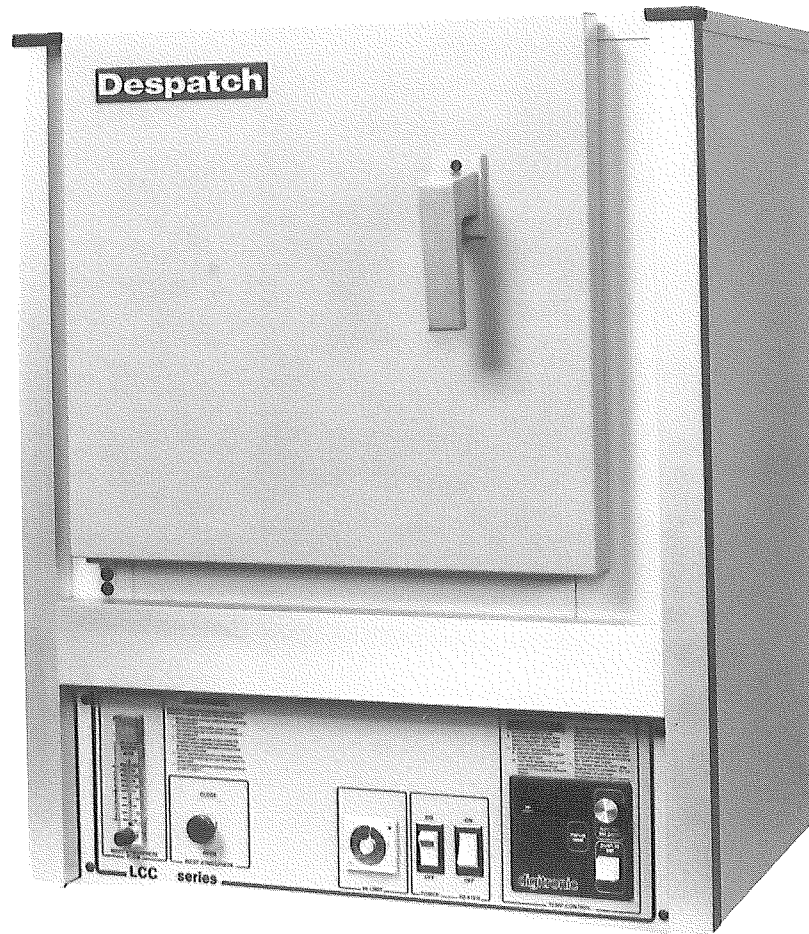


## Instruction Manual for LCC Series



Despatch LCC Series oven is a class 100 clean room bench oven with maximum operating temperature of 260°C (500°F) and with forced convected airflow. LCC Series also has a nitrogen atmosphere version.

<u>Model</u>	<u>Volts</u>	<u>Phase</u>	<u>HZ*</u>	<u>Heater Watts</u>	<u>Total</u>
LCC-11	240	1	50/60	3,000	14.4
LCC-11N	240	1	50/60	3,000	14.4
LCC1-54	240	1	50/60	6,000	27.3
LCC1-54N	240	1	50/60	6,000	27.3
LCC1-87	240	1	50/60	9,000	42.3
LCC1-87N	240	1	50/60	9,000	42.3

\* For 50Hz operation a kit is available.



## Notice

Users of this equipment must comply with operating procedures and training of operation personnel as required by the Occupational Safety and Health Act (OSHA) of 1970, Section 6 and relevant safety standards, as well as other safety rules and regulations of state and local governments. Refer to the relevant safety standards in OSHA and National Fire Protection Association (NFPA), section 86A of 1977, article 100, chapter number 1 section 6 and appendix F and any amendments.

## Warning Signs

If it appears that any warning, danger, caution or information label or sign has been damaged or lost, contact Despatch Industries for replacements. Call or write:

Customer Service  
Despatch Industries  
P.O. Box 1320  
Minneapolis, MN 55440  
Call Toll Free 800-328-5476  
(in Minnesota) 800-462-5396



# PREFACE

This manual is your guide to the Despatch LCC Series Ovens. It is organized to give you the information you need quickly and easily.

The INTRODUCTION section provides an overview of the Despatch LCC Series Ovens.

The THEORY OF OPERATION section details the function and operation of assemblies and subassemblies on the Despatch LCC Series Ovens.

The INSTRUCTIONS section provides directions on unpacking, installing, operating and maintaining of the Despatch LCC Series Ovens.

The APPENDIX section contains a Troubleshooting Table, a list of Accessories and a Warranty.

An efficient way to learn about the oven would be to read the manual while working with the corresponding oven control system. This will give you practical hands-on experience with information in the manual and the oven.

While reading this manual, if a term or section of information is not fully understood, look up that item in the appropriate section. Then go back and reread that section again. Information skipped, not understood or misunderstood could result in operating the equipment in an unsafe manner. Unsafe operation can cause damage to the oven or personnel or reduce the efficiency of the equipment.

**NOTE:**  
Read the entire INTRODUCTION and THEORY OF OPERATION before installing the oven.

**WARNING:**  
Failure to heed warnings in this instruction manual and on the oven could result in death, personal injury or property damage.



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# INTRODUCTION

The INTRODUCTION section provides an overview of the Despatch LCC Series Ovens. The LCC offers HEPA filtration for processes where minimization of contamination is essential. Air or inert atmosphere models are available.

## Special Features

The removable HEPA (High Efficiency Particulate Air) filter is designed to provide a constant flow of 99.99%\* clean air to the product. Other special features include:

- Digital TEMP CONTROL and manual reset HI-LIMIT to protect the chamber workload as well as the oven itself.
- Stainless steel interior with all interior seams continuously welded on the insulation side to protect the work chamber from contamination and to permit chamber washing without damaging insulation.
- Silicone rubber door gaskets and interior chamber walls that can be removed for easy cleaning.
- Heater with a five year warranty.
- Cooling coil to provide rapid cooldown and low temperature operation. (Inert atmosphere models only).
- Scratch-resistant SilverClay® baked enamel exteriors and a stainless steel interior for easy cleaning.

\* Based on standard DOP test for 0.3 micron particles.

# Specifications

## Dimensions

Table 1 Dimensions

Model	Chamber Size in (cm)			Capacity feet <sup>3</sup> (liters)	Overall Size in (cm)			Maximum Number of Shelves
	W	D	H		W	D	H	
LCC 1-11	10 (25)	14 (35)	14 (35)	1.1 (31)	25 (64)	25 (64)	31 (79)	5
LCC 1-11N	10 (25)	14 (35)	14 (35)	1.1 (31)	26 (66)	25 (64)	31 (79)	5
LCC 1-54	18 (46)	20 (51)	26 (66)	5.4 (153)	34 (86)	28 (71)	43 (109)	11
LCC 1-54N	18 (46)	20 (51)	26 (66)	5.4 (153)	34 (153)	28 (71)	43 (109)	11
LCC 1-87	22 (56)	20 (51)	34 (86)	8.7 (248)	39 (99)	32 (81)	52 (132)	14
LCC 1-87N	22 (56)	20 (51)	34 (86)	8.7 (248)	39 (99)	32 (81)	52 (132)	14

# Capacities

Table 2 Capacities

Model		LCC 1-11	LCC 1-11N	LCC 1-54	LCC 1-54N	LCC 1-87	LCC 1-87N
Maximum Load	Lbs.	25	25	150	150	200	200
Maximum Shelf Load	Lbs.	10	10	25	25	25	25
Recirculating Fan	CFM	265	265	400	400	990	500
	H.P.	1/4	1/4	1/4	1/4	3/4	3/4
Approximate Net Weight	Lbs.	285	285	380	380	500	500
	KG	129	129	172	172	227	227
Shipping Weight (approximate)	Lbs.	400	400	615	615	675	675
	KG	181	181	279	279	306	306

## Power

Line voltages may vary in some geographical locations. If your line voltage is much lower than the oven voltage rating, warm-up time will be longer and motors may overload or run hot. If your line voltage is higher than name plate rating, the motor may run hot and draw excessive amps.

If the line voltage varies more than 10% from the oven voltage rating, some of the electrical components such as relays, temperature controls, etc. may operate erratically.

Table 3 Power Requirements

Model	Volts*	Amps	Hertz†	Heater Phase	KW	Cord and Plug
LCC 1-11	240	14.4	50/60	1	3	None, Hardwired
LCC 1-11N	240	14.4	50/60	1	3	None, Hardwired
LCC 1-54	240	27.3	50/60	1	6	None, Hardwired
LCC 1-54N	240	27.3	50/60	1	6	None, Hardwired
LCC 1-87	240	42.3	50/60	1	9	None, Hardwired
LCC 1-87N	240	42.3	50/60	1	9	None, Hardwired

\* Oven designed for 240 volts (see name plate on oven) will operate satisfactorily on a minimum of 208 volts, but with a 25% reduction in heater power. If your power characteristics are lower, contact Despatch Industries.

