cavity temperature by controlling the heat relay (R3) through the blower motor centrifugal switch contacts. |
| High Limit Thermostat . . . | Protects the oven from temperatures above 550°F by removing power from the 1st valve (safety) on the dual solenoid gas valve which stops the flow of gas to the burner. Auto resets at 500°F. |
| Ignition Control Module | Controls the gas ignition cycle - Energizes the 2nd valve (main) on the dual solenoid gas valve, generates spark for burner ignition, monitors the presence of a flame and controls the No Ignition light. The ignition times are: 4 second self diagnostic test (initial power ON); 7 second ignition trial; 3 ignition trials with a 15 second purge between each trial. |
| Igniter/Flame Sense . . . | Ignites the gas and senses the presence of a flame. The flame presence generates a micro-amp "flame sense" current that is monitored by the ignition control module. A flame sense current of 1.0 micro amp (minimum) is required to maintain burner ignition. |
| Power On Light | Lit whenever the power switch (S1) is turned to ON or Cool Down mode. |
| Heat Light | Lit whenever temperature control is calling for heat. |
| No Ignition Light | Lit when power is turned ON, during ignition trial & gas purge time and when no flame is detected by flame sensor. If the oven fails to ignite after 3 attempts, it will remain lit until power is reset. |
| Temperature Probe . . . | Senses the oven temperature for the solid state temperature control. Converts the temperature into a resistance value which is monitored by the temperature control board. The probe is an RTD (resistance temperature detector) of the Thermistor type. As temperature increases the resistance value decreases. |
| Gas Valve (Dual Solenoid) | Allows gas flow to the burner when the 1st valve (safety) and 2nd valve (main) solenoid coils are both energized. |
| Cooling Fan | Circulates cooler air from rear of oven forward to cool components in the control area. |

