

SERVICE MANUAL

(INTERNATIONAL)

IMPINGER CONVEYOR OVEN

**MODEL 1100-000-A SERIES
(SN 2038615 & BELOW)
SERVICE MANUAL**



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SEQUENCE OF OPERATIONS

(For serial numbers before 2038616 w/ analog control)

MODEL 1154-000-EA	NAT. GAS	230 VAC	50 HZ.	1 PHASE
MODEL 1155-000-EA	LP GAS	230 VAC	50 HZ.	1 PHASE

POWER SUPPLY

Electrical power to be supplied to the oven by a three conductor service.

CONTROL BOX AUTO COOL DOWN

When the temperature in the control box reaches 120° F, $\pm 3^\circ$ (48.9°C, $\pm 1.7^\circ$ C), the cooling fan thermostat will switch power to the control box cooling fan. The thermostat will interrupt power to the cooling fan when the control box temperature falls to 100° F, $\pm 3^\circ$ (37.8°C, $\pm 1.7^\circ$ C).

MAIN FAN CIRCUIT

Power is permanently supplied through the 10A oven fuse, through the normally closed control box hi-limit thermostat (opens at 140° F, 60° C) to the normally open double pole oven fan switch and to the cooling fan. Closing the oven fan switch supplies line voltage to the main fan motor. Closing the fan switch also supplies voltage to the cooling fan. The conveyor, burner and temperature display are also energized.

BURNER CIRCUIT

Closing the oven fan switch supplies line voltage through the normally open gas pressure switch (located in the gas valve and closed when gas pressure is present), through the normally open air pressure switch (closed by air pressure from the main fan), through the normally closed oven cavity hi-limit thermostat (opens at 662° F, 350°C which is manually resettable after a drop in temperature of 18° F, 10° C), and to the ignition control.

IGNITION CONTROL

The ignition control switches line voltage to the combustion blower motor, the combustion air switch switches from normally closed to normally open upon sensing air pressure in the burner housing. After a pre-purge period of between 30 and 60 seconds, the spark generator is energized, the main gas valve and the burner pilot light are energized, and ignition should now occur.

TEMPERATURE CONTROL

Closing the oven fan switch supplies line voltage to the temperature control. The 1K ohm temperature pot. is adjusted to desired temperature. The thermocouple will provide varying millivolts to the temperature control. The temperature control supplies line voltage to the temperature regulation valve at intermittent intervals to maintain desired temperature. The heat lamp is energized with the temperature regulation valve.

CONVEYOR DRIVE

Closing the oven fan switch supplies line voltage to the motor control board. AC volts are converted to DC volts and are supplied to the conveyor motor at terminals A+ and A-. Adjustment of the speed control potentiometer will change resistance at terminals P1 and P2, varying the DC voltage to the motor. The speed of the conveyor motor will increase or decrease as the DC voltage from the board increase or decreases respectively.

NOTE: The conveyor control uses a sensor and magnet, mounted on the conveyor motor, that senses the motor speed. Any change in motor load (\pm RPM) is detected by the sensor and the voltage to the motor is adjusted accordingly.

TEMPERATURE DISPLAY

Closing the switch supplies line voltage to primary of the temperature display transformer. The secondary of this transformer supplies 12VAC to the temperature display. The thermocouple supplies DC millivolts to the temperature display. The display converts this millivolt reading to a temperature reading.

SEQUENCE OF OPERATIONS

MODEL 1164-000-EA 400/230 VAC 50 HZ. 3 PHASE

POWER SUPPLY

Electrical power to be supplied to the oven by a four conductor service.

Brown conductor is Hot.

Black conductor is Hot.

Black conductor is Hot.

Green conductor is ground.

CONTROL BOX AUTO COOL DOWN

When the temperature in the control box reaches 120° F, $\pm 3^\circ$ (48.9°C, $\pm 1.7^\circ\text{C}$), the cooling fan thermostat will switch power to the control box cooling fan. The thermostat will interrupt power to the cooling fan when the control box temperature falls to 100° F, $\pm 3^\circ$ (37.8°C, $\pm 1.7^\circ\text{C}$).

MAIN FAN CIRCUIT

Power is permanently supplied through the normally closed oven cavity hi-limit, through the 10A fuse, through the normally closed control box hi-limit thermostat, to the normally open main fan switch. Power is also supplied to the normally open cooling fan thermostat. Closing the main fan switch supplies 230 VAC to the main fan motor, the cooling fan motor, to the primary of the temperature display transformer and to the heat and conveyor circuits.

HEAT CIRCUIT

Closing the oven fan switch supplies 230VAC, through the normally open air pressure switch (closed by air pressure from the main fan) to the electronic temperature control. The 1K ohm temperature potentiometer is adjusted to desired temperature. The thermocouple will provide varying millivolts to the temperature control. The temperature control then supplies 230 VAC to the coil of the contactor at intermittent intervals to maintain the desired temperature. The heat lamp is energized with the contactor.

CONVEYOR DRIVE

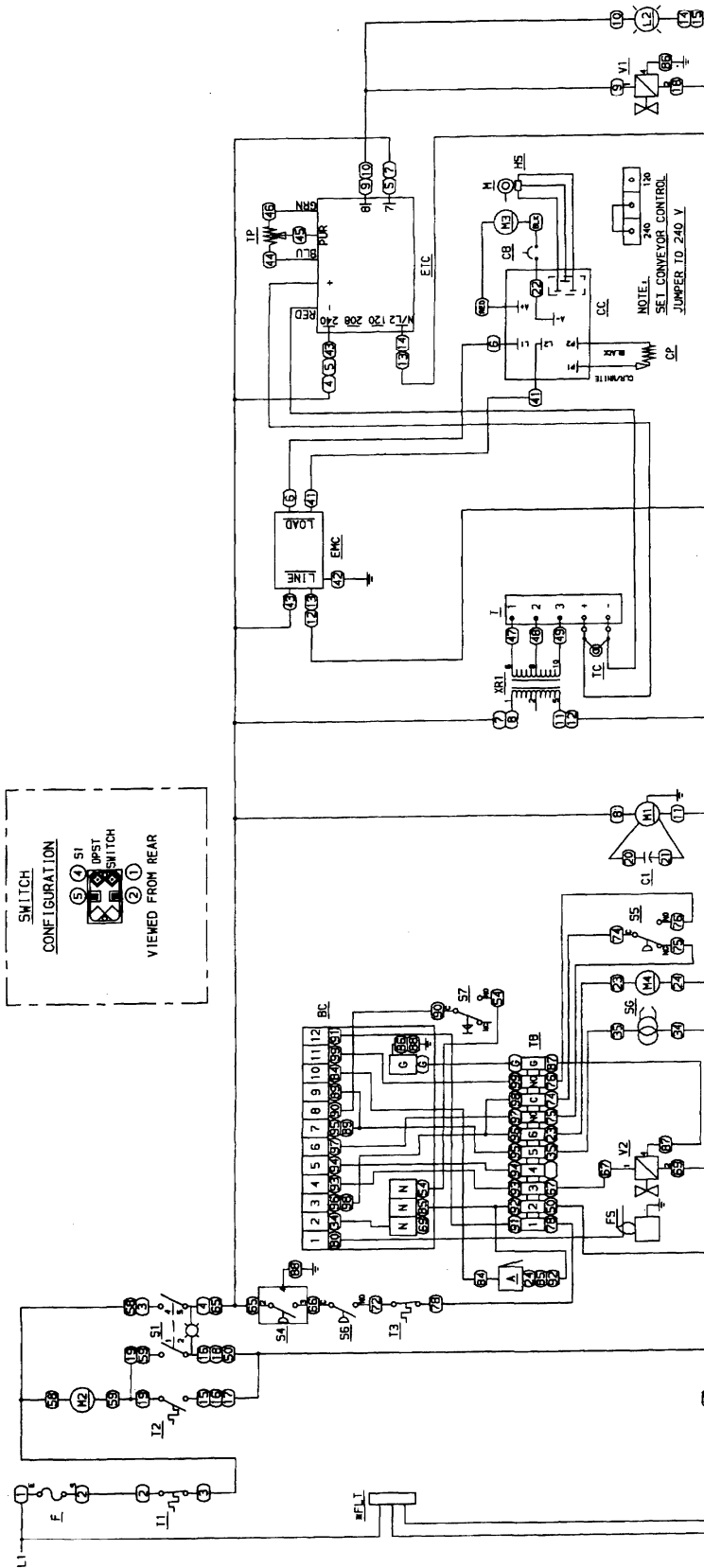
Closing the oven fan switch supplies 230 VAC through the EMI filter to the motor control board. AC volts are converted to DC volts and are supplied to the conveyor motor at terminals A+ and A-. Adjustment of the speed control potentiometer will change resistance at terminals P1 and P2 varying the DC voltage to the motor. The speed of the conveyor motor will increase or decrease as the DC voltage from the board increases or decreases respectively.

NOTE: The conveyor control uses a sensor and magnet, mounted on the conveyor motor, that senses the motor speed. Any change in motor load (\pm RPM) is detected by the sensor and the voltage to the motor is adjusted accordingly.

TEMPERATURE DISPLAY

Closing the main fan switch supplies 230 VAC to the primary of the temperature display transformer. The secondary of this transformer supplies 12 VAC to the temperature display. The thermocouple supplies DC millivolts to the temperature display. The display converts this millivolt reading to a temperature reading.