† For 50 Hz operation a kit is available.

# Temperature

Table 3 Temperature Specifications

Model	LCC 1-11	LCC 1-11N	LCC 1-54	LCC 1-54N	LCC 1-87	LCC 1-87N	
Time to Temperature (approximate minutes)	25°C - 100°C	4	4	4	4	5	5
	25°C - 200°C	13	13	14	13	11	11
	25°C - 260°C	20	20	23	21	16	16
Recovery Time Door Open 1 Min. (approximate minutes)	125°C	0.5	0.5	1	1	1	1
	200°C	1	1	2	2	2	2
	260°C	2.5	2.5	3	3	3	3
Temperature Uniformity at (maximum)	125°C	±1°C	±1°C	±2°C	±2°C	±1°C	±1°C
	200°C	±2°C	±2°C	±2°C	±2°C	±2°C	±2°C
	260°C	±3°C	±3°C	±3°C	±3°C	±3°C	±3°C
Maximum Operating Temperature	260°C	260°C	260°C	260°C	260°C	260°C	
Above ambient without water cooling (approximate)	48°C	53°C	34°C	85°C	54°C	78°C	
Above ambient with water cooling* (approximate)	9°C	9°C	18°C	18°C	18°C	20°C	
Cooling Time Empty Oven* (approximate minutes)	200°C-50°C	63	64	48	58	54	78
Control Stability		±0.3°C	±0.3°C	±0.3°C	±0.3°C	±0.3°C	±0.3°C
Repeatability		±0.5°C	±0.5°C	±0.5°C	±0.5°C	±0.5°C	±0.5°C

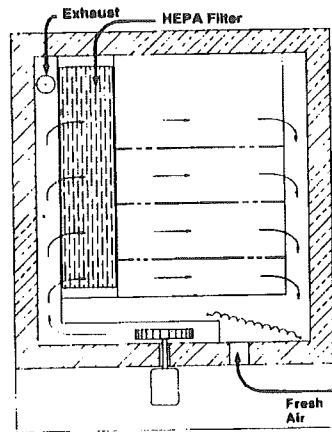
\* Assumes 55°F maximum, water temperature at 55 gph.

# THEORY OF OPERATION

The THEORY OF OPERATION section details the function and operation of the Despatch LCC Series Ovens.

The LCC series oven is a class 100 clean room oven with HEPA (High Efficiency Particulate Air) filtration. This oven is ideal for processes where minimization of contamination is essential.

Forced convected airflow, provides rapid uniform distribution of heat. An absolute HEPA (High Efficiency Particulate Air) filter is mounted in a stainless steel frame in the supply plenum. These filters are 99.99% effective in filtering 0.3 micron particles. Fresh air is damper controlled by a knob on the front panel (air models only).



*Figure 1 illustrates the precision horizontal airflow in the Despatch LCC ovens.*

## Construction

The LCC series oven has a type 304-2B stainless steel interior. All interior seams are continuously welded on the insulation side. This protects the work chamber from contaminated air and permits chamber washing without damaging the insulation. Silicone rubber door gaskets and interior chamber side walls can be easily removed for cleaning. Heater frame, fan wheel and motor shaft are constructed of stainless steel.

Exteriors are steel finished in Silver Clay™ enamel, baked to a 2H hardness for chip and scratch resistance. All controls are mounted on the front of the oven for easy operation and readability. Two stainless steel wire shelves are provided. The shelves are removable and adjustable on two inch centers.

## Cooling

Ovens have a stainless steel water coil. When used in conjunction with the optional flowmeter the cooling coil permits rapid cooldown and low temperature operation.

## Inert Atmosphere

An inert atmosphere option offers the advantages of both a clean room oven and inert atmosphere oven. The inert atmosphere option includes a purge and maintain flowmeter. A manual valve is provided to select the proper operating condition.

The nitrogen portion for the LCC1-54N model oven includes a manual three way valve and two flowmeters, connected by piping to the inlet connection on the lower back panel marked nitrogen supply.

The nitrogen portion for the LCC-11N and LCC1-87N model ovens include an adjustable valve and a flowmeter. These components are connected by piping to the inlet connection on the lower back panel marked nitrogen supply.

# HEPA Filters

Heater box HEPA (High Efficiency Particulate Air) filters are used to limit particulate in the work chamber to 0.2 microns or less. The gentle entrance and exit air velocity to and from the HEPA filter results in high efficiency and long life for the HEPA filters.

## Definitions

HEPA - High Efficiency Particulate Air

Burn-Off - A process for getting rid of the binder and DOP contained in the filter from the manufacturing and testing function.

DOP - Dioctyl Phthalate - Aerosol particles of submicron size used in the testing phase to spot defects or measure filter efficiency.

Binder - An organic substance that is used in the construction of the filter that gives some structural strength to the media.

## Packaging and Shipping

Packaging practice varies among the filter unit manufacturers. Normally units are packaged in cardboard cartons with various approaches for internal strengthening and impact-resistance of the container.

The shipping carton normally is marked with a vertical arrow and "This Side Up" to indicate positioning of the carton in the transporting vehicle. When a filter unit is shipped with pleats in the horizontal position, the vibration to which it is subjected in transportation and the jarring which usually accompanies handling occasionally cause the filter medium to break at the adhesive line.

A filter unit is placed in the carton so that the pleated folds are vertical (running from top to bottom - not side to side), a position essential to prevent damage in shipment. To prevent sagging of the pleats, it is important that vertical positioning of the pleats be maintained in handling and storage. Moreover, the filter unit should be installed for operation with the pleats in the vertical position. When installed in the horizontal position the pleats form shelves for collection of entrapped material, the accumulated weight of which causes sagging and leads to an early failure of the unit.

## Handling

Filter units should be kept in shipping cartons when moved from one location to another. When transferred for installing, the units should be unloaded at a point which, so far as practicable, will reduce physical handling. Filter units should remain in cartons until ready for installation.

If for any reason an unpackaged filter unit must be placed with its face on the floor or other surface, the surface must be cleared of every object or irregularity which might damage the filter pack.

## The Necessity of the Burn-off Process

The burn-off process will take place in any piece of equipment where a new HEPA filter is used at temperatures above 300°F/150°C. There will be smoke, a possible pungent odor, and a light residue on interior surfaces as a result of this temperature at the filter due to the burning of the binder and the DOP. Filter manufacturers say that 99% of the binder and DOP will leave after running at temperature of 260°C/500°F for 4-8 hours or over night. The actual length of the burn-off period is determined by the amount of purge air or nitrogen used during the burn-off to clear out the smoke and odor. Check exhaust for smoke and odor to determine when the process is finished.

## Why Doesn't Despatch Do It?

When the binder is burned out of the filter media, it becomes very fragile and we do not feel that the filter could survive the normal shipping and handling abuse. We do the final testing of our units with filter simulators to give us the same resistance as the actual air filter. The filter is normally shipped in the original carton or package that the filter manufacturer uses. This will give good storage and maximum protection from dirt and moisture.



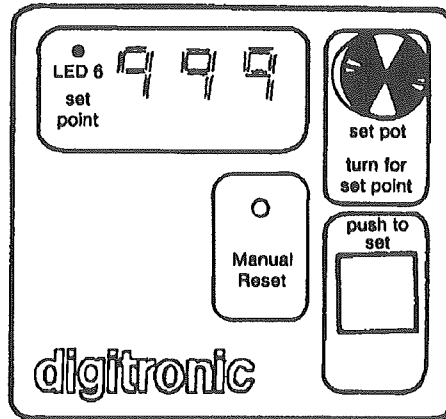
## Filter Unit Replacement

Replacement of the filter unit may be required because of resistance or for reasons other than resistance. Most of the factors for change-out of the unit are considered below.

- Resistance, or pressure drop, across the filter unit. Maximum level of resistance in inches (water gauge) will vary depending upon the operation of the filter and the available fan capacity. For example, a plutonium fabrication facility may change filter units when resistance builds up to 2½ to 3 inches, water gauge. Adequate fan capacity obviously must be available.
- Loss of efficiency (leakage), determined from air-sampling measurements made downstream of the filter unit.
- Visible damage or rupture of the filter medium in a unit.
- Change in process application.
- Excessive build-up of lint or combustible particulate matter on the filter unit from the operation.
- Water droplets in airstream through filter, free water (RH = 100%), will saturate filter very quickly and may cause burnout or holes in burned off filter media.
- High level of radiation in the vicinity of the filter unit.