COMPONENT LOCATION

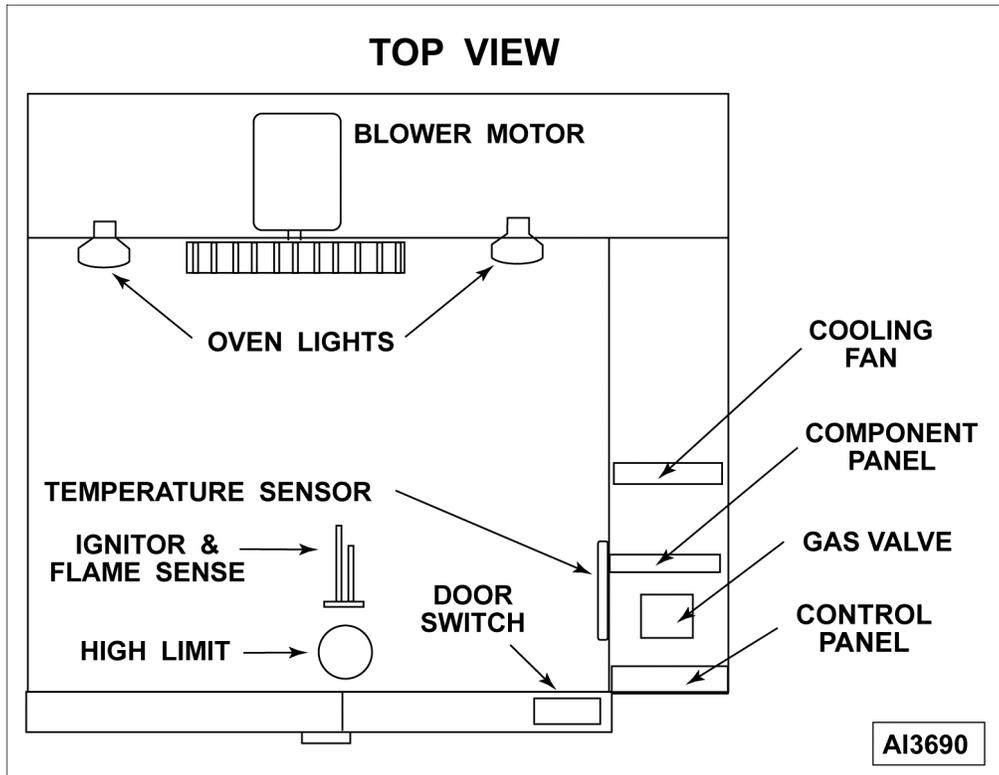
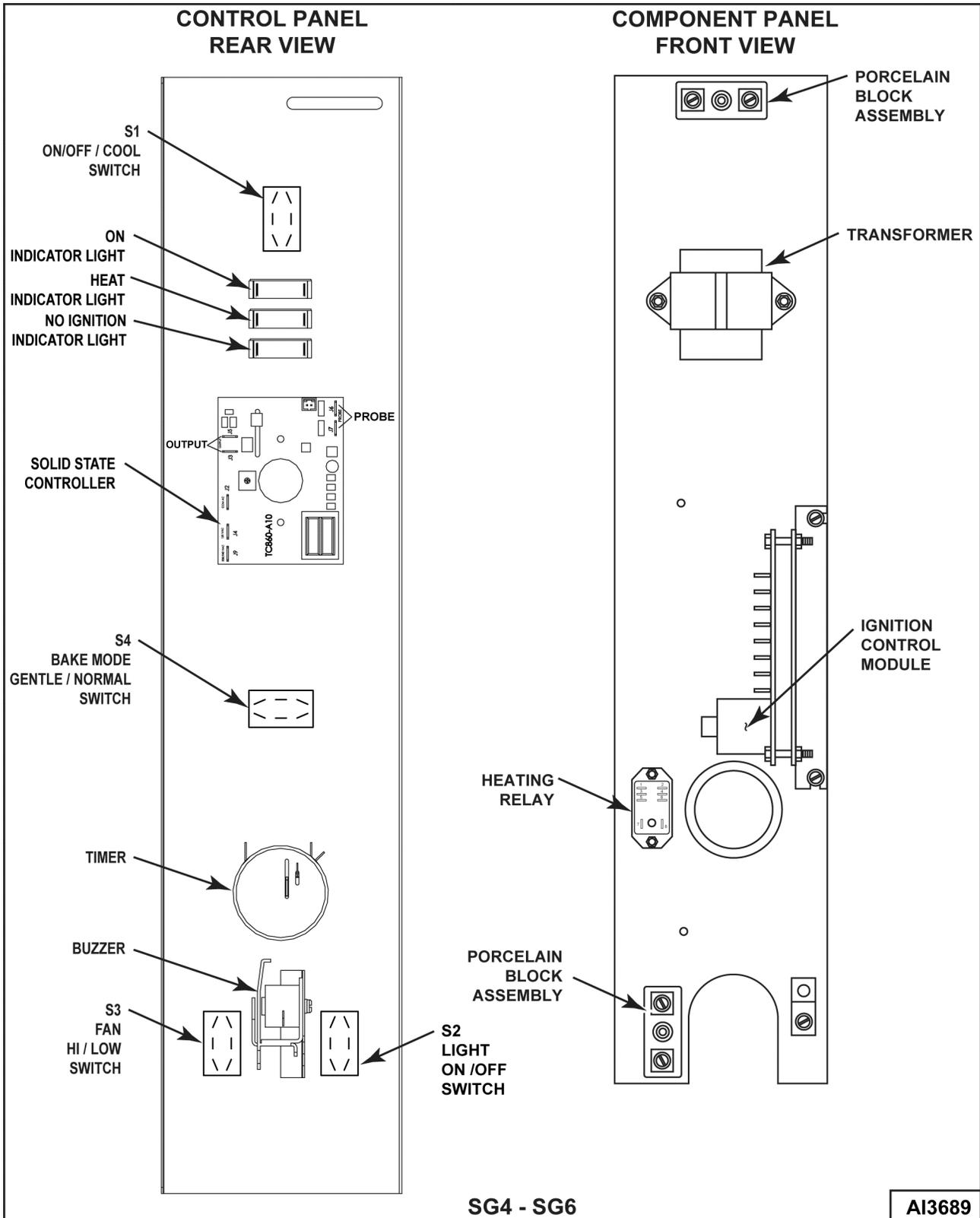


Fig. 51



SG4 - SG6

Fig. 52

Schematic diagram [AI3691](#) will be used to explain the electrical sequence of operation.