SCHEMATIC DIAGRAM MODEL 1154-000-EA, 1155-000-EA

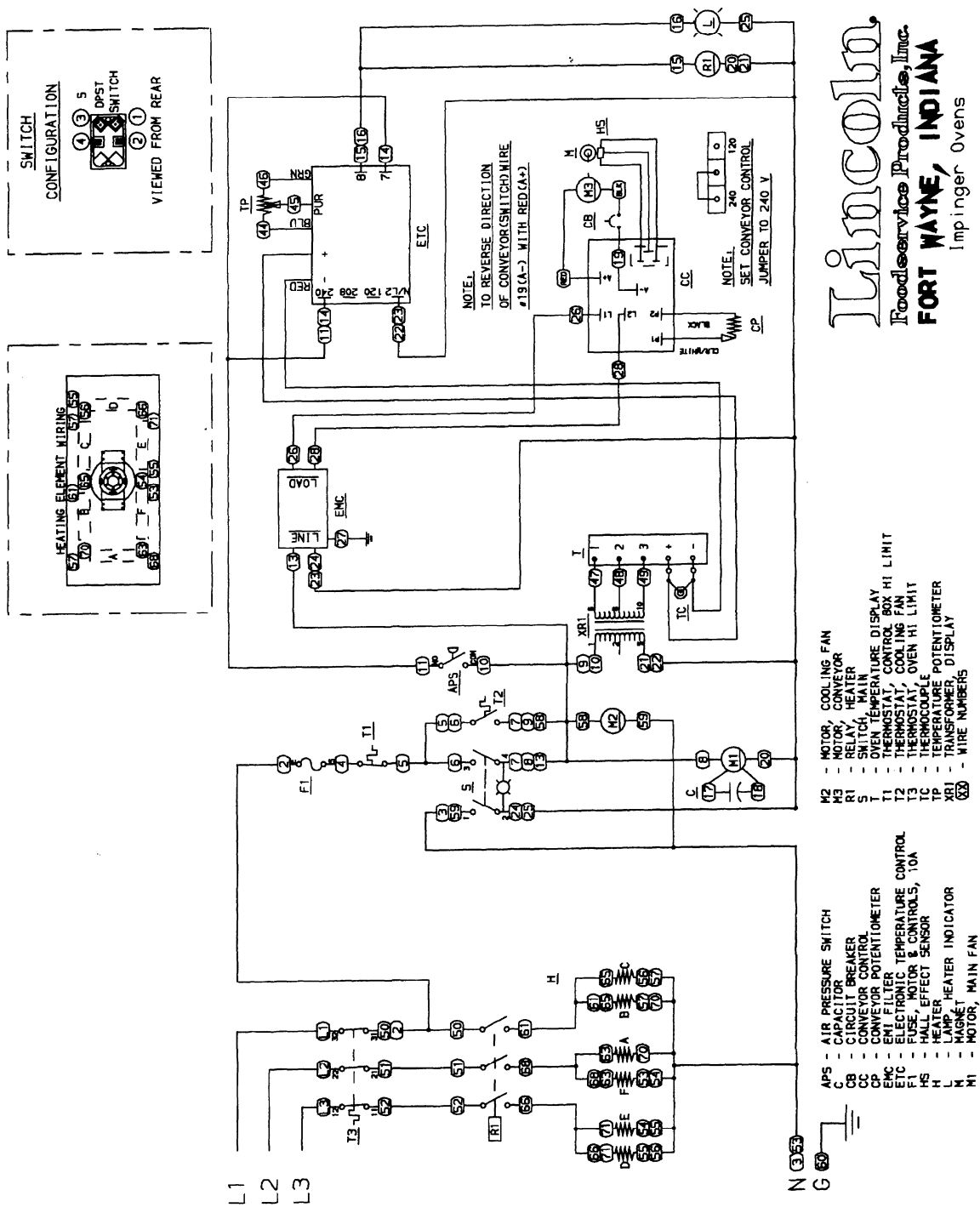


- NOTE:**
1. ■ = CE OVENS ONLY
- ALARM CONTROL
 - CAPACITOR 2.5 MFD
 - CONVEYOR CONTROL
 - CONVEYOR POT ASSEMBLY
 - ENH FILTER
 - OVER FUSE 10A
 - FILTER REF1
 - FLAME SENSOR
 - HALL SENSOR
 - MAGNETIC TEMP CONTROL
 - MOTOR, OVEN FAN
 - MOTOR, COOLING FAN
 - MOTOR, CONVEYOR
 - MOTOR, BURNER BLOWER
 - SWITCH, OPEN FAN
- 54 - SWITCH, GAS INLET PRESSURE
 - 55 - SWITCH, OPEN INLET PRESSURE
 - 56 - SWITCH, OPEN IR PRESSURE
 - 57 - LOCKOUT RESET SWITCH
 - 58 - SPARK GENERATOR
 - T1 - THERMOSTAT, CONTROL BOX HIGH LIMIT
 - T2 - THERMOSTAT, CONTROL BOX COOLING
 - T3 - THERMOSTAT, OPEN HIGH LIMIT
 - T4 - THERMOSTAT, OPEN HIGH LIMIT
 - T5 - THERMOSTAT, TYPE J
 - T6 - TEMP DISPLAY
 - T7 - VALVE, TEMPERATURE REGULATION
 - V1 - VALVE, TEMPERATURE REGULATION
 - XR1 - TRANSFORMER, T-12, 240V CT
 - TP - TEMPERATURE POT ASSEMBLY
 - ⊗ - WIRE NUMBERS
- 64 - SWITCH, OPEN IR PRESSURE
 - 65 - SWITCH, OPEN INLET PRESSURE
 - 66 - SWITCH, OPEN IR PRESSURE
 - 67 - LOCKOUT RESET SWITCH
 - 68 - SPARK GENERATOR
 - T1 - THERMOSTAT, CONTROL BOX HIGH LIMIT
 - T2 - THERMOSTAT, CONTROL BOX COOLING
 - T3 - THERMOSTAT, OPEN HIGH LIMIT
 - T4 - THERMOSTAT, OPEN HIGH LIMIT
 - T5 - THERMOSTAT, TYPE J
 - T6 - TEMP DISPLAY
 - T7 - VALVE, TEMPERATURE REGULATION
 - V1 - VALVE, TEMPERATURE REGULATION
 - XR1 - TRANSFORMER, T-12, 240V CT
 - TP - TEMPERATURE POT ASSEMBLY
 - ⊗ - WIRE NUMBERS

Lincoln
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FORT WAYNE, INDIANA
IMPINGER 2' ADVANTAGE GAS 50HZ

28028200

SCHEMATIC DIAGRAM MODEL 1164-000-EA



Lincoln
Foodservice Products, Inc.
FORT WAYNE, INDIANA
Impinger Ovens

28028210

TROUBLESHOOTING GUIDE

GAS OVENS

1154-000-EA	NAT. GAS	230VAC	50 HZ.	1 PHASE
1155-000-EA	LP GAS	230VAC	50 HZ.	1 PHASE

REFER TO PROPER SCHEMATIC FOR IDENTIFIED COMPONENTS

SYMPTOM	POSSIBLE CAUSE	EVALUATION
Oven fan will not run	Incoming power supply	Check breakers, reset if required. Check power plug to be sure it is firmly in receptacle. Measure incoming power, call power co. if needed
	Fuse, 10A	Check, replace if necessary.
	Fuse holder	Check, replace if necessary.
	Hi-limit thermostat, control box	Check for voltage on both sides of the switch. Terminals are normally closed. If open, reset and test oven for proper operation. If thermostat will not hold, and control box temperature is not exceeding 140° F (60° C) replace thermostat.
	Main fan switch	With power off, Check continuity between switch terminals. Replace as needed.
	Main fan motor	Check for opens, shorts or grounds. With power off, turn fan blade to check for locked rotor.
	Capacitor	Check for shorts or grounds. WARNING: Capacitor has a stored charge, discharge before testing.
No control box cooling	Incoming power supply	Check main circuit breakers, reset if required. Call power co. if needed.
	Main fan switch	With power off, Check continuity between switch terminals. Replace as needed.
	Cooling fan	Line voltage should now be at the cooling fan. If voltage is present, check motor for shorts or opens. With power off, check for locked rotor.
No automatic control box cooling	Incoming power supply	Check main circuit breakers, reset if required. Call power co. if needed.
	Cooling fan thermostat	Check the cooling fan thermostat (thermostat closes at 120° F and opens at 100° F). With the cooling fan thermostat preheated, check for continuity. If switch is open, replace thermostat.
Oven will not heat	Gas supply	Check for adequate gas supply and be sure that manual gas shut off valve is open. Also check flexible gas line connection.
	Main fan	If not operating, refer to "Main fan will not run"
	Gas pressure switch	This switch is located inside the gas valve and should close when gas pressure is present. WITH POWER OFF: Remove 3 prong plug (on gas valve) and measure continuity between terminals 2 and 3. If no continuity, check the following: Proper gas pressure supply to gas valve as marked on the oven specification plate. Check for proper adjustment of gas pressure switch, 10 for Nat. gas, 27 for LP gas or 4.5 for town gas. Check the filter in gas valve for blockage or damage. If above checks are okay, but pressure switch is still not closed, replace gas valve.

	Air pressure switch	Check air switch terminals for supply voltage to terminals NO 2 and COM. If voltage is present on one side only, check for air tube blockage or misalignment. If these are okay, adjust switch or replace if necessary.
	Oven cavity hi-limit thermostat	Terminals are normally closed, opens at 660° F (350° C). If open, push in reset button and retest. If thermostat will not hold for maximum oven temperature, and oven is not exceeding temperature dial setting, check for proper location of capillary bulb in its spring holder. If above checks are okay, replace hi-limit thermostat.
	Ignition control	Check for proper supply voltage to ignition control. Check for proper line voltage to the burner blower motor. This can be checked at motor connecting plug terminals 2 and 5. If voltage is present, proceed with next step, if not, wait 30 seconds, push reset button and try to restart. If this fails, check wires from thermostat and burner blower motor to the ignition control. If all above checks okay, replace ignition control.
	Burner blower motor	Check for supply voltage to motor. WITH POWER OFF: Turn blower wheel to check for locked rotor. If proper supply voltage is present at motor connecting plug, terminals 2 and 5, and motor does not run, replace motor.
	Air pressure switch (burner blower)	Check for proper supply voltage switching from "NC" to "NO" on ignition control. Check for air switch adjustment, air tube blockage or misalignment. If these fail, replace air pressure switch.
	Spark generator	A pre-purge time of 30 to 60 seconds occurs after blower motor starts. Check for supply voltage at spark generator. If voltage is not present, check reset button for the ignition control. If voltage is still not present, replace ignition control. If there is input voltage but there is no output voltage, replace spark generator.
	Igniter/sensor assembly	Check this assembly for visible damage. Replace as needed. If there is no visible damage, check for supply voltage to igniter/sensor assembly. If there is supply voltage to igniter/sensor assembly, but there is no spark, replace igniter/sensor assembly.
	Gas valve	Gas valve should open when proper supply voltage is present. If no voltage is present, check the reset button on ignition control, and all connections for tightness. If there is still no voltage at gas valve, replace the ignition control. If there is voltage present, check for gas pressure at the gas pressure tap (located in the gas piping just prior to the burner). If there is no gas pressure, replace the gas valve.