# CONTROL Instrument

The exclusive Despatch Digitronic solid state temperature controller, with digital set point and chamber temperature readout, offers the best in precise control of oven temperature. The time proportioning control is advanced state-of-the-art in temperature control today. Digitronic is also computer or microprocessor compatible with the optional remote set point interface kit.



*Figure 2 illustrates the CONTROL instrument installed on the Despatch LCC Series Ovens.*

## Digital Display

Set point and actual chamber temperature, are displayed in large, 1/2 inch high numerals. Set point and chamber temperature multiplex every ten seconds automatically. The digits are visible in almost any ambient lighting.

Temperature is set by pressing a push-to-set pushbutton and turning a turn for setpoint knob until desired temperature is shown in readout area. When pushbutton is released, multiplexing function beings. Pushing set button does not disengage control function. Temperature set knob uses ten turns for high resolution setting.

Thermocouple input on the Digitronic eliminates capillary leakage risk for improved control accuracy. The thermocouple input is linearized, making the control extremely reliable. Thermocouple break protection assures that, if thermocouple break occurs, control will shut off heater.

The Digitronic is precisely calibrated at our factory, but should it ever need readjustment, it can be recalibrated against known standards.

## Proportioning Control

The Digitronic sends full power to the heater to get the chamber quickly up to temperature. The controller measures chamber temperature every second and turns the heater on or off for some portion of every second. As the actual temperature draws closer to set temperature, ON time is gradually reduced, thereby minimizing temperature overshoot. Digitronic works this way constantly, with virtually no temperature fluctuation during processing.

The solid state, zero crossover switching Digitronic controls triacs or SCRs (silicon controlled rectifier), making the Digitronic silent and reliable. A type J thermocouple (iron/constantan) is installed for quick response to temperature changes.

# HI-LIMIT Instrument

The purpose of the HI-LIMIT instrument is to protect the product and/or the oven from excessively high temperatures. If the setting on the HI-LIMIT is exceeded, the heating process will discontinue.

The HI-LIMIT instrument must be set to a temperature slightly higher than the CONTROL instrument setpoint or to a temperature that should not be exceeded in the process. The HI-LIMIT instrument must be manually reset by pushing the red button on the HI-LIMIT instrument.

## Product HI-LIMIT Instrument

If the product being processed has a critical high temperature limit, the HI-LIMIT instrument should be used as a product HI-LIMIT instrument. The HI-LIMIT instrument should be set to a temperature somewhat below the temperature at which the product could be damaged. Use the CONTROL instrument or a pyrometer to determine the product high-limit setting. If the destructive temperature of the product is already known, this could be used as a point below which the product high-limit is set.

## Oven HI-LIMIT Instrument

If the product does not have a critical high temperature limit, the HI-LIMIT can be used as an oven HI-LIMIT instrument. An oven HI-LIMIT instrument protects oven equipment.

Since the HI-LIMIT instrument does not show the temperature, it can be properly set only after oven is in operation. Until then, the HI-LIMIT should be set at maximum position so all preliminary testing and adjusting can be done.

Never operate the oven at a temperature in excess of the maximum operating temperature of 260°C (500°F).

# INSTRUCTIONS

The INSTRUCTIONS section provides directions on unpacking, installation, operation and maintenance of the Despatch LCC Series Ovens.

## Unpacking and Inspection

Remove all packing materials and thoroughly inspect the oven for damage of any kind that could have occurred during shipment.

- See whether the carton and plastic cover sheet inside carton are still in good condition.
- Look at all outside surfaces and corners of the oven for scratches and dents.
- Check the oven controls and indicators for normal movement, bent shafts, cracks, chips or missing parts such as knobs and lenses.
- Check the door and latch for smooth operation.

If there is damage, and it could have happened during shipment follow these instructions.

1. Contact the shipper immediately and file a written damage claim.
2. Contact Despatch Industries to report your findings and to order replacement parts for those that were damaged or missing.
3. Please send a copy of your filed damage claims to Despatch.
4. Check to make sure you have received all the required materials. Your shipment should include:
  - One (1) Despatch oven,
  - One (1) Filter,
  - One (1) Instruction manual,
  - One (1) Warranty card,
  - Two (2) Shelves
  - One (1) Package containing four rubber feet

If any of these items are missing from the packaged contents, contact Despatch Industries to have the appropriate materials forwarded to you. Any optional accessories ordered will be shipped separately.

5. Complete the warranty card and mail it to Despatch within 15 days after receipt of the equipment.

**NOTE:**

Despatch Industries cannot be responsible for either the process temperature used, or for the quality of the product being processed. It is the responsibility of the purchaser and the operator to see that the product undergoing processing in a Despatch Industries oven is adequately protected from damage.

# Set-up

**WARNING:**  
DO NOT use oven in wet, corrosive, or explosive atmosphere.

**WARNING:**  
DO NOT use with other than inert gases (nitrogen model only)

**CAUTION:**  
The design and piping of the drain system should preclude the possibility of operator injury from high temperature or pressure buildup. Piping must be able to withstand short periods of up to 450° F temperatures. Drain lines should be insulated or warning labels installed for the distance that a hazard exists.

**WARNING:**  
Never allow drain to be plugged as a hot oven will generate a small amount of steam when the water is first turned on. Steam burns.

1. Remove adhesive backing sheet from the rubber feet.
2. Attach rubber feet to the bottom corners of the oven.
3. Place oven on a bench top or an optional cabinet base. The oven must have a minimum of two (2) inches clearance in the rear to provide proper ventilation. The oven may be placed next to another cabinet, or next to another oven, with three-quarters (3/4) of an inch clearance (the doors are still open).
4. Make sure oven is level and plumb; this will assure proper heat distribution and operation of all mechanical components.
5. (Nitrogen models only) Connect the nitrogen supply line (from a tank) to the inlet marked nitrogen supply on the oven rear panel. The nitrogen supply to the oven must not exceed 80 PSI.
6. Install water connection for cooling coils.
  - a. Pipe the coil with a three-way water supply/drain valve on the inlet (bottom fitting) and a vacuum breaker valve at the high point of the drain line. This will keep water moving through the cooling coil, minimizing steam generation.
  - b. Mount the optional flowmeter cooling water flowmeter.

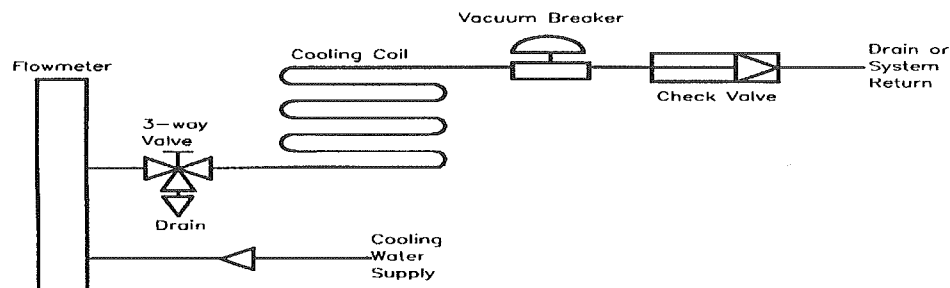


Figure 3 illustrates the recommended water connection on the Despatch LCC series ovens.

The brass needle valve on the face of the water flowmeter can be used for adjusting the water flow or shutting off the water flow.

1. Run tubing from flowmeter to water valve.
  2. Connect a clean water supply to the flowmeter marked inlet.
  3. Adjust the water flow. Cooldown times and steam generation are dependent on cooling water flow rate. Recommended flow rate is 50 gallons per hour.
- c. The pipe on the rear of the oven marked WATER DRAIN should be piped to a vacuum breaker and then to an open drain.

## Set-up (Cont.)

7. Identify correct power source indicated on the specification plate. Power requirements are also listed on the cover of this manual.
8. Hardwire oven directly to the electric supply. Refer to the electrical schematic in the back of this manual and the power requirements table (page 3).

**WARNING:**  
All grounding and safety equipment must be in compliance with applicable codes, ordinances and accepted safe practices.

## Oven HI-LIMIT Instrument

Before putting oven into production, adjust the oven HI-LIMIT instrument as follows:

1. Set CONTROL instrument at 14°C (25°F) above the desired operating temperature.
2. Push red button to reset the HI-LIMIT instrument and operate oven until the CONTROL instrument is regulating.
3. Carefully adjust HI-LIMIT instrument downward until it trips. (HEATER ON light goes off.)
4. Reset CONTROL instrument at the desired operating temperature. The two instruments are now set in their correct positions.