SEQUENCE OF OPERATION

SG4, SG6 (Solid State Temperature Control)

Normal Cycle

1. Conditions.

- A. Oven connected to correct voltage.
 - 1) L1 (HOT) to power switch (S1).
 - 2) L2 (NEUTRAL or SECOND LINE) to one side of the following components: power ON light, heat light, temperature control board terminal T2 (120VAC) or terminal T3 (208- 240VAC), oven cavity lights, buzzer, "Cook" timer motor, heat relay coil (R3), convection fan motor common (©), transformer primary (T1), motor speed (Hi/Low) switch and the component cooling fan.
 - B. Oven properly grounded.
 - C. Gas supply valve ON.
 - D. Gas combination control valve ON.
 - E. Power switch (S1) OFF.
 - F. Oven light switch (S2) ON/OFF (position has no affect on the function of the "Cook" cycle).
 - G. Temperature control dial set to lowest temperature (fully counterclockwise).
 - H. High limit switch CLOSED.
 - I. Timer in the OFF position.
 - J. Oven doors Closed.
 - 1) Door switch contacts CLOSED.
 - K. Oven cavity temperature below 140°F.
2. Set temperature control dial to desired temperature.
 3. Power switch (S1) turned ON.
 - A. Component cooling fan energized.
 - B. Power ON light (Amber) comes ON.
 - C. Power to one side of the following components: Timer terminal 1, transformer primary (T1).
 - a. Power (24VAC) to one side of the following components: heat relay (R3) normally open (N.O.) contacts, high limit --- connected through the normally closed (N.C.) contacts to the 1st valve (safety) on the dual solenoid gas valve.
 - a) 1st valve (safety) on the gas valve energized.
- NOTE:** Gas does not flow to the burner until the 2nd valve (main) is energized.
- 2) With door switch closed, power is applied to motor speed switch (Hi/Low).
 - a. When the convection fan motor reaches operating speed, the centrifugal switch (N.O.) on the motor closes.
 - b. Power to normally open (N.O.) side of internal relay contacts (terminal 7) on the temperature control board.
 - 3) Power is also connected back through a second set of contacts on the power switch (S1) to terminal 8 on the temperature control board.
 - a. Solid state temperature control energized. If the oven temperature is below set point, the temperature control will energize its internal relay. The normally open (N.O.) contacts close and apply power to the following components:
 - a) Heat light (clear) comes ON.
 - b) Power is connected through the centrifugal switch contacts on the convection fan motor, heat relay (R3) is energized, (R3) contacts (N.O.) close and the heating circuit is powered.
 - c) Ignition control module is energized.
- NOTE:** Power is available to the oven light switch (wire #20) to turn the oven cavity lights ON when the light switch is turned ON; and power is available to the normally open N.O. side (wire #28) of the door switch contacts and connects power to additional components when the door switch contacts are CLOSED (door closed).
- 1) Transformer (T1) energized.

- d) No ignition light (red) comes ON, module performs a self diagnostic test for 4 seconds, 2nd valve (main) on the gas valve is energized. Gas starts to flow to the burner, sparking begins, the "no ignition" light goes out and burner lights. Sparking continues for up to 7 seconds or until a flame is established. If a flame is "sensed", the "no ignition" light stays out and burner remains lit. If a flame is not "sensed" after 7 seconds of sparking, the "no ignition" light comes back on, 2nd valve (main) on the gas valve is de-energize and gas flow to the burner stops. Ignition trial cycle repeats after a 15 second purge between cycles for two additional tries before locking out. To reset after a lockout, turn power switch (S1) OFF then ON.
4. Oven reaches set temperature.
 - A. Temperature control de-energizes internal relay and the normally open (N.O.) contacts OPEN.
 - 1) Heat light goes out.
 - 2) Power removed from heat relay (R3).
 - a. R3 normally open (N.O.) contacts OPEN.
 - a) Power removed from 2nd valve (main) on the gas valve and gas flow to the burner stops.
 5. The oven will continue to cycle on the temperature control until the doors are opened or power switch (S1) is turned to the OFF or COOL DOWN position.
- Cool Down Cycle (Solid State Temperature Control)**
1. Conditions.
 - A. Oven is ON.
 - B. Oven cavity temperature needs to be lowered.
 - C. Doors are open.
 - 1) Door switch contacts OPEN
 - D. Cook timer in the OFF position.
 2. Power Switch (S1) turned to COOL DOWN.

NOTE: With door switch contacts OPEN (doors open), the convection fan motor will still run and continue to cool the oven. However, power would be removed from the following components: Power ON light (goes out), transformer T1 (de-energized) and to the component cooling fan.