Flame will not stay on	Flame sensor	To check for flame sensor operation, connect a digital multimeter (capable of measuring DC microamps) between the flame sensor wire and terminal #1 on the ignition control. Sensor current is to be 3 microamps, minimum. If these readings are not achieved, replace igniter sensor assembly. Also, check for any type of damage to flame sensor wire and connections. NOTE: The DC microamp test must be conducted with the oven in low flame (bypass) operation.
	Power supply	Turn the temperature to the lowest temperature setting. If there is sufficient microamp current, but the flame will not stay lit, check for proper polarity of the power supply.
	Ignition control	If there is sufficient flame sensor current, but the burner will not remain ignited, check the reset button on ignition control. If all above test okay, replace ignition control.
	NOTE: Flame should be lit at this time	
Low flame is on, but no main flame	Temperature control	Check for supply voltage at terminal #7 to L2 on temperature control. If there is no voltage, trace wiring back to oven fan switch. Turn the temperature adjustment knob to maximum temperature position and check for supply voltage at the load terminal #8 and L2. If voltage is present and unit is not heating, refer to "Temperature regulation valve" for next check. If voltage is not present, proceed.
	Thermocouple	With power on and thermocouple leads attached to the temperature control board: Measure the DC millivolt output of these leads. Refer to thermocouple chart in "removal and installation" section for proper readings. If these readings are not achieved, replace thermocouple.
	Temperature potentiometer	Disconnect the potentiometer leads from the temperature control board. Place ohmmeter test leads on the blue and green pot. leads. Reading should be 1K ohms. Place meter leads on the blue and purple pot. leads and rotate knob from high to low. Repeat on green and purple leads. Check for an even rise and fall of ohms reading to insure that there are no open or dead spots in the potentiometer. Check each lead to ground for any short circuits to ground. Replace as needed.
	Temperature regulation valve	If supply voltage is present on the temperature control board at load terminals #8 and L2, check for voltage at temperature regulation valve. If voltage is present, listen for valve to open and close. Also check for opens or shorts in the operating coil. Replace as needed.
Intermittent heating	Thermal overload of main fan and burner blower motors	The main fan motor and burner blower motor are equipped with internal thermal protection and will cease to operate if overheating occurs. As these motors overheat and then cool, the burners will cycle on and off intermittently. Improper ventilation or a lack of preventive maintenance may cause this condition. Also,

		most of the problems listed under “Oven will not heat” can cause intermittent failure.
Conveyor will not run	Power supply	Check incoming power supply, If no voltage is present, check circuit breakers.
	Fan switch	With power off, Check continuity between switch terminals. Replace as needed.
	Speed adjustment potentiometer	This is a 0 to 10K ohm, 1 turn potentiometer. With power off, remove the black and white pot. leads from the motor control board at terminals P1 and P2. Place the meter leads on the black and white pot. leads. Rotating the pot. slowly, from low to high, the meter reading should show an even transition from 0 to 10K ohms \pm 5%. There should be no dead or open spots throughout the rotation of the potentiometer. Check both pot. leads to ground. There should be no continuity to ground. If any of the above checks fail, replace the potentiometer.
	DC motor control board	Check for supply voltage input to the control board at terminals L1 and L2. If voltage is not present, check wiring back to the oven fan switch. If supply voltage is present, check both fuses on control board (8A line and 1A armature). Check the DC voltage output at terminals A+ and A-. If there is power in to the control board but no power at A+ and A-, check the following:
	Hall effect sensor	Disconnect the Hall effect sensor from the DC motor control board. If the motor begins to run, replace the Hall effect sensor.
	DC motor control board	If, after disconnecting the Hall effect sensor, the motor is still not running, check for DC voltage from terminals A+ and A-. If there is no DC voltage, replace the DC motor control board.
	Circuit breaker	If there is DC voltage output from the DC motor control board, but the motor is still not running, check the 0.4 Amp circuit breaker. Disconnect wires from the circuit breaker and check for continuity through the circuit breaker. Reset circuit breaker or replace as needed.
	Conveyor gearmotor	Check the leads to the motor for evidence of any shorts or opens, and each lead to ground. If the motor fails the above tests, replace motor. Rotate motor shaft to determine if there is a locked rotor or a locked gearbox (use care so that magnet and sensor are not damaged). Check motor brushes for damage or excessive wear, replace brushes if needed. Replace motor if needed. Also check to be sure that the conveyor drive coupling is tight and properly engaged to the conveyor shaft.
	Conveyor	Check for any mechanical misalignment. Also, check for worn bearings. A conveyor belt that is too tight may cause excessive bearing wear and sometimes, irregular speed.
Conveyor speed unsteady	Power supply	Check power supply at the DC motor control board for supply voltage at terminals L1 and L2. Supply voltage should be steady.

	Speed adjustment potentiometer	This is a 0 to 10K ohm, 1 turn potentiometer. With power off, remove the black and white pot. leads from the motor control board at terminals P1 and P2. Place the meter leads on the black and white pot. leads. Rotating the pot. slowly, from low to high, the meter reading should show an even transition from 0 to 10K ohms \pm 5%. There should be no dead or open spots throughout the rotation of the potentiometer. Check both pot. leads to ground. There should be no continuity to ground. If any of the above checks fail, replace the potentiometer.
	Magnet	Check to insure that the magnet (cemented to shaft of conveyor drive motor) has not been damaged, or come loose from the motor shaft. Re-glue or replace as needed.
	Hall effect sensor	Check for any physical damage to hall effect sensor (mounted on conveyor drive motor). Check all wiring and connections for damage. Replace as needed.
	Hall effect sensor cable	Check continuity through the wires in the cable. Check all wiring and connections for visible damage. Replace as needed.
	DC motor control board	With motor running, measure DC voltage across the red wire and black wire in the hall effect cable (all wires must be connected during this test). Voltage reading should be approx. 12VDC and steady. If this reading is not achieved, replace DC motor control board.
	Hall effect sensor	With the motor running at maximum speed, measure the frequency across the white wire and the black wire in the hall effect cable (all wires must be connected during this test). Reading should be approx. 327 Hz. And steady. If there is no reading, replace hall effect sensor. If the reading is unsteady, calibrate the DC motor control board.
Temperature display inoperative	Display transformer	Measure the transformer primary for supply voltage input. If voltage is not present, trace wiring back to the oven fan switch. Measure the secondary output, which will normally be 12-15VAC. Voltage across terminals 1-3 should be 12-15VAC. Terminals 1-2 and 2-3 should be $\frac{1}{2}$ the voltage reading 1-3. If the above secondary readings are not achieved, replace transformer.
	Temperature display	If proper voltage is present at terminals 1,2 and 3 on temperature display, but the display is not lighted, recheck all connections for tightness. If temperature display is still not operating, replace the temperature display.
Temperature display inaccurate, or erratic	Thermocouple	Place the thermocouple of a pyrometer into the center of the top finger. The pyrometer will indicate oven temperature. Measure DC millivolts of thermocouple at the temperature display. See thermocouple chart in "Removal and Installation" section for proper readings. Replace thermocouple if proper readings are not achieved. If readings are correct on the thermocouple, recalibrate or replace

**TROUBLESHOOTING GUIDE
ELECTRIC OVENS**

**MODEL 1164-000-EA 400/230 VAC 50 HZ. 3 PHASE
REFER TO PROPER SCHEMATIC FOR IDENTIFIED COMPONENTS**

SYMPTOM	POSSIBLE CAUSE	EVALUATION
Oven fan will not run	Incoming power supply	Check circuit breakers. Reset if required. Call power company if needed.
	Oven cavity hi-limit thermostat	Terminals are normally closed. If open, reset and test oven for proper operation. If thermostat will not hold for maximum oven temperature, and oven is not exceeding temperature dial setting, check for proper location of capillary bulb in its spring holder. If above checks okay, replace hi-limit thermostat.
	Fuse, 10 Amp	Check, replace if necessary.
	Fuse holder	Check, replace if necessary.
	Control box hi-limit thermostat	Check for voltage on both sides of the switch. Terminals are normally closed. If open, reset and test oven for proper operation. If thermostat will not hold, and control box temperature is not exceeding 140° F (60° C) replace thermostat.
	Main fan switch	With power off, Check continuity between switch terminals. Replace as needed.
	Main fan motor	Check for opens, shorts or grounds. With power off, turn fan blade to check for locked rotor.
	Capacitor	Check for shorts or grounds. WARNING: Capacitor has a stored charge, discharge before testing.
No control box cooling		Check for main fan operation. If not operating, refer to "Oven fan will not run".
	Cooling fan	Line voltage should now be at the cooling fan. If voltage is present, check motor for shorts or opens. With power off, check for locked rotor.
No automatic control box cooling	Incoming power supply	Check circuit breakers. Reset if required. Call power company if needed.
	Oven cavity hi-limit thermostat	Terminals are normally closed. If open, reset and test oven for proper operation. If thermostat will not hold for maximum oven temperature, and oven is not exceeding temperature dial setting, check for proper location of capillary bulb in its spring holder. If above checks okay, replace hi-limit thermostat.
	Cooling fan thermostat	Check the cooling fan thermostat (thermostat closes at 120° F and opens at 100° F). With the cooling fan thermostat preheated, check for continuity. If switch is open, replace thermostat.
	Cooling fan	Line voltage should now be at the cooling fan. If voltage is present, check motor for shorts or opens. With power off, check for locked rotor.
Control box cooling fan continues to run	Cooling fan thermostat	This normally open thermostat should close at 120°F (48.9°C) and reopen at 100°F (37.8°C). Replace as needed.