**WARNING:**  
Never operate oven at a temperature in excess of the maximum operating temperature which is 260°C (500°F).

It will be necessary to reset the HI-LIMIT instrument whenever it has tripped. The HI-LIMIT instrument may be reset by first allowing the oven chamber to cool slightly (or turning the HI-LIMIT instrument thermostat up several degrees) and pushing the red reset button.

## HEPA Filter Installation

**NOTE:**

Make sure that the filter installed in the exhaust housing is rated for high temperature.

Craftsmen responsible for installing the filter should use caution. The filter is delicate and must not be damaged during installation. Any filter unit dropped, whether or not in the carton, should be examined for damage. Equally important, the filter unit must be installed so that unfiltered air will not leak past the unit.

1. Remove the filter from the carton.
  - a. Place the carton on the floor. The floor must be clear of nuts, bolts, and similar protrusions which would damage the face of the unit. Do not drop or jar the carton.
  - b. Tilt the carton on one corner. Be sure to handle the carton at opposing corners.
  - c. Remove the sealing tape and fold the flaps of the carton back.
  - d. Gently upend the filter to place the exposed end of the filter on the floor. Do not jar the filter.
  - e. Pull the carton from the filter unit. Do not pull the filter from the carton.
2. Inspect the filter. Use a strong lamp to examine the exposed areas of both faces to assure that no breaks, cracks, or pinholes are evident. A flashlight, can be used in a darkened room.

- ✓ Look for visible defects with the light projected along the full length of each channel created by the separators. Translucent spots may not necessarily indicate holes or cracks but may simply be variations in thickness of the filter medium.
- ✓ Check that the adhesive seal around the filter unit faces are complete and unbroken.
- ✓ Check the corner joints of the frame for adhesive sealing and tightness.
- ✓ Check that the gaskets are cemented firmly to the filter frame and that the gasket pieces are butted or mated at the joints.

3. Remove one gasket from the filter and clean the edges of the filter frame at the points of clamp contact.
4. Remove the old HEPA filter.
  - a. Unscrew the four (4) brass nuts on the left side of the work chamber.
  - b. Remove the perforated duct exposing the filter.
  - c. Remove and discard the old HEPA filter.

**NOTE:**

Repairing the damaged filter unit, particularly the medium, should not be attempted by the user. Any unit so repaired must be retested by DOP penetrometer to assure that hidden damage does not exist which will reduce filtering efficiency. Repair and retest is uneconomical for most users.



## HEPA Filter Installation (Cont.)

5. Install the filter with the gaskets pressed against the upper plates. Be sure to install the filter with pleats and separators running from top to bottom.
6. Install and tighten the perforated duct. Be sure to compress the gasket evenly and equally at all points with the filter frame completely covering the opening.

## HEPA Filter Burn-off

Burn-off is a process for getting rid of the binder and DOP (dioctyl phthalate) contained in the filter from the manufacturing and testing function.

This burn-off process takes 4-8 hours depending on the amount of ventilation air that is drawn through the equipment.

1. Select a location where smoke and odor ventilated from the HEPA filter burn-off process will not interrupt and inconvenience regular work schedules. If burn-in takes place indoors, special attention must be given to an exhaust hook up that will capture most of the smoke and odor.
2. Press the POWER ON pushbutton.
3. Set the CONTROL INSTRUMENT to 500°F, the maximum equipment temperature rating.
4. Press the HEATER ON pushbutton.

There will be smoke, a possible pungent odor, and a light residue on interior surfaces of the oven as a result burning off the binder and the DOP. The completion of the burn-off period should be based on smoke-free exhaust and a minimal odor level.

### NOTE:

If it is necessary to move the equipment after the burn-off process, considerable care should be used. The binder which gives strength to new filters is now burned-off and the media is very fragile. Rough handling of either the filter alone or the equipment with the filter installed is not recommended as it may tear the media and lose its efficiency rating.

### NOTE:

After burn-in, the gaskets may have shrunk. Check the tightness of the bolts after burn-in.

# Operating

## WARNING:

Do not use oven in wet, corrosive or explosive atmospheres unless this oven is specifically designed for a special atmosphere.

## NOTE:

Despatch Industries cannot be responsible for either the process, the process temperature used, or for the quality of the product being processed. It is the responsibility of the purchaser and operator to see that the product undergoing processing in a Despatch oven is adequately protected from damage. Carefully following the instructions in this manual will assist the purchaser and operator in fulfilling that responsibility.

Users and operators of this oven must comply with operating procedures and training of operating personnel as required by the Occupational Safety and Health Act (OSHA) of 1970, Section 5 and relevant safety standards, as well as other safety rules and regulations of state and local governments. Refer to the relevant safety standards in OSHA and National Fire Protection Association (NFPA), Section 86A of 1977, Chapter 1, Section 1-6 and Appendix F or any subsequent editions.

## Loading the Oven

When loading the oven avoid spilling anything onto the heater elements or onto the floor of the oven. Do not place the load on the oven floor plate. This may cause the load to heat unevenly and the weight may cause shorting out of the heater elements. Use the shelves provided.

The two shelves are designed to be pulled out about two inches without tipping. Refer to the Table 4, Capacities, in this manual for the support capacity of the shelves. Do not overload the shelves.

Distribute workload evenly so that airflow is not restricted. Do not overfill your oven. The workload should not take up more than two-thirds of any dimension of the inside cavity.

## Pre-Start-Up Checklist

- ✓ Know the system. Read this manual carefully. Make use of its instructions and explanations. The know how of safe, continuous, satisfactory, trouble-free operation depends primarily on the degree of your understanding of the system and of your willingness to keep all parts in proper operating condition.
- ✓ Check line voltage. This must correspond to nameplate requirements of motors and controls. A wrong voltage can result in serious damage. Refer to the section on power connections in the INTRODUCTION of this manual.
- ✓ Check fresh air & exhaust dampers (Non-atmosphere models only). Do not be careless about restrictions in and around the fresh air and exhaust openings and stacks. Under no condition, permit them to become so filled with dirt that they appreciably reduce the air quantity.

## Start-Up

For fastest oven heat-up time, close the vent. After desired temperature is reached, vent may be adjusted as needed.

1. Start fan.
  - a. Open oven door.
  - b. Press POWER toggle switch to the ON position. You will hear the recirculating fan start.
  - c. Shut oven door.
  - d. Check that the amber LED on the CONTROL panel is on.
2. Enter setpoint on the CONTROL instrument.
  - a. Press and hold the CONTROL instrument push-to-set pushbutton. The pilot light is on as long as the push-to-set pushbutton is pressed.
  - b. Adjust the turn-to-set knob until desired operating temperature is displayed on the CONTROL instrument LED.
  - c. Release the push-to-set pushbutton. Note that the set point will not be changed if knob is turned when button is not depressed.

Oven set point can be displayed at any time by manually depressing and holding the "push-to-set" button. This will not disengage the control function.

### WARNINGS:

Do not use any flammable solvent or other flammable material in this oven. Do not process closed containers of any substance or liquid in this oven because they may explode under heat.

### NOTE:

When operating the oven without the optional water cooling, the minimum operating temperature is approximately 75 degrees centigrade (nitrogen models) and approximately 55 degrees centigrade (non-nitrogen models) over the ambient room temperature. This is the result of the heat generated by the recirculating fan.

## Start-Up (Cont.)

### 3. Set HI-LIMIT instrument.

Set the HI-LIMIT instrument to a temperature  $10^{\circ}\text{C}$  -  $15^{\circ}\text{C}$  than the setpoint or to a temperature that should not be exceeded in the process. The HI-LIMIT instrument must be manually reset by pushing the button on the HI-LIMIT instrument.

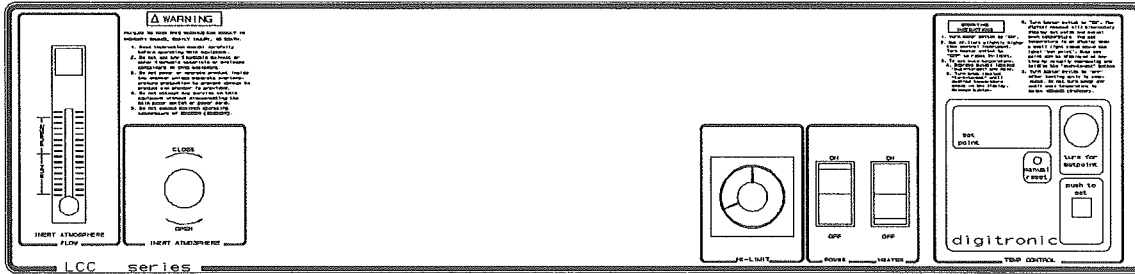


Figure 4 illustrates the control panel on the LCC1-11N and the LCC1-87N models.