 - A. Power to motor speed switch (Hi/Low).
 - 1) Motor speed (Hi/Low) relay (R1) is energized and contacts change state.
 - a. Convection fan motor energized.
 - b. When Convection fan motor reaches operating speed the centrifugal switch on the motor closes but no power is available for connection to other components.
 3. If door switch is CLOSED (doors closed), power is supplied to one side of the following components: Power ON light (Amber), oven light switch (S2), timer terminal 1, transformer primary (T1) and component cooling fan.
 - A. Power ON light (Amber) comes ON.
 - B. Transformer (T1) energized.
 - 1) Power (24VAC) to one side of the following components: heat relay (R3) normally open (N.O.) contacts, high limit --- connected through the normally closed (N.C.) contacts to the 1st valve (safety) on the dual solenoid gas valve.
 - a. 1st valve (safety) on the gas valve energized.

NOTE: Gas does not flow to the burner until the 2nd valve (main) is energized.
 4. The oven will remain in this condition until the power switch (S1) is turned to the OFF or ON position.

SCHEMATICS

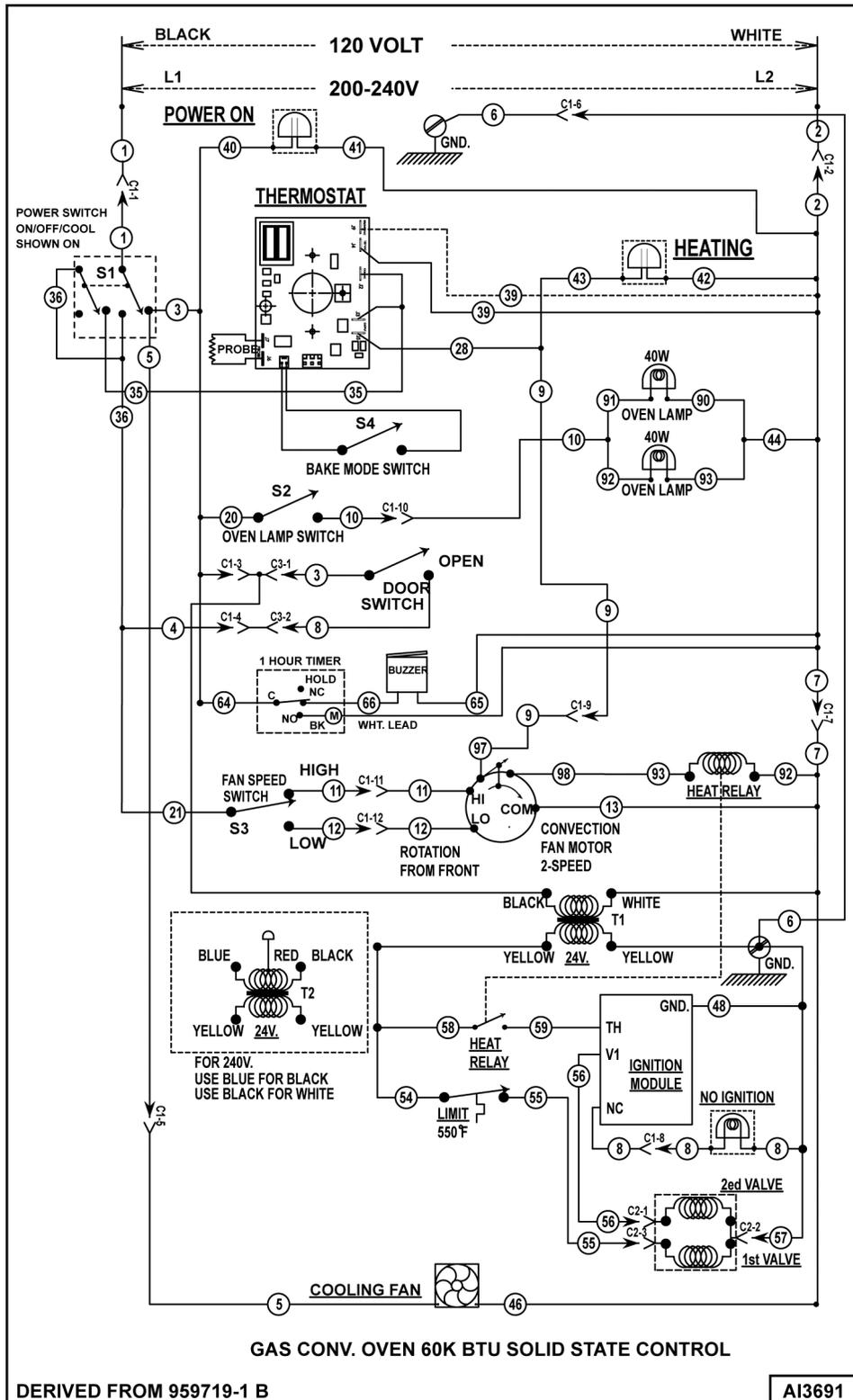


Fig. 53

WIRING DIAGRAM

See Wiring Diagram AI3692

TRUBLESHOOTING



⚠ WARNING Certain procedures in this section require electrical test or measurements while power is applied to the machine. Exercise extreme caution at all times and follow Arc Flash procedures. If test points are not easily accessible, disconnect power and follow Lockout/Tagout procedures, attach test equipment and reapply power to test.

ALL MODELS

| SYMPTOMS | POSSIBLE CAUSES |
|---|---|
| Blower motor doesn't run with 1S in "Cool Down" or "On" position. | <ol style="list-style-type: none"> 1. Line voltage. 2. Power switch (S1) malfunction. 3. Switch (S3) malfunction. 4. Interconnecting wiring malfunction. 5. Motor inoperable. |
| Blower motor doesn't run in "On" position. "Cool Down" functions OK. | <ol style="list-style-type: none"> 1. Door switch malfunction. 2. Power switch contacts inoperative. 3. Interconnecting wiring malfunction. |
| Blower motor doesn't run in "Cool Down" position. Runs OK in "On" position. | <ol style="list-style-type: none"> 1. Power switch malfunction. 2. Interconnecting wiring malfunction. |