Oven will not heat	Main fan motor	Check for main fan operation. If fan is not operating, refer to "Oven fan will not run".
	Air pressure switch	This normally open switch should close when the main fan is activated. Check air switch tube for blockage or obstructions. Adjust switch if necessary (see "Removal and installation" section for instructions). Replace air pressure switch as needed.
	Temperature control	Check for supply voltage at temperature control. If no voltage is present, trace wiring back to air pressure switch. Turn the temperature adjustment knob to maximum temperature position and check for 230VAC at the load terminals #8 and neutral. If 230VAC is present and unit is not heating, refer to "Mercury contactor" for next check. If 230VAC is not present, proceed.
	Thermocouple probe	With power on and thermocouple leads attached to the temperature control board: measure DC millivolt output of these leads. Refer to "Removal and installation" for proper readings. If these readings are not achieved, replace thermocouple.
	Temperature control potentiometer	Disconnect the potentiometer leads from the control board. Place ohmmeter test leads on the blue and green pot. wires. Reading should be 1K ohms. Place meter leads across the blue and purple pot. leads and rotate knob from low to high. Repeat on green and purple leads. Check for an even rise and fall of ohms reading to insure that there are no open or dead spots in the potentiometer. Check each lead to ground for short circuits. Replace potentiometer as needed.
	Mercury contactor	Check for supply voltage to the contactor coil. If voltage is present and the contactor will not activate, replace the contactor. Also, check each contactor for proper high voltage input and output.
	Heater elements	Check the amp draw on each leg of the power supply for proper load. Check the oven specification plate for rating information. If the amp draw is low or high, check the individual elements for opens, shorts and proper resistance. WITH POWER OFF: To check resistance of the elements, remove all wires from the elements. The element resistance should be: 230VAC – 33 ohms approx.
Oven heats with switch off	Mercury contactor	The mercury contactor has probably malfunctioned in the closed position. If there is no voltage to the operating coil, but there is high voltage at the contactor output, replace the mercury contactor.
Intermittent heating	Thermal overload of main fan motor	The main fan motor is equipped with internal thermal protection and will cease to operate if overheating occurs. As the motor overheats and then cools, the heat circuit will cycle on and off intermittently. Improper ventilation or a lack of preventive maintenance may cause this condition. Also, most of the problems listed

		under "Oven will not heat" can cause intermittent failure.
Conveyor will not run	Power supply	Check incoming power supply, If no voltage is present, check circuit breakers.
	Fan switch	With power off, Check continuity between switch terminals. Replace as needed.
	Speed adjustment potentiometer	This is a 0 to 10K ohm, 1 turn potentiometer. With power off, remove the black and white pot. leads from the motor control board at terminals P1 and P2. Place the meter leads on the black and white pot. leads. Rotating the pot. slowly, from low to high, the meter reading should show an even transition from 0 to 10K ohms \pm 5%. There should be no dead or open spots throughout the rotation of the potentiometer. Check both pot. leads to ground. There should be no continuity to ground. If any of the above checks fail, replace the potentiometer.
	DC motor control board	Check for supply voltage input to the control board at terminals L1 and L2. If voltage is not present, check wiring back to the oven fan switch. If supply voltage is present, check both fuses on control board (8A line and 1A armature). Check the DC voltage output at terminals A+ and A-. If there is power in to the control board but no power at A+ and A-, check the following:
	Hall effect sensor	Disconnect the Hall effect sensor from the DC motor control board. If the motor begins to run, replace the Hall effect sensor.
	DC motor control board	If, after disconnecting the Hall effect sensor, the motor is still not running, check for DC voltage from terminals A+ and A-. If there is no DC voltage, replace the DC motor control board.
	Circuit breaker	If there is DC voltage output from the DC motor control board, but the motor is still not running, check the 0.4 Amp circuit breaker. Disconnect wires from the circuit breaker and check for continuity through the circuit breaker. Reset circuit breaker or replace as needed.
	Conveyor gearmotor	Check the leads to the motor for evidence of any shorts or opens, and each lead to ground. If the motor fails the above tests, replace motor. Rotate motor shaft to determine if there is a locked rotor or a locked gearbox (use care so that magnet and sensor are not damaged). Check motor brushes for damage or excessive wear. Replace brushes if needed. Replace motor if needed. Also check to be sure that the conveyor drive coupling is tight and properly engaged to the conveyor shaft.
	Conveyor	Check for any mechanical misalignment. Also, check for worn bearings. A conveyor belt that is too tight may cause excessive bearing wear and sometimes, irregular speed.
Conveyor speed unsteady	Power supply	Check power supply at the DC motor control board for supply voltage at terminals L1 and L2. Supply voltage should be steady.

	Speed adjustment potentiometer	This is a 0 to 10K ohm, 1 turn potentiometer. With power off, remove the black and white pot. leads from the motor control board at terminals P1 and P2. Place the meter leads on the black and white pot. leads. Rotating the pot. slowly, from low to high, the meter reading should show an even transition from 0 to 10K ohms \pm 5%. There should be no dead or open spots throughout the rotation of the potentiometer. Check both pot. leads to ground. There should be no continuity to ground. If any of the above checks fail, replace the potentiometer.
	Magnet	Check to insure that the magnet (cemented to shaft of conveyor drive motor) has not been damaged, or come loose from the motor shaft. Re-glue or replace as needed.
	Hall effect sensor	Check for any physical damage to hall effect sensor (mounted on conveyor drive motor). Check all wiring and connections for damage. Replace as needed.
	Hall effect sensor cable	Check continuity through the wires in the cable. Check all wiring and connections for visible damage. Replace as needed.
	DC motor control board	With motor running, measure DC voltage across the red wire and black wire in the hall effect cable (all wires must be connected during this test). Voltage reading should be approx. 12VDC and steady. If this reading is not achieved, replace DC motor control board.
	Hall effect sensor	With the motor running at maximum speed, measure the frequency across the white wire and the black wire in the hall effect cable (all wires must be connected during this test). Reading should be approx. 327 Hz. And steady. If there is no reading, replace hall effect sensor. If the reading is unsteady, calibrate the DC motor control board.
Temperature display inoperative	Display transformer	Measure the transformer primary for supply voltage input. If voltage is not present, trace wiring back to the oven fan switch. Measure the secondary output, which will normally be 12-15VAC. Voltage across terminals 1-3 should be 12-15VAC. Terminals 1-2 and 2-3 should be $\frac{1}{2}$ the voltage reading 1-3. If the above secondary readings are not achieved, replace transformer.
	Temperature display	If proper voltage is present at terminals 1,2 and 3 on temperature display, but the display is not lighted, recheck all connections for tightness. If temperature display is still not operating, replace the temperature display.
Temperature display inaccurate, or erratic	Thermocouple	Place the thermocouple of a pyrometer into the center of the top finger. The pyrometer will indicate oven temperature. Measure DC millivolts of thermocouple at the temperature display. See thermocouple chart in "Removal and Installation" section for proper readings. Replace thermocouple if proper readings are not achieved. If readings are correct on the thermocouple, recalibrate or replace

REMOVAL, INSTALLATION AND ADJUSTMENT

INTERNATIONAL IMPINGER II ADVANTAGE

CAUTION!

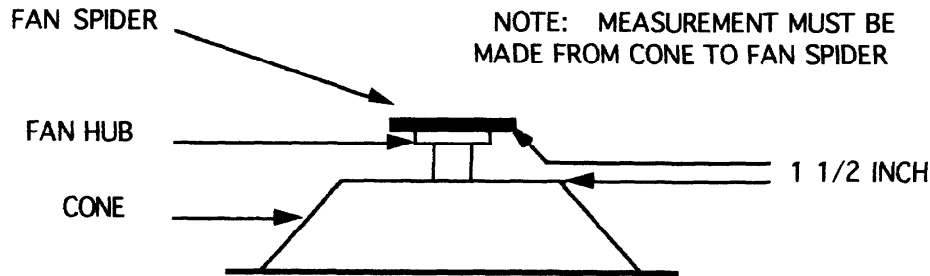
BEFORE REMOVING OR INSTALLING ANY COMPONENT IN THE IMPINGER OVEN, BE SURE TO DISCONNECT ELECTRICAL POWER AND GAS SUPPLY.

MOTOR, MAIN FAN - REPLACEMENT

- A. Shut off power at main breaker.
- B. Remove motor cover from back of oven.
- C. Remove wires for motor and mark for reassembly.
- D. Remove bolts from the oven back and slide oven back assembly straight out of the oven.
- E. Loosen bolt from fan hub and remove fan from motor shaft.
NOTE: Measure distance from fan blade to rear wall assembly before removal to aid in reassembly.
- F. Remove the bolts from the motor mount and remove motor clamp. Slide the motor assembly out of the oven back.
- G. Remove motor by removing the four mounting nuts and washers.
- H. Reassemble in reverse order. When motor mount assembly is set on the oven back, align motor shaft in the center of the hole. Set fan assembly on the motor shaft.
NOTE: It is recommended that anti-seize compound be applied to the bolts before assembly.

MAIN FAN - REPLACEMENT

- A. Shut off power at main breaker.
- B. Remove back assembly. (see "MOTOR, MAIN FAN")
- C. Reinstall and locate fan so that the bottom of the fan spider is 1 ½ inches from the top of the oven back cone. (see drawing)



CAPACITOR, MOTOR - REPLACEMENT

- A. Shut off power at main breaker.
- B. Remove control box cover and front panel.
- C. Discharge capacitor.
- D. Remove capacitor and reassemble in reverse order.

ON/OFF SWITCH – REPLACEMENT

- A. Shut off power at main breaker.
- B. Remove control box cover.
- C. Remove front panel.
- D. Depress spring clips on sides of switch and push switch out.
- E. Remove wires from switch, note wire numbers and location.
- F. Reassemble in reverse order and check system operation.
NOTE: make sure that switch housing is fully seated in opening in control box.

FUSE HOLDER – REPLACEMENT

- A. Shut off power at main breaker.
- B. Remove control panel top and front cover.
- C. Remove wires from fuse holder and mark for reassembly.
- D. Remove mounting screws or mounting nut from fuse holder and remove fuse holder.
- E. Reassemble in reverse order and check system operation.

THERMOSTAT, CONTROL BOX HI-LIMIT – REPLACEMENT

- A. Shut off power at main breaker.
 - B. Remove control panel top and front cover.
 - C. Remove wires from thermostat and mark for reassembly.
 - D. Remove mounting screws and remove thermostat.
 - E. Reassemble in reverse order and check system operation.
- NOTE: Push reset button on new thermostat.

COOLING FAN, CONTROL BOX – REPLACEMENT

- A. Shut off power at main breaker.
- B. Remove control panel top and front cover.
- C. Remove four screws from fan frame.
- D. Disconnect cord and plug from fan and remove fan.
- E. Reassemble in reverse order and check system operation.

THERMOSTAT, COOLING FAN – REPLACEMENT

- A. Shut off power at main breaker.
- B. Remove control panel top and front cover.
- C. Remove wires and mark for reassembly.
- D. Remove mounting screws and remove thermostat.
- E. Reassemble in reverse order and check system operation.

BURNER BLOWER MOTOR – REPLACEMENT

- A. Shut off power at main breaker.
 - B. Remove control panel top and front cover.
 - C. Unplug motor connector.
 - D. Remove three mounting screws at burner housing and remove motor.
 - E. Remove air shutter assembly from old motor and install on new motor.
 - F. Reassemble in reverse order and check system operation.
- NOTE: Set air shutter at approximately ½ open and adjust to get a good blue flame in high flame operation.

THERMOSTAT, OVEN CAVITY HI-LIMIT – REPLACEMENT

- A. Shut off power at main breaker.
 - B. Remove control panel top and front cover.
 - C. Remove conveyor and bottom finger assembly.
 - D. Remove capillary tube from mounting bracket in oven chamber and pull through tube into control box.
 - E. Remove wires from thermostat and mark for reassembly.
 - F. Remove mounting nut and remove thermostat.
 - G. Reassemble in reverse order and check system operation. Make sure capillary tube is mounted in the mounting bracket.
- NOTE: Push reset button on new thermostat.