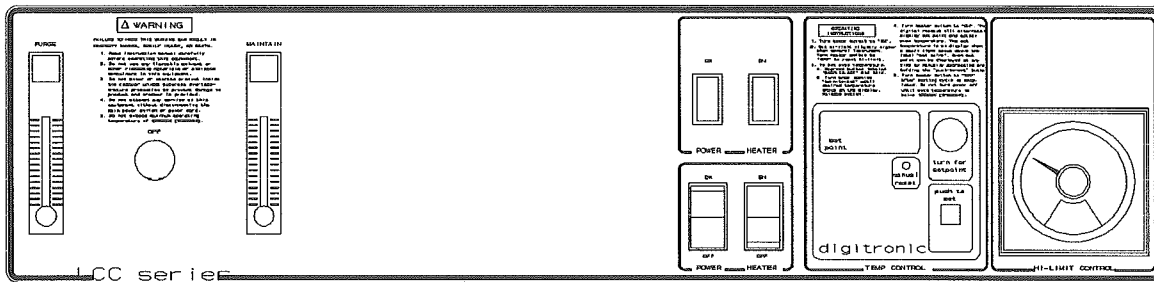


Figure 5 illustrates the control panel on the LCC1-54N model.

**WARNING:**  
Never operate the oven at a temperature in excess of the maximum operating temperature which is  $260^{\circ}\text{C}$  ( $500^{\circ}\text{C}$ ).

## Start-Up (Cont.)

4. For the inert atmosphere ovens, adjust flow rate. Refer to Figures 6 - 8 for times and flow rates to achieve the listed conditions.
  - a. (LCC1-54N model) The flow rates of the PURGE and MAINTAIN can be set by the needle valve at the bottom of each flowmeter.  
  
(LCC-11N and LCC1-87N) The flow rates of the PURGE and MAINTAIN can be set by adjusting the valve to the proper operating condition.
  - b. The flow rate will be increased by turning the control knob counter clockwise and decreased by turning the knob clockwise.

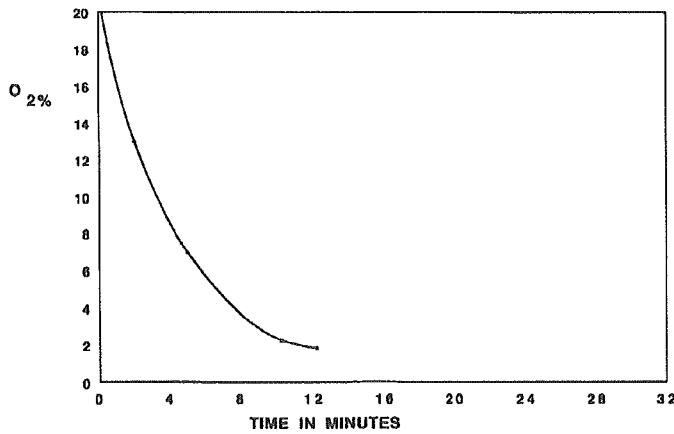


Figure 6 illustrates the oxygen level vs. time at 100 SCFH purge.

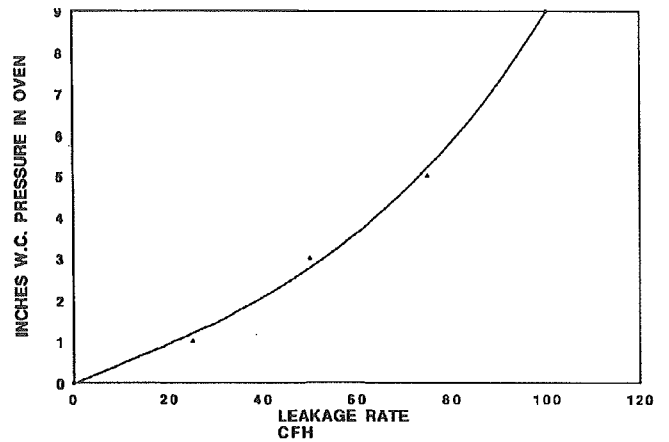


Figure 7 illustrates the nitrogen leakage rate vs. oven pressure.

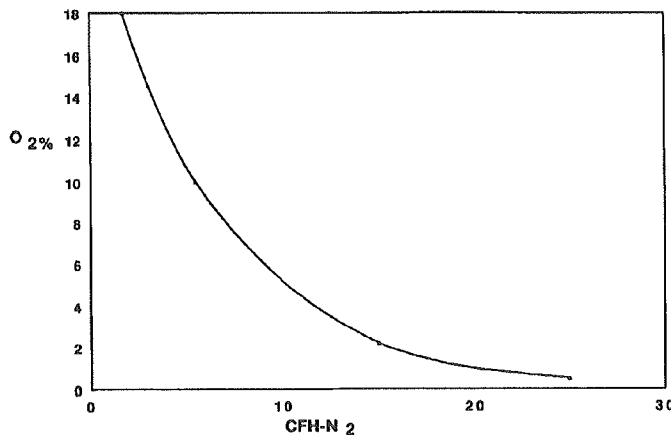


Figure 8 oxygen stabilization level vs. flow of nitrogen.

## Start-Up (Cont.)

**WARNING:**

Never operate the oven at a temperature in excess of the maximum operating temperature which is 260°C (500°C).

5. If necessary, turn on water supply to the cooling coil or the valve on the face of the optional cooling water flowmeter.

The water cooling coil should be used when cooling a load that has been processed at a higher temperature in a relatively short period of time. The water is controlled by the optional cooling water flowmeter and can be adjusted or shut off by the brass needle valve on its face. See figure 9 for approximate cooling coil performance for various water flow rates in an empty oven.

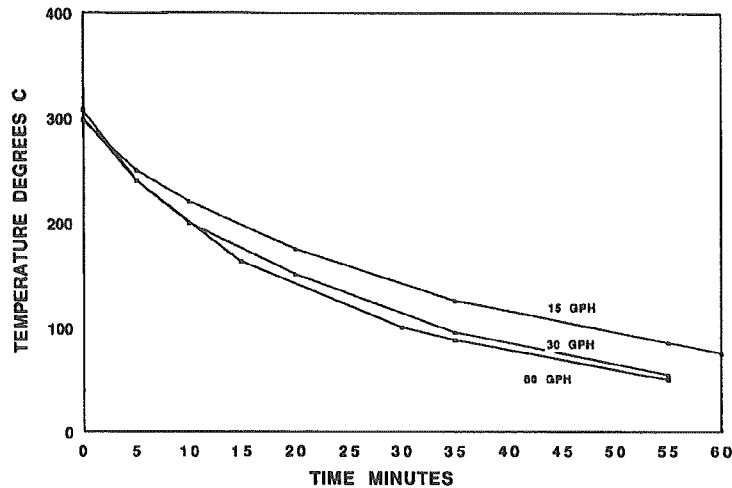


Figure 9 illustrates the cool down rate with water cooling coil (unit without a load).

6. Press the heater toggle switch to the ON position. The white light will come on, indicating a heat on condition. Heater indicator light should come on. When the desired temperature is reached, the Digitronic will proportion power to the heater as needed and the heater indicator light will flash on and off.
7. The readout area will alternately display set point and actual chamber temperature. Set point is on display when the small light shows above the set point label.
8. After heating cycle is complete, turn the heater toggle switch to the OFF position. Do not turn the power off until the oven chamber temperature is below 100°C (212°F).

**WARNING:**

DO NOT touch cooling coil drain piping during chamber operation - steam can be generated in the cooling coil and STEAM BURNS.

## Manual Reset Adjustment

When operating the oven at different temperatures and damper settings, the setpoint may vary from the oven temperature. Align these two readings as follows:

1. Turn oven ON and allow the oven to cycle off and on at the desired setpoint for 15 minutes.
2. If the oven temperature is below the setpoint on the display, turn the trim pot marked clockwise. If the oven temperature is above the setpoint, turn offset pot counter clockwise. A 1/16 turn of the pot is equal to approximately 1°C (2°F). Adjust until both read the same.