| Gas does not ignite; No spark; No Ignition Light ON. | <ol style="list-style-type: none"> 1. Shorted electrode on ignitor/flame sense. 2. Ignitor cable (high voltage) OPEN. 3. Heat relay (R3) malfunction. 4. Transformer (T1) inoperative. 5. High limit thermostat open. 6. Interconnecting wiring malfunction. 7. Ignition Module malfunction. |
| Sparks but gas does not ignite. | <ol style="list-style-type: none"> 1. Gas solenoid valve OFF or inoperative. 2. Manual gas valve CLOSED. 3. Gas supply OFF or Insufficient gas pressure. 4. Interconnecting wiring malfunction. 5. Ignition Module malfunction. |
| Gas ignites but will not maintain flame. | <ol style="list-style-type: none"> 1. Igniter lead connections malfunction. 2. Ignitor ground inoperative. 3. Ignitor/flame sense malfunction. 4. Insufficient gas pressure. 5. Snorkel vent plugged, obstructed or missing. 6. Incorrect polarity from transformer (T1) to Ignition module. |

| SYMPTOMS | POSSIBLE CAUSES |
|---|--|
| Excessive or low heat. | <ol style="list-style-type: none"> 1. Temperature probe malfunction. 2. Temperature control board malfunction. 3. Gas pressure Insufficient. 4. Gas orifice plugged or obstructed. |
| Mechanical Timer inoperative or not functioning properly. | <ol style="list-style-type: none"> 1. Interconnecting wiring malfunction. 2. Line voltage incorrect. 3. Timer malfunction. |
| Component cooling Fan does not run. | <ol style="list-style-type: none"> 1. Motor inoperable. 2. Interconnecting wiring malfunction. |
| Uneven Cooking. | <ol style="list-style-type: none"> 1. Convection Fan motor speed/direction. 2. Poor combustion. <ol style="list-style-type: none"> A. Gas pressure incorrect. B. Exhaust vent plugged or obstructed. C. Snorkel Vent plugged or obstructed. 3. Air flow Baffles missing or damaged. |
| Intermittent problems. | <ol style="list-style-type: none"> 1. High ambient temperatures. 2. Wiring connections loose. 3. Cooling fan malfunction. |
| No power to temperature control. | <ol style="list-style-type: none"> 1. Power switch (S1) in "Cool Down". 2. Door or door switch open. |