THERMOCOUPLE – REPLACEMENT

- A. Shut off power at main breaker.
- B. Remove control panel top and front cover.
- C. Remove conveyor and bottom finger assembly.
- D. Remove thermocouple from mounting bracket in oven chamber, pull through tube into control box.
- E. Remove two thermocouple wires from temperature control and mark for reassembly.
- F. Reassemble in reverse order and check system operation.

THERMOCOUPLE MEASUREMENT CHART

INFORMATION:

When two wires composed of dissimilar metals are joined together and one of the ends is heated, a continuous current flow is generated. We use an iron constant (type J) thermocouple. The iron wire increases the number of dissimilar junctions.

It is possible to check a thermocouple with a properly calibrated D. C. millivolt meter. At 32°F, the millivolt reading should be 0.00. Inserting the thermocouple into an ice bath can check this.

The millivolt reading at 72°F should be 1.134.

When using the following chart, the temperature at the terminal connections must be noted. This temperature is called the junction temperature.

The following chart lists the thermocouple millivolt readings from 200°F to 600°F.

Thermocouple Measurement Chart:

Explanation: The junction temperature is the ambient air temperature where the thermocouple fastens to the electronic temperature control board.

		O	V	E	N	T	E	M	P			
		200°F	250°F	300°F	325°F	350°F	400°F	425°F	450°F	500°F	550°F	600°F
J U N C T I O N	90°F	3.26	4.77	6.30	7.06	7.83	9.37	10.14	10.91	12.46	14.00	15.53
	88°F	3.32	4.83	6.36	7.12	7.89	9.43	10.20	10.97	12.51	14.05	15.59
	86°F	3.37	4.88	6.41	7.17	7.94	9.49	10.26	11.03	12.57	14.11	15.65
	84°F	3.43	4.94	6.47	7.23	8.00	9.54	10.31	11.09	12.63	14.19	15.71
	82°F	3.49	5.00	6.53	7.29	8.06	9.60	10.37	11.14	12.69	14.23	15.76
	80°F	3.55	5.06	6.59	7.35	8.12	9.66	10.43	11.20	12.74	14.28	15.82
	78°F	3.60	5.11	6.64	7.40	8.17	9.72	10.49	11.26	12.80	14.34	15.86
	76°F	3.66	5.17	6.70	7.46	8.23	9.77	10.55	11.32	12.86	14.40	15.94
	75°F	3.69	5.20	6.73	7.49	8.26	9.80	10.57	11.35	12.89	14.43	15.97
	74°F	3.72	5.23	6.76	7.52	8.29	9.83	10.60	11.37	12.92	14.46	15.99
T E M P	72°F	3.78	5.29	6.82	7.58	8.35	9.89	10.66	11.43	12.97	14.51	16.05
	70°F	3.83	5.34	6.87	7.63	8.40	9.95	10.72	11.49	13.03	14.57	16.11
	68°F	3.89	5.40	6.93	7.69	8.46	10.00	10.78	11.55	13.09	14.63	16.17
	66°F	3.95	5.46	6.99	7.75	8.52	10.06	10.83	11.61	13.15	14.69	16.23
	64°F	4.01	5.52	7.05	7.81	8.58	10.12	10.89	11.66	13.20	14.74	16.28
	62°F	4.06	5.57	7.10	7.86	8.63	10.18	10.95	11.72	13.26	14.80	16.34
60°F	4.12	5.63	7.16	7.92	8.69	10.24	11.01	11.78	13.32	14.86	16.40	

ELECTRONIC TEMPERATURE CONTROL – REPLACEMENT

- . Shut off power at main breaker.
- . Remove control panel top and front cover.
- . Disconnect all wiring and mark for reassembly.
- . Depress nylon clips and remove electronic temperature control from mounting bracket.
- . Reassemble in reverse order and check system operation.

ELECTRONIC TEMPERATURE CONTROL – CALIBRATION

- . Place the thermocouple of your test meter through a finger hole in the top center of the oven.
- . With temperature dial fully counter clockwise, align red line on dial over the “CAL” mark on temperature scale and tighten dial knob.
- . Turn temperature dial fully clockwise, adjust pot on temperature control to achieve 575° F on temperature meter. (There are two adjustment pots on control, adjust pot that is closest to the edge of the board.)
- . Set dial to 500° F. Adjust dial to match actual temperature.
- . Seal adjustment pot with glyptol or nail polish.

TEMPERATURE CONTROL POTENTIOMETER – REPLACEMENT

- . Shut off power at main breaker.
- . Remove control panel top and front cover.
- . Loosen two allen screws and remove knob by sliding off shaft.
- . Remove mounting nut from potentiometer shaft and remove potentiometer.
- . Disconnect potentiometer wires from temperature control and mark for reassembly.
- . Reassemble in reverse order and check system operation.

HEAT LIGHT – REPLACEMENT

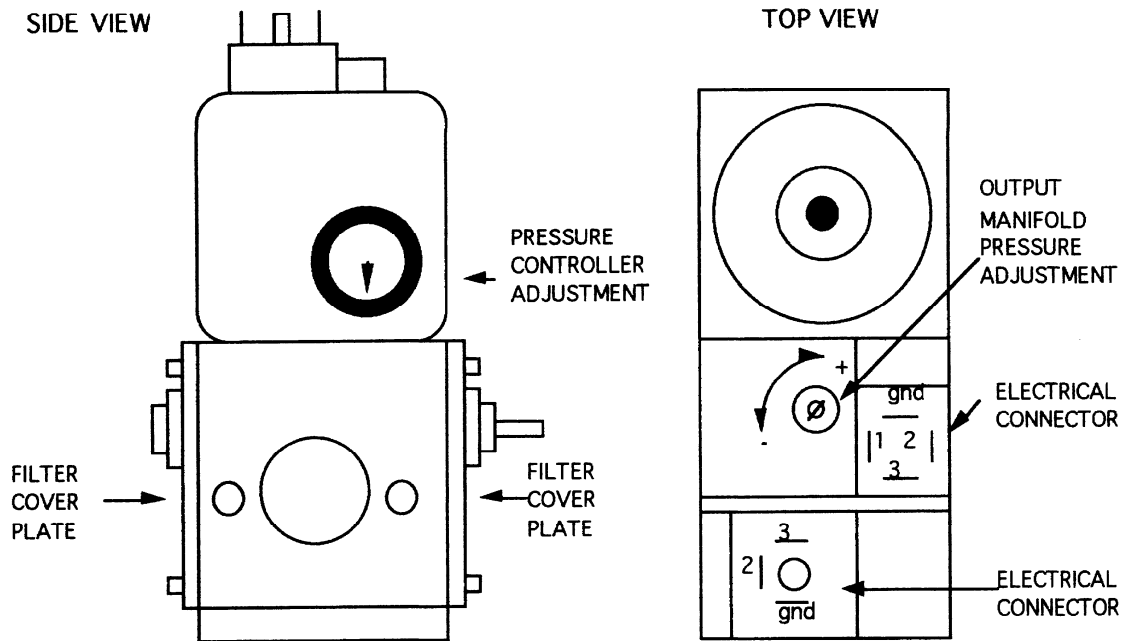
- . Shut off power at main breaker.
- . Remove control panel top and front cover.
- . Remove two wires from light and mark for reassembly.
- . Grasp body of light and slide sideways to remove light.
- . Reassemble in reverse order and check system operation.

IGNITION CONTROL – REPLACEMENT

- . Shut off power at main breaker.
- . Remove control panel top and front cover.
- . Remove front portion of control from base by releasing tabs on sides of control and pulling control from base.
- . Remove wires from terminal strip on control base and mark for reassembly.
- . Remove two mounting screws and remove control base.
- . Reassemble in reverse order and check system operation.

GAS VALVE – REPLACEMENT AND ADJUSTMENT

- . Shut off power at main breaker and disconnect gas supply.
- . Disconnect gas piping from back of unit.
- . Remove four screws from the incoming piping nipple mounting bracket. Remove incoming piping nipple.
- . Remove all wires from gas valve and mark for reassembly.
- . Disconnect pilot tube from gas piping. Disconnect pipe union and remove gas valve.
- . Remove piping from gas valve.
- . Reassemble in reverse order and check system operation. Check all gas line fittings for leaks.
- . Check for proper adjustment of gas pressure switch. Switch should be set as follows: 10 on dial for Nat. gas, 27 for LP or 4.5 for town gas. Adjust as needed.
- . Check and adjust manifold pressure. Remove pressure tap at burner manifold and install manometer. Adjust gas pressure as follows: 3.5” WC for Nat. gas, 10” WC for LP or 2.0” WC for town gas.
- . If needed, check gas filter by removing cover plate on side of gas valve and sliding filter out of valve. Reassemble in reverse order and check system operation. Check for gas leaks.



BYPASS ORIFICE – REPLACEMENT

- . Shut off power at main breaker.
- . Shut off gas supply to oven.
- . Remove control panel top and front cover.
- . Remove pilot tube from bypass orifice and remove orifice.
- . Reassemble in reverse order and check system operation.
- . Check gas line fittings for leaks.

TEMPERATURE REGULATION VALVE – REPLACEMENT

- . Shut off power at main breaker.
- . Shut off gas supply to oven.
- . Remove control panel top and front cover.
- . Remove bypass tube from burner.
- . Disconnect wires from temperature regulation valve and mark for reassembly.
- . Remove four nuts from burner manifold and disconnect pipe union.
- . Remove temperature regulation valve and piping from oven.
- . Remove piping from valve and reassemble in reverse order and check system operation. Check all gas line fittings for leaks.

IGNITER/SENSOR ASSEMBLY – REPLACEMENT

- . Shut off power at main breaker.
- . Shut off gas supply to oven.
- . Remove control panel top and front cover.
- . Remove gas valve assembly. (see "GAS VALVE")
- . Remove temperature regulation valve. (see "TEMPERATURE REGULATION VALVE")
- . Disconnect all wires from burner and mark for reassembly.
- . Remove screws from burner tube and remove burner venturi.
- . Remove two mounting screws and remove igniter/sensor assembly from burner venturi.
- . Reassemble in reverse order and check system operation. Check all gas line fittings for leaks.

BURNER ALARM – REPLACEMENT

- . Shut off power at main breaker.
- . Remove control panel top and front cover.
- . Remove two wires from burner alarm and mark for reassembly.
- . Remove mounting ring from burner alarm and remove from control box.
- . Reassemble in reverse order and check system operation.