## Shut Down

1. Push the heater switch to OFF after the heating cycle is complete.
2. Do not turn the power off until the oven temperature is below 150°C (302°F). If the oven is turned off before it is properly cooled, the fan shaft and motor bearings may become overheated, shortening the life of the motor.
3. Turn the nitrogen control valve to OFF.
4. Turn off the water supply to the cooling coil or the valve on the face of the optional cooling water flowmeter.

# Maintenance

Do not attempt any service on this oven before opening the main power disconnect switch.

## Checklist

**WARNING:**  
DO NOT attempt any service on this equipment without shutting off the nitrogen gas supply.

- ✓ Keep equipment clean. Gradual dirt accumulation retards air flow. A dirty oven can result in unsatisfactory operation such as unbalanced temperature in the work chamber, reduced heating capacity, reduced production, overheated components, etc. Keep the walls, floor and ceiling of the oven work chamber free of dirt and dust. Floating dust or accumulated dirt may produce unsatisfactory work results. Keep all equipment accessible. Do not permit other materials to be stored or piled against it.
- ✓ Protect controls against excessive heat. This is particularly true of controls, motors or other equipment containing electronic components. Temperatures in excess of 51.5°C (125°F) should be avoided.
- ✓ Establish maintenance & checkup schedules. Do this promptly and follow them faithfully. Careful operation and maintenance will be more than paid for in continuous, safe and economical operation.
- ✓ Maintain equipment in good repair. Make repairs immediately. Delays may be costly in added expense for labor and materials and in prolonged shut down.
- ✓ Practice safety. Make it a prime policy to know what you are doing before you do it. Make CAUTION, PATIENCE, and GOOD JUDGEMENT the safety watchwords for the operation of your oven.
- ✓ Lubrication - Fan motor bearings are permanently lubricated. All door latches, hinges, door operating mechanisms, bearing or wear surfaces should be lubricated to ensure easy operation.



## Tests

Tests should be performed carefully and regularly. The safety of personnel as well as the condition of equipment may depend upon the proper operation of any one of these controls at any time.

### Nitrogen Supply Check

This test is necessary in nitrogen models only.

1. Turn the inert atmosphere valve on the control panel to the OFF position.
2. On the LCC1-54N, screw the adjusting knob on the flowmeters clockwise all the way to the OFF position. The adjusting knobs must be off on both the PURGE and MAINTAIN flowmeters.

On the LCC1-11N and the LCC1-87N, turn the inert atmosphere valve clockwise to the off position.

3. Open the tank valve on the nitrogen supply and set the pressure regulator to about 40 psi.
4. Check the nitrogen plumbing for leaks using a soapy water solution. As nitrogen gas is odorless, all leaks should be stopped to prevent the possibility of suffocation in a small work area in which a nitrogen leak might displace much of the oxygen in the atmosphere.

### Process Timer

The process timer is optional equipment. Turn the timer switch to the ON position. Set the process timer to the desired interval, the heater will shut off when this time period has elapsed. To manually control the process interval turn the timer switch off.

### Ventilation

This procedure is necessary in non-atmosphere models only.

There is an exhaust opening in the rear of the unit that is always open. The fresh air can be adjusted open or closed by adjusting the vent mechanism on the control panel.

**WARNING:**  
High voltage is present on terminals, voltage checks to be made only by qualified electrical maintenance personnel: E.G., electrician or technician. Failure to heed this warning can result in serious bodily injury, property damage, or death.

## Control Output Test

1. Disconnect line power from the control.
2. Remove the jumper or leads attached to terminals + and - on the control.
3. Attach a multimeter with internal impedance greater than 10,000 OHMS/volt DC across these terminals.
4. Set meter to 30 VDC range.
5. Reconnect line power to the control.
6. The meter should read approximately 10 VDC when the sensor readout is 10°C below setpoint and 0 VDC when the readout is 10°C above setpoint. The voltage should be fluctuating when both the sensor and setpoint readouts are the same.
7. Replace control if the unit does not respond as above.

## Safety Controls

Make these tests carefully and do them regularly. The safety of personnel as well as the equipment may depend upon the proper operation of any one of these controls at any time.

- a. Temperature Control (every 40 hours)

The heater indicator light should flash every 1 to 2 seconds when the control is operating at set point temperature.

- b. HI-LIMIT (every 40 hours)

With the oven operating at a given temperature, gradually turn the HI-LIMIT control knob down to the set point operating temperature. The HI-LIMIT has tripped when the heater indicator light shuts off. Return the HI-LIMIT to its original setting. The LCC models require the HI-LIMIT reset button to be pushed.

## Thermocouple Test

1. Place a jumper or short the terminals T+ and T- on the control. The display should read ambient temperature and be very stable.
2. Replace the control if the unit is not stable.

## Potentiometer Test

### Control

1. Most controls have a bypass resistor across terminals P<sub>1</sub> and P<sub>2</sub> to limit the maximum operating setpoint temperature.
2. Remove one Potentiometer lead leaving the bypass resistor across P<sub>1</sub> and P<sub>2</sub>. The setpoint display will increase to approximately 200° to 400°, but the readout should be stable.
3. Replace control if the readout still is not stable.

### Setpoint Potentiometer

1. Turn the pot all the way clockwise and then all the way counter clockwise several times. This should remove any dust or dirt from the slidewire. The setpoint should be stable.
2. Replace pot if the readout is still not stable.

### Calibration Procedure

The following calibration procedure is for the Digitronic controller number 61-06-AR/61-06-AT.

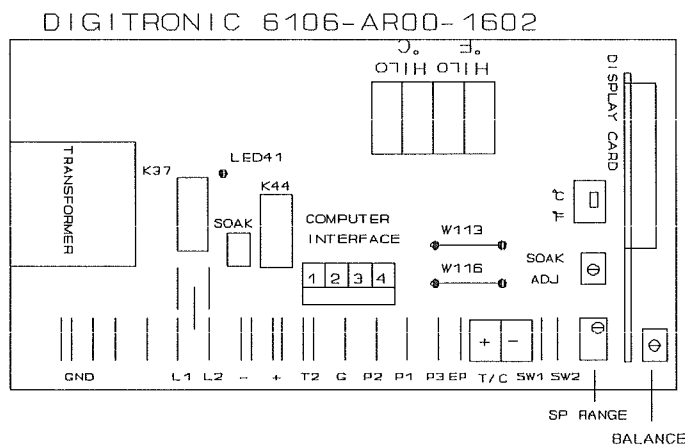


Figure 10 illustrates the main board for the Digitronic.

1. Disconnect line power to the control.
2. Attach an accurate potentiometer with an ambient compensated millivolt of Type J thermocouple output to the TC + and TC - terminals on the control.
3. Set Digital Voltmeter (DVM) to 30 VDC range.
4. Turn the line voltage on.

### Calibration Procedure (Cont.)

5. Set reset and soak adjust pots to mid range.
6. Set °C/°F switch to °C. Allow unit to warm up 15 minutes before calibration.
7. Connect digital voltmeter (DVM) from COM (-) J69 Plug Pin #4 to W113 (+). Set millivolt source to 0° C (0.00 mv). Adjust °C lo pot for 0.00V +/- .005V on DVM. Adjust zero pot for 000 on display when LED (6) indicator on the front of the control is off.
8. Set millivolt source to 540° C (29.64 mv). Adjust °C hi for 2.700V +/- .005V on DVM. Adjust F.S. pot for 540 on display when LED (6) indicator is off.
9. Repeat steps 7 and 8 as necessary.
10. Set millivolt source to 260° C (14.11 mv), display should read 260 +/- 1 when LED (6) indicator is off.
11. Set °C/°F switch to °F.
12. Set millivolt source to 32° F (0.00 mv). Adjust °F lo pot for 32 on the display when LED (6) indicator is off.
13. Repeat millivolt source to 990° F (29.20 mv). Adjust °F hi pot for 990 on the display when LED (6) indicator is off.
14. Repeat steps 12 and 13 as necessary.
15. Set millivolt source to 500° F (14.11 mv), display should read 500 +/- 1 when LED (6) indicator is off.
16. Connect DVM from COM (-) J69 Plug Pin #4 to W116 (+). Adjust set pot (see figure 1C) for 2.500V on DVM. With set point switch depressed, adjust the balance pot for 500 on display.
17. Adjust the reset pot until the load is cycling 50 percent. The cycle time should be about 1 second +/- 1/4 second. LED (41) should cycle with the load.
18. Disconnect all power and leads if necessary.
19. Place nail polish on the zero, °C/°F Hi and Lo, FS adjust, and bal. adjust pots.
20. Place °C/°F selection switch to desired setting.

# Replacement

## Parts

To return parts contact Despatch Industries to obtain an MRA (material return authorization) number. This number must be attached to the returned part for our identification. If required, a new part will be sent and invoiced to you. When the return part is received, credit will be given, if in warranty.

When ordering parts or service, be sure to specify the model, serial number and part number. This will expedite the process of obtaining your replacement part.

### WARNING:

Shut down nitrogen supply and disconnect main power switch or power cord before attempting any repairs or adjustments.

## CONTROL Instrument

(Tools needed: one quarter (1/4) inch socket set)

1. Disconnect power.
2. Remove screws from the face of the control panel and slide it forward.
3. Remove wires from the old control board, noting which numbered wires connect to which terminals.
4. Replace old control board with new control board.
5. Reattach wires to the new CONTROL instrument. Make sure that the wires are connected correctly. Refer to the wiring diagram in the appendix of this manual.
6. Replace control panel.

## Fan Motor

(Tools needed: Screwdriver, 5/32 inch Allen wrench, crescent wrench)

1. Disconnect power.
2. Remove filter cover and filter from left side.
3. Remove floor plate.
  - a. Remove screws from the floor plate.
  - b. Lift floor plate out of the oven.
4. Remove the screws from the heater frame then tip up and to the right.
5. Loosen set screws on fan wheel inside fan housing.
6. Remove the screws from the face of the control panel and slide it forward to uncover motor.
7. Tip oven on its back.
8. Remove outside floor.
9. Unbolt the four bolts holding the motor to the motor mount.
10. Remove motor. After fan wheel has run at temperature for a while it will stick to the shaft. Some force may be required to separate the two. Suggest holding the fan wheel against the insulated wall while using a mallet and center punch to loosen the shaft from the fan.
11. Disconnect motor leads from terminal block.
12. Hold new motor in place while you remount fan wheel to motor shaft. Reattach motor to motor mount.
13. Attach motor lead wires to terminal block (see wiring diagram).
14. Replace oven control panel and bottom, then tip oven upright again.
15. Adjust fan wheel for 3/16" clearance between wheel and inlet ring.
16. Tighten set screws making sure set screws hit the flats machined into the motor shaft.
17. Bolt heater back in place.
18. Replace interior floor.
19. Replace filter and filter cover.
20. Reconnect power.

## **Replacing Thermocouple for HI-LIMIT Control**

1. Disconnect power.
2. Remove screws from face of control panel and slide it forward.
3. Remove thermocouple wires from terminals on HI-LIMIT controller and Digitronic controller.
4. Remove old thermocouple by loosening brass retaining nut on top left of oven.
5. Install new thermocouple in same position as old one and tighten brass retaining nut.
6. Thread and connect wires of new thermocouple to terminals on HI-LIMIT controller and Digitronic controller.
7. Replace control panel.

## **Replacing HI-LIMIT**

(tools needed: screwdriver, one quarter (1/4) inch socket set)

1. Disconnect power.
2. Remove screws from face of control panel and slide it forward.
3. Remove wires from HI-LIMIT noting which numbered wires connect to which terminals. Refer to wiring diagram in this manual.
4. Replace old HI-LIMIT with new HI-LIMIT.
5. Reattach wires to the new HI-LIMIT making sure the correct wires are attached.
6. Replace control panel.

## Thermocouple Break Protection

If the thermocouple breaks, the Digitronic will shut off power to the heater, preventing excessive temperature in the chamber. This condition will be indicated on the Digitronic digital display area by decimal points between the numerals.

### Replacing the Thermocouple

(tools needed: small screwdriver and small crescent wrench)

The controller thermocouple is type J (iron/constantan) and is replaceable using the following procedure:

1. Disconnect power and remove screws from the face of the control panel and slide it forward.
2. Locate thermocouple along the left side of the control chamber.
3. Loosen the nut on the fitting holding the thermocouple in place.
4. Pull thermocouple out of brass fitting.
5. Feed new thermocouple through the nut and ferrule and place back into the fitting.
6. Re-tighten the fitting nut.
7. Remove old thermocouple from terminals marked T+ and T- on PC board.
8. Attach new thermocouple to T+ and T- making sure that white lead is attached to the + terminal and the red lead is attached to the - terminal.
9. Replace oven control panel.
10. If decimal points still appear between numerals, repeat procedure.



## Heater Unit

(Tools needed: Crescent wrench, screwdriver, one quarter (1/4) inch socket set)

1. Disconnect power.
2. Remove filter cover and filter from left side.
3. Remove floor plate.
  - a. Remove screws from the floor plate.
  - b. Lift floor plate out of the oven.
4. Disconnect heater leads from heater element with wrench. Note which wires go on which terminals.
5. Unscrew screws holding the frame to the oven body.
6. Remove heater and discard.
7. Screw down new heater frame.
8. Attach heater leads to appropriate terminals.
9. Replace interior floor and screws.
10. Replace filter and filter cover.
11. Reconnect power.

## Warning Signs

If it appears that any warning, danger, caution or information label or sign has been damaged or lost, contact Despatch Industries for replacements. Call or write:

Customer Service  
Despatch Industries  
PO Box 1320  
Minneapolis, MN 55440  
Call Toll Free 800-328-5476  
(in Minnesota 800-462-5396)



# APPENDIX



# Troubleshooting

Any equipment operating for as many hours a day as lab ovens often do is likely to have problems now and then. Below are possible problems and suggested solutions. If you have a problem not listed and do not know what to do, contact Despatch Industries at our toll free Help Line 800-328-5476 (in Minnesota 800-462-5396).

Difficulty	Probable Cause	Suggested Remedy
Failure to heat	No power	Check power source and/or oven and wall fuses.
	Burned out heating element	Replace element (see warranty statement)
	CONTROL instrument malfunction	See trouble shooting information on Digitronic.
	Loose wire connections	Disconnect power and check connections behind control panel.
Slow heat up	Improperly loaded	Reduce load or redistribute load in chamber.
	Low line voltage	Supply sufficient power and proper connections. Check to see if circuit is overloaded.
	1 or 2 heating elements	Replace burned out element (see warranty statement, back page).
	240 volt oven is connected to a 208 volt line.	Consult with factory.
	Fan motor failure	Replace fan motor.
	Water flow in optional cooling coil	Shut water off.
	Filter clogged	Replace filter (see section on HEPA filter)
Frequent heater element burn out	Harmful fumes generated by load	Increase vent opening or discontinue process.
	Overheating oven	Do not operate over 260+°C (500+°F).
	Excessive dust build up in filter	Replace filter (see section on HEPA filter)

## Troubleshooting (Cont.)

Erratic temp. Inaccurate temp.	CONTROL instrument malfunction	See troubleshooting information on Digitronic
Inaccurate temperatures	Control miscalibration	See troubleshooting information on Digitronic
Excess surface temp. around door	Door seal deterioration	Replace door seal.
Improper airflow	Fan motor failure	Replace fan motor.
	Unbalanced fan wheel	Replace fan wheel.
	Filter clogged	Replace fan wheel.
Excessive vibration	Dirty fan wheel	Clean fan.
	Unbalanced fan wheel	Replace fan wheel.
Oven will not control at setpoint	HI-LIMIT instrument set too low	Set the HI-LIMIT instrument higher.
	HI-LIMIT is out of calibration	Recalibrate the HI-LIMIT
	Solid state relay malfunction	Replace solid state relay.
	CONTROL instrument malfunction	See troubleshooting information on Digitronic
	Air friction of recirculation fan	The minimum operating temperature is approximately 75°C above ambient room temperature. Use optional water cooling coil.
Heater does not shut off until the temperature reaches the high limit setting	Solid state relay shorted	Replace solid state relay.
Excessive O <sub>2</sub> levels	Door seal deterioration	Replace door seal
	Pressure relief valve leaking	Replace valve
	Fan shaft seal leaking	Replace shaft seal (remove fan motor first)

# Digitronic Troubleshooting

DIFFICULTY	PROBABLY CAUSE	SUGGESTED REMEDY
Erratic sensor readout	Broken thermocouple Control malfunction	See thermocouple test See control output test
Erratic setpoint readout	Bad slide wire on 5K Potentiometer Control malfunction	See potentiometer test See potentiometer test
Inaccurate points between the numerals		
Sensor readout	Thermocouple is open or broken overrange	See thermocouple break protection
Setpoint readout	overrange	Lower setpoint potentiometer or input signal voltage





# Accessories

The LCC Series Ovens have several available options that can easily be field installed. Despatch uses a modular concept of popular accessories. You no longer need to be limited by accessories available on certain models or by accessories you don't need. Those accessories indicated as kits are available for field mounting. Installation is quick and easy. All electrical connections are made by means of a plug. A maximum of 2 kits can be mounted. If more modular accessories are required, please consult the local sales office or factory.