SPARK GENERATOR – REPLACEMENT

- . Shut off power at main breaker.
- . Remove control panel top and front panel.
- . Remove all wires from spark generator and mark for reassembly.
- . Remove two mounting screws and remove spark generator.
- . Reassemble in reverse order and check system operation.

MAIN BURNER ORIFICE – REPLACEMENT

- . Shut power at main breaker.
- . Shut off gas supply to oven.
- . Remove control panel top and front cover.
- . Remove burner manifold. (See “TEMPERATURE REGULATION VALVE”)
- . Remove main burner orifice from burner manifold.
- . Reassemble in reverse order and check system operation. Check all gas line fittings for leaks.

MERURY CONTACTOR – REPLACEMENT

- . Shut off power at main breaker.
- . Remove control panel top and front cover.
- . Disconnect all wires from mercury contactor and mark for reassembly.
- . Remove mounting screws and remove mercury contactor.
- . Reassemble in reverse order and check system operation.

AIR PRESSURE SWITCH – MAIN FAN - REPLACEMENT AND ADJUSTMENT

- . Shut off power at main breaker.
- . Remove control panel top and front cover.
- . Disconnect all wires and mark for reassembly.
- . Disconnect air switch tube from air pressure switch.
- . Remove mounting screws and remove air pressure switch.
- . Reassemble in reverse order and check system operation. Adjust air pressure switch as needed.
- . To adjust air pressure switch, turn adjusting screw fully counter clockwise. With heat on, turn adjusting screw clockwise until heat shuts off. Turn adjusting screw ¼ turn counter clockwise and unit should heat.

AIR PRESSURE SWITCH – BURNER MOTOR – REPLACEMENT AND CALIBRATION

- . Shut off power at main breaker.
- . Remove control panel top and front cover.
- . Disconnect all wires and mark for reassembly.
- . Remove air tube from air pressure switch and remove air pressure switch from hanger.
- . Reassemble in reverse order and check system operation. Adjust air pressure switch as needed.
- . To adjust air pressure switch, remove cover over terminals to access adjustment screw. To increase sensitivity, turn screw counter clockwise. Check for proper line voltage switching from N.C. to N.O. as the air pressure switch closes.

HEATING ELEMENT – REPLACEMENT

- . Shut off power at main breaker.
- . Remove back cover.
- . Disconnect motor wires and heating element wires and mark for reassembly.
- . Remove oven back from oven.

- . Remove fan shroud.
 - . Remove heating element(s) from oven back.
 - . Reassemble in reverse order and check system operation. Apply anti-seize compound to all mounting bolts on elements and back bolts.
- NOTE: Be sure all wiring connections are tight. Loose connections at on the elements may cause the terminals to burn off and damage the elements or wiring.

CONVEYOR CONTROL POTENTIOMETER – REPLACEMENT

- . Shut off power at main breaker.
- . Remove control panel top and front cover.
- . Loosen two allen screws and remove knob by sliding knob off of shaft.
- . Remove mounting nut from potentiometer shaft and remove potentiometer.
- . Disconnect potentiometer wires and mark for reassembly.
- . Reassemble in reverse order and check system operation.

CONVEYOR CONTROL BOARD – REPLACEMENT

- . Shut off power at main breaker.
 - . Remove control panel top and front cover.
 - . Disconnect wiring from conveyor control board and mark for reassembly.
 - . Remove conveyor control board from its mounting bracket.
 - . Reassemble in reverse order. Calibrate new conveyor control board and check system operation.
- NOTE: Be sure that jumper (on conveyor control) is set to the proper input voltage (120/240) position.

CONVEYOR CONTROL BOARD – CALIBRATION

- . Connect digital voltmeter to the hall effect sensor. Black meter lead connected to black hall effect sensor lead, red meter lead to white hall effect sensor lead.
- . Turn conveyor control knob fully counter clockwise. Loosen knob and align with calibration mark and tighten knob.
- . Set conveyor control knob to the 1-minute setting. Adjust “MAX” pot on conveyor control to 327.5Hz.
- . Set conveyor control knob to the 30-minute setting. Adjust “MIN” pot on conveyor control to 10.9 Hz. Recheck at 1 minute and 30 minute settings until proper readings are achieved. Seal pots with glyptol or nail polish.

CIRCUIT BREAKER – REPLACEMENT

- . Shut off power at main breaker.
 - . Remove control panel top and front cover.
 - . Disconnect two wires from circuit breaker and mark for reassembly.
 - . Remove mounting nut from circuit breaker and remove circuit breaker.
 - . Reassemble in reverse order and check system operation.
- NOTE: Be sure to reset circuit breaker before operation.

CONVEYOR DRIVE MOTOR – REPLACEMENT

- . Shut off power at main breaker.
- . Remove control panel top and front cover.
- . Remove conveyor.
- . Disconnect wiring from motor and mark for reassembly.
- . Remove coupling from motor drive shaft.
- . Remove four mounting screws and remove conveyor motor and mounting bracket.
- . Remove mounting bracket from conveyor motor.
- . Reassemble in reverse order and check system operation.

REVERSING CONVEYOR DIRECTION

- . Shut off power at main breaker.
- . Remove control panel top and front cover.
- . Reverse wires fastened to terminals A+ and A- on conveyor control board. (See schematic diagram for wire numbers.)
- . Reassemble in reverse order and check system operation.

HALL EFFECT SENSOR – REPLACEMENT

- . Shut off power at main breaker.
- . Remove control panel top and front cover.
- . Remove conveyor motor assembly (see “CONVEYOR DRIVE MOTOR”).
- . Remove two mounting screws and remove sensor and bracket from conveyor motor.
- . Remove Hall effect sensor from mounting bracket.
- . Reassemble in reverse order and check system operation.

TEMPERATURE DISPLAY TRANSFORMER – REPLACEMENT

- . Shut off power at main breaker.
- . Remove control panel top and front cover.
- . Remove all wires from transformer and mark for reassembly.
- . Remove two mounting screws and remove transformer.
- . Reassemble in reverse order and check system operation.

TEMPERATURE DISPLAY – REPLACEMENT

- . Shut off power at main breaker.
- . Remove control panel top and front cover.
- . Remove wires from temperature display and mark for reassembly.
- . Gently pry temperature display from mounting tabs to remove display. (This is a pressure fit.)
- . Reassemble in reverse order and check system operation.

TEMPERATURE DISPLAY – CALIBRATION

- . Place the thermocouple of your test meter through a finger hole in the top center of the oven. Pre- heat the oven to 500°F for 30 minutes.
- B. Set switch on back of temperature display to read desired temperature (°F or °C).
- C. Adjust “temp adj.” on back of temperature display until display matches actual oven temperature.

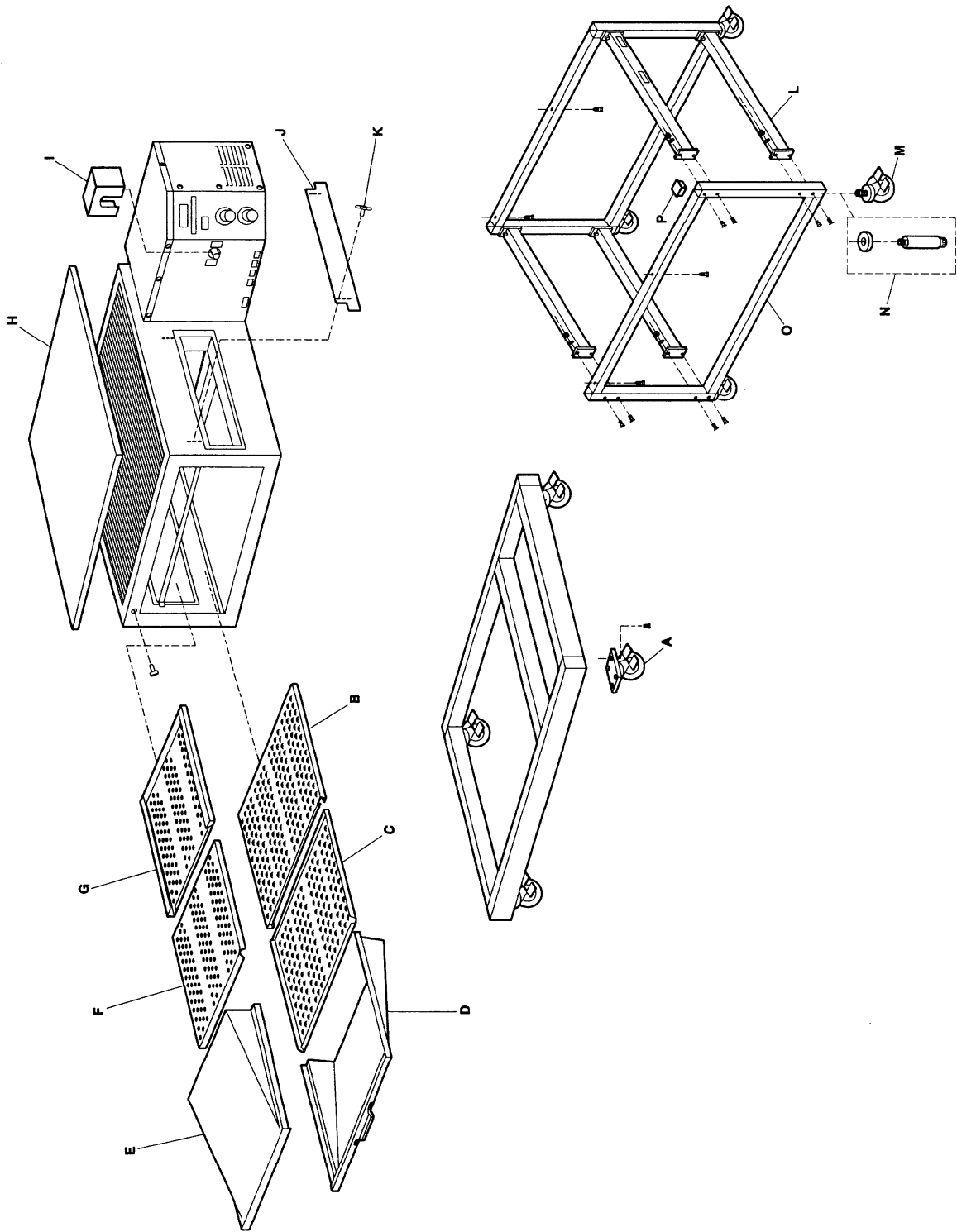
BEARING, CONVEYOR – REPLACEMENT

- A. Remove conveyor from oven and place on a flat work surface.
- B. Remove connecting links from conveyor belt and remove belt from conveyor frame.
- C. Move drive shaft or idler shaft toward end of conveyor, and bearing will now slip out of holding bracket.
- D. Remove bearing from shaft.
- E. Reassemble in reverse order and check system operation.

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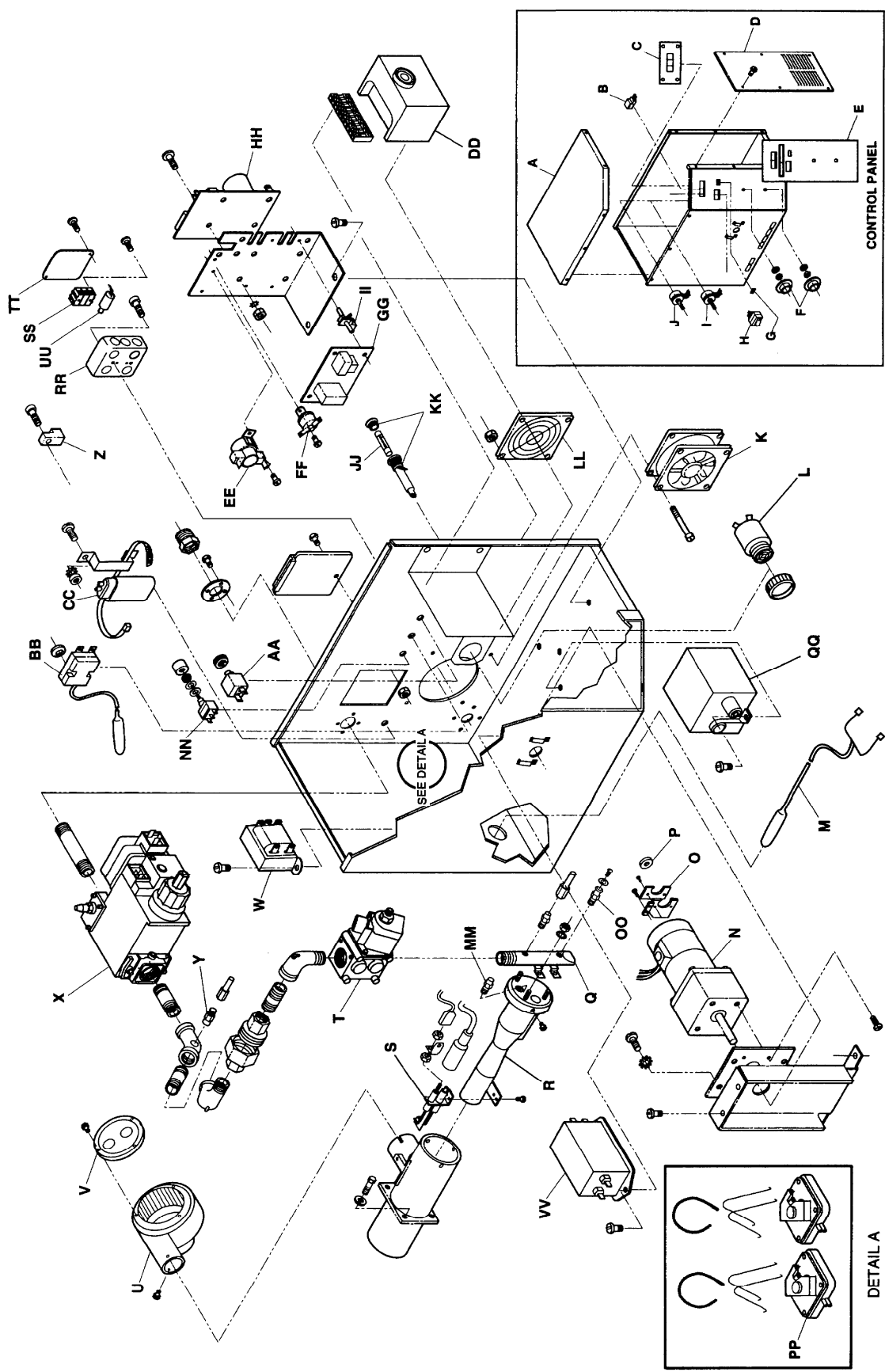
GENERAL VIEW
IMPINGER II ADVANTAGE

LETTER	PART NUMBER	DESCRIPTION
A	369390	Caster, 4" with mounting plate
B	369502	Bottom finger cover
C		Columnating plate, see Installation Operations manual
D	370010	Bottom finger housing
E	369504	Top finger housing
F		Columnating plate, see Installation Operations manual
G	369503	Top finger cover
H	369511	Oven top
I	369659	Conveyor hole cover
J	371066	Baffle
K	369211	Thumb screw
L	370118	Cross support
M	369231	Caster, 4" with threaded stem
N	369232	Adjustable leg
O	369919	Stand side
P	370066	Plug



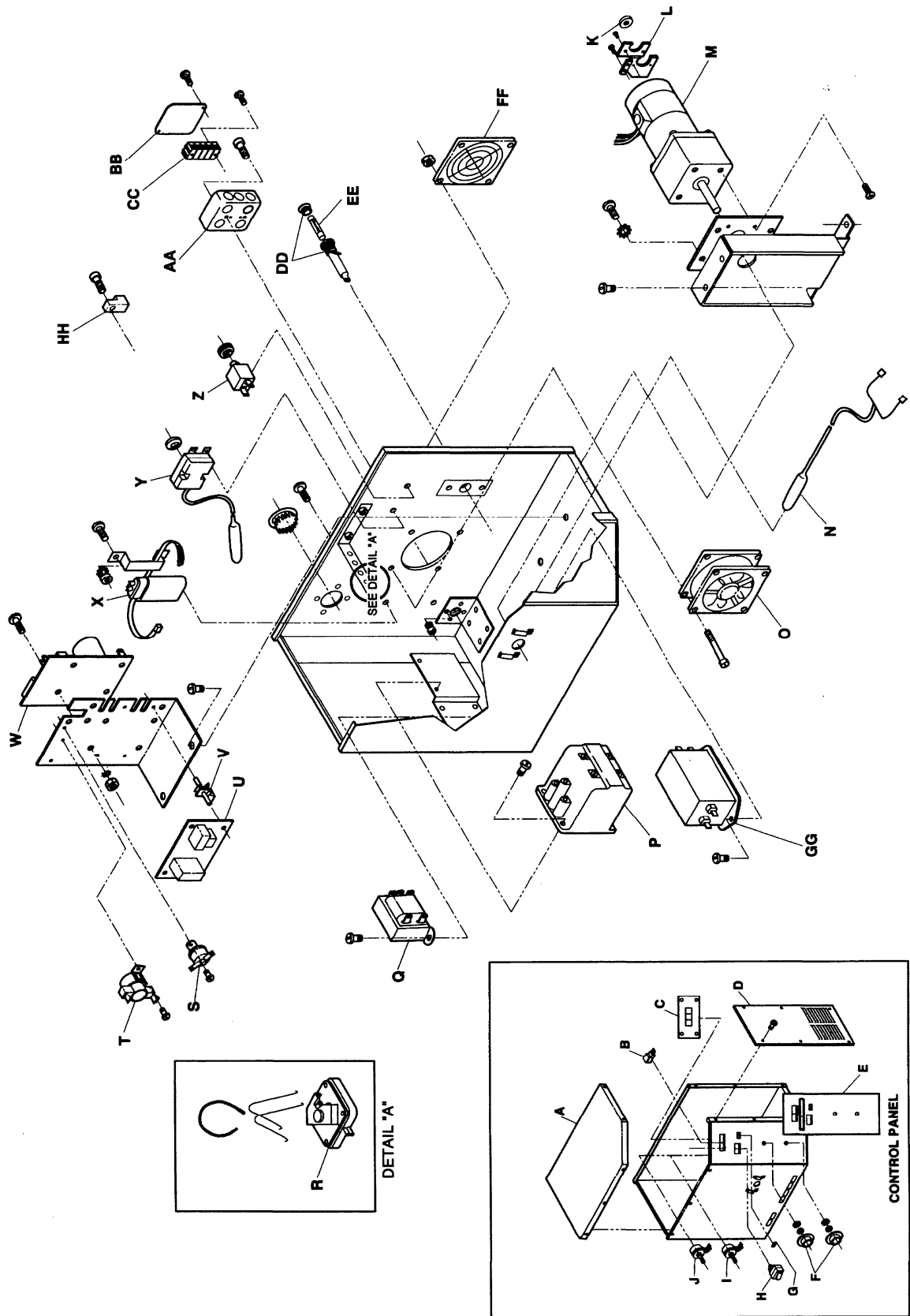
CONTROL BOX VIEW
IMPINGER II ADVANTAGE
MODELS 1154-000-EA, 1155-000-EA

LETTER	PART NUMBER	DESCRIPTION
A	370108	Control box top
B	369467	Pilot light
C	370073	Temperature display
D	370107	Side panel
E	370214	Operation label
F	369316	Knob
G	350224	Lens, yellow
H	369432	On/off switch
I	369809	Conveyor potentiometer
J	369449	Temperature potentiometer
K	369378	Cooling fan
L	369579	Solid state alarm
M	369131	Thermocouple
N	370061	Conveyor motor assembly, includes "O" and "P"
O	369823	Hall effect sensor
P	370065	Magnet, 16 pole
Q	369901	Manifold, burner
R	369654	Venturi, natural gas
	369939	Venturi, LP gas
S	369590	Igniter/sensor assembly
T	370186	Temperature regulation valve
U	369589	Burner blower motor
V	369401	Air shutter assembly
W	369173	Transformer, temperature display
X	369580	Gas valve
Y	370031	Bypass orifice, natural gas
	369557	Bypass orifice, LP gas
Z	353082	Ground lug
AA	370064	Circuit breaker, 0.4 A
BB	357067	Thermostat, oven cavity hi-limit
CC	369192	Capacitor
DD	369573	Ignition control
EE	369507	Thermostat, cooling fan
FF	369431	Thermostat, control box hi-limit
GG	369465	Electronic temperature control
HH	370177	Conveyor control
II	369856	Stand-off, support
JJ	369014	Fuse, 10A
KK	357107	Fuse holder
LL	369331	Finger guard
MM	369566	Main burner orifice, natural gas
	369524	Main burner orifice, LP gas
NN	369771	Reset switch, ignition control
OO	369689	Plug, pressure test
PP	369575	Air pressure switch, Dungs
	369025	Air pressure switch, Johnson
QQ	369574	Spark generator
RR	370178	Junction box
SS	369376	Terminal block, 3 pole
TT	369698	Cover
UU	370176	Filter, E.M.I.
VV	370184	Filter, R.F.I.



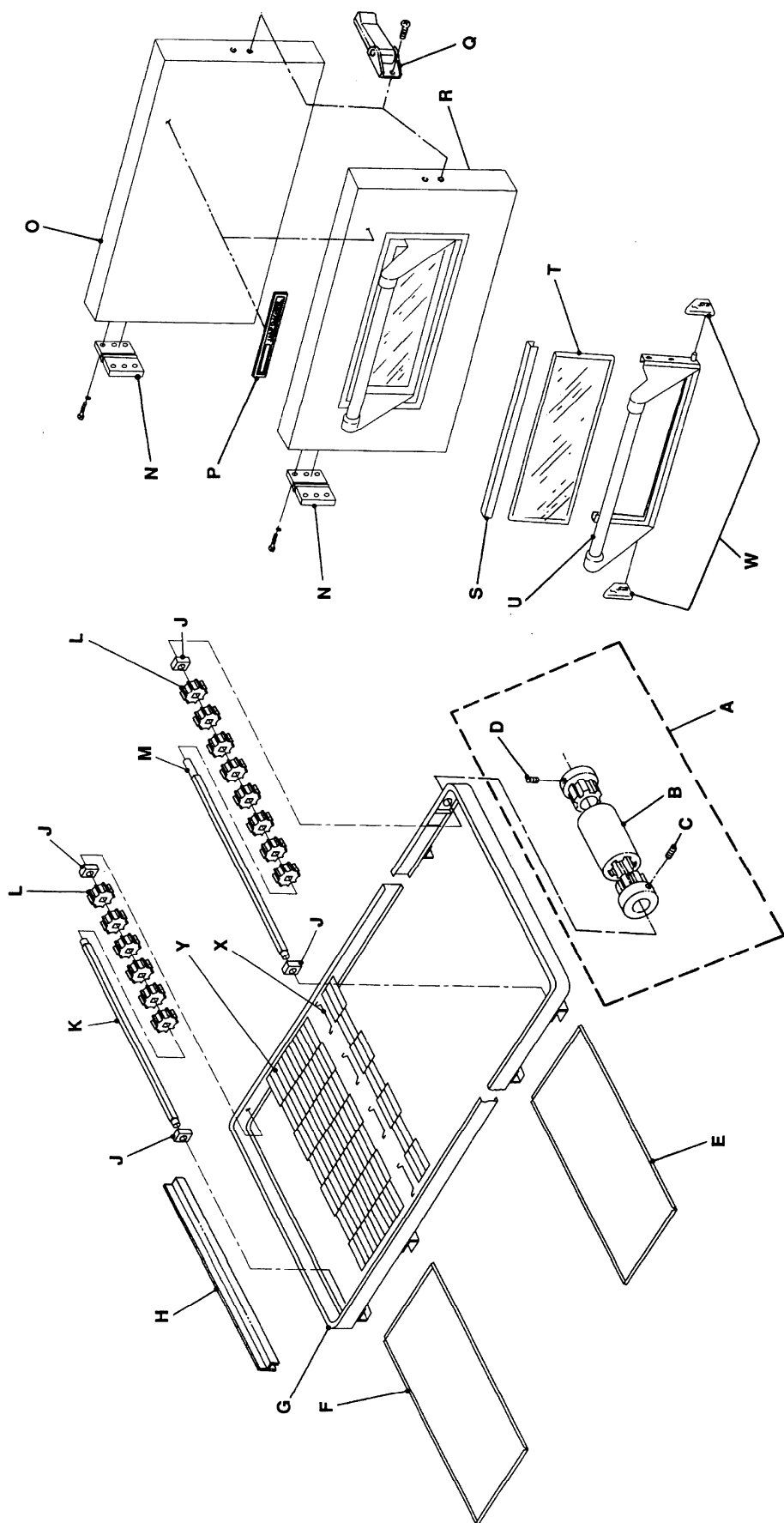
CONTROL BOX VIEW
IMPINGER II ADVANTAGE
MODEL 1164-000-EA

LETTER	PART NUMBER	DESCRIPTION
A	370108	Control box top
B	369467	Pilot light
C	370073	Temperature display
D	370107	Side panel
E	370214	Operations label
F	369316	Knob
G	350224	Lens, yellow
H	369432	On/off switch
I	369809	Conveyor potentiometer
J	369449	Temperature potentiometer
K	370065	Magnet, 16 pole
L	369823	Hall effect sensor
M	370061	Conveyor motor assembly, includes "K" and "L"
N	369131	Thermocouple
O	369378	Cooling fan
P	369479	Mercury contactor, 3 pole
Q	370173	Transformer, temperature display
R	369575	Air pressure switch
S	369431	Thermostat, control box hi-limit
T	369507	Thermostat, cooling fan
U	369465	Electronic temperature control
V	369856	Stand-off, support
W	370177	Conveyor control
X	369192	Capacitor
Y	369368	Thermostat, oven cavity hi-limit
Z	370064	Circuit breaker
AA	369698	Electric box
BB	370178	Electric box cover
CC	370177	Terminal block
DD	357107	Fuse holder
EE	369014	Fuse, 10A
FF	369331	Finger guard
GG	370176	Filter, E.M.I.
HH	353082	Ground lug



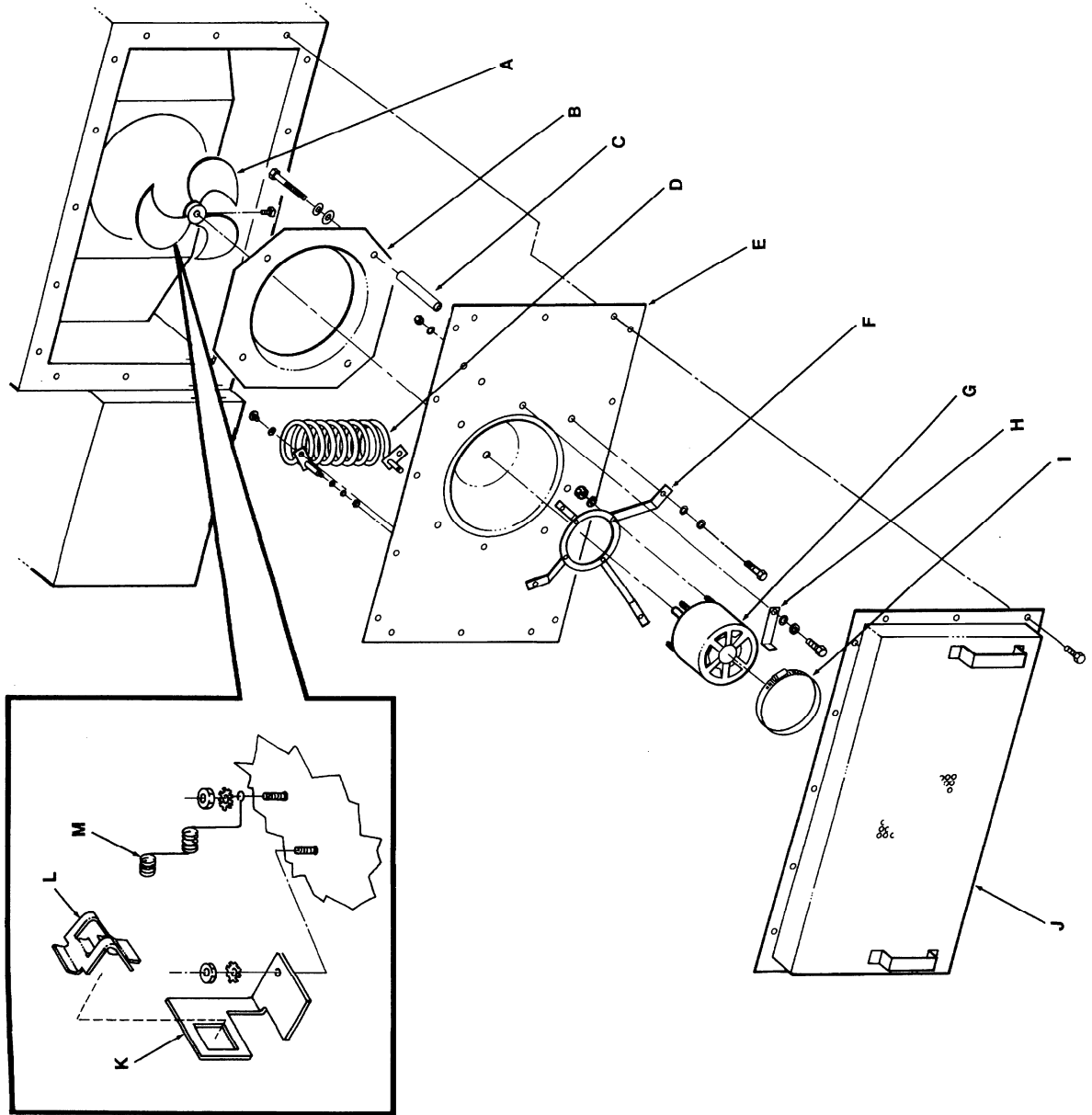
CONVEYOR/DOOR VIEW
IMPINGER II ADVANTAGE

LETTER	PART NUMBER	DESCRIPTION
A	369611	Coupler
B	369664	Coupling center
C	369269	Ball plunger
D	370116	Set screw
E	369223	Crumb pan, right
F	369224	Crumb pan, left
G	369666	Conveyor frame assembly
H	369226	Pan stop
J	369516	Conveyor bearing
K	369514	Idler shaft
L	369515	Sprocket
	369978	Set screw
M	369238	Drive shaft
N	369513	Hinge
O	369510	Door assembly, includes "N", "P" and "Q"
P	370016	Impinger nameplate
Q	369501	Door latch & catch
R	1123D	Door with window, includes "N", "P" and "Q"
S	369927	Window frame top
T	369925	Glass, access window
U	369926	Window frame bottom
W	369929	Retainer, window
X	369165	Splice clip, conveyor belt
Y	369194	Conveyor belt, complete
	369394	Conveyor belt, 1ft. section



**OVEN BACK VIEW
IMPINGER II ADVANTAGE**

LETTER	PART NUMBER	DESCRIPTION
A	369182	Fan
B	369899	Fan shroud
C	369655	Stand-off
D	370164	Heating element, 230 volt
E	369549	Rear wall
F	369581	Motor mount
G	369196	Motor, 240 volt, 50Hz.
H	369695	Bracket, motor
I	369033	Clamp, motor
J	369681	Cover, back
K	369979	Bracket, hi-limit thermostat
L	369227	Spring
M	369541	Thermocouple bracket



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