**NOTE:**  
Specifications are subject to change without notice. If the existing specifications differ from yours, ask about our adapting capabilities.

Table 5 Accessories

Option	Functional Description
Running Time Meter Kit.	Digital time meter denotes up to 99,999.9 hours of running time.
Preset Temperature Selector Kit.	Lets you preset up to four temperatures and select desired temperature by a turn of a dial. No need to set control each time a commonly used temperature is set. Turn dial back to manual mode for selecting setpoint at Digitronic. A remote mode position is also included for use with remote setpoint interface kit.
Remote Set Point Interface Kit.	Lets you monitor chamber temperature and adjust setpoint remotely through a microprocessor programmer. Kit provides 5 mv per degree process variable input/output. Can also be used for computer interface with the addition of an A to D conversion.
Cooling Coil Piping Kit.	Includes flow meter, shut off valve, vacuum breaker, check valve, tubing and fitting. Kit provides necessary components for connecting water cooling coil.
Extra HEPA filter.	
Extra shelves.	
Base cabinets.	



# Factory Installed Options

Table 6 Factory Installed Options

Digital Process Timer.	Adjustable range 3 digit display from .01 seconds to 999 hours. Shuts down heater only, fan continues to run. Can also be field installed as a kit.
Microprocessors/ controllers	Programmed for temperature control.
Recorders	Round or strip charts are available. Standard round chart recorder is available as a kit which can be field installed.
Window and light.	

Special options available on request.



# Warranty

Despatch Industries warrants equipment manufactured by Despatch Industries to be free from defects in workmanship and materials under normal use and service for a period of one (1) year from the date of delivery or the period of twenty-one hundred (2,100) accumulated hours of use, whichever period is shorter.

Components manufactured by others, including but not limited to expendable items, are excluded from this warranty and are warranted (if at all) only in accordance with the warranty, if any, issued by such other manufacturer.

Use or service with corrosive or abrasive chemicals is not deemed normal.

If Purchaser gives written notice specifying the particular defect within 14 days after discovery thereof, Despatch Industries will correct without charge any workmanship that is demonstrated to Despatch Industries' satisfaction to have been defective at time of installation or erection and will repair or replace, at the warrantor's option, without charge, FOB, Despatch Industries factory, parts covered by this warranty that upon inspection are found defective under normal use within the warranty period stated above.

All work of removal and reinstallation or installation of parts, whether or not found defective, and shipping charges for defective or replacement parts shall be at the sole expense of the Purchaser.

The foregoing warranty shall not apply to equipment repaired or altered by others, unless such repairs or alterations were specifically agreed to in writing by an officer of Despatch Industries.

Despatch Industries shall not be liable for incidental or consequential damages of any kind (whether for personal injury, lost profits or otherwise), whether arising from breach of this warranty, negligence or other tort or otherwise, which occurred during the course of installation of equipment, or which result from the use or misuse by user, its employees or others of the equipment supplied hereunder, or from any malfunction or nonfunction of such equipment, and Purchaser's sole and exclusive remedy against Despatch Industries for any breach of the foregoing warranty or otherwise shall be for the repair or replacement of the equipment or parts thereof affected.

The foregoing warranty shall be valid and binding upon Despatch Industries if and only if user loads, operates and maintains the equipment supplied hereunder in accordance with the instruction manual to be provided upon delivery of the equipment.

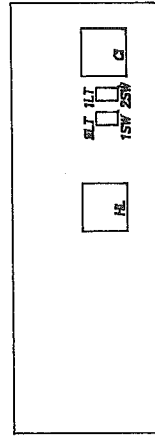
Despatch Industries does not guarantee the process of manufacture by user or the quality of product to be produced by the equipment supplied hereunder, and Despatch Industries shall not be liable for lost profits.

**THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES AND REPRESENTATIONS WHATSOEVER, INCLUDING BUT NOT LIMITED TO THOSE OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.**



# Drawings

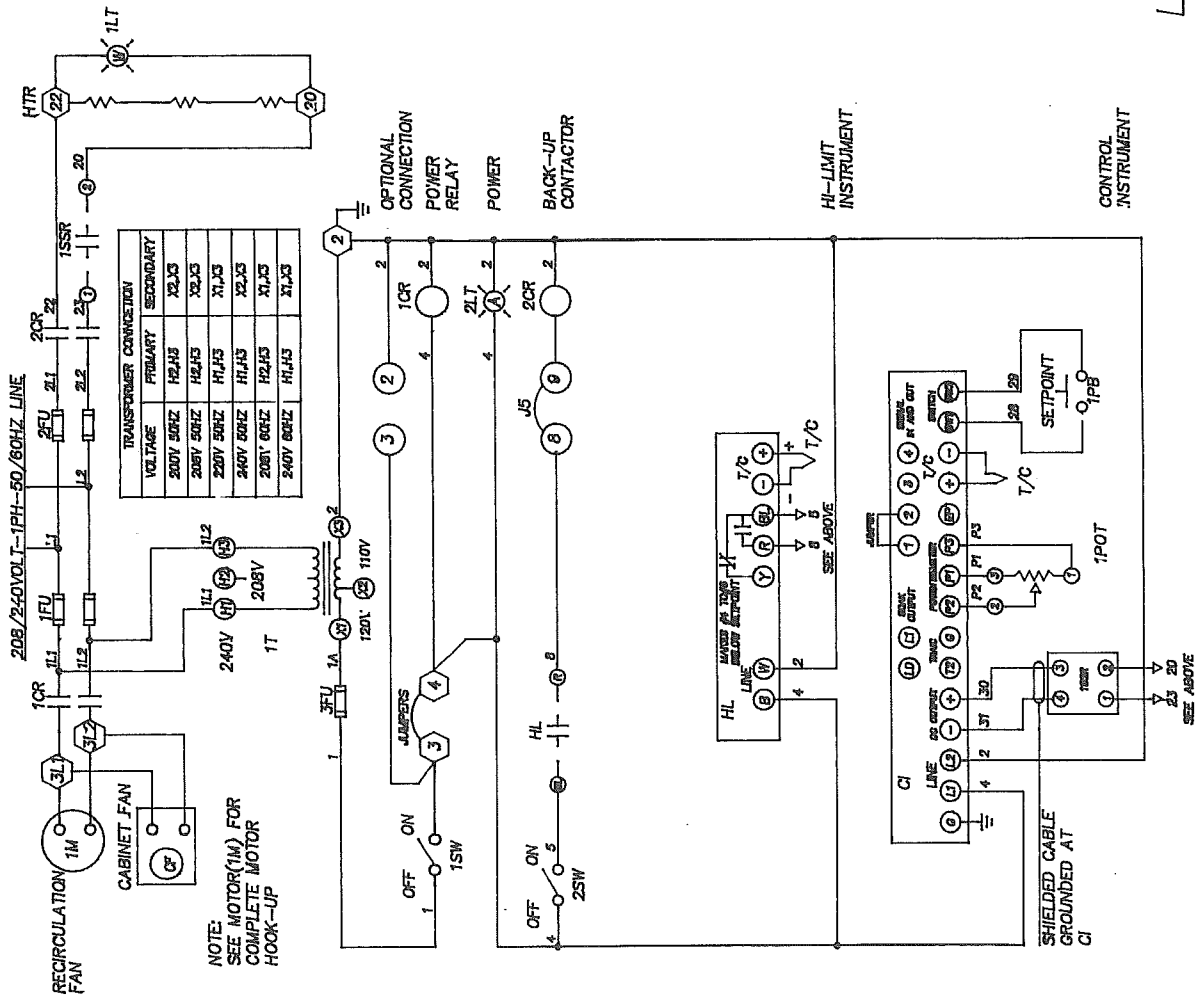
MATERIAL LIST		
ITEM	PART #	DESCRIPTION
CI	080822	6106-AR00-1802 DESPATCH DIGITRONIC
IFB	030525	TYPE J T/C 120V
IPOT	080734	6108 SWITCH AY
HL	086420	6108 POTENTIOMETER AAY
T/C	084913	DESPATCH HI-LIMIT
1FU	007471	G-400C TYPE J T/C 120V
2FU	007456	J39012U-00-18-C048-2 T/C
3FU	007484	F030A2 FUSEBLOCK
1T	031330	FRN 5.0 AMP FUSE
1M	058079	F030A2 FUSEBLOCK
HTR	074968	A26 X 15 AMP AMP-TRAP FUSE
CF	015229	3845 FUSEBLOCK
1-2CR	080187	FNM 1.0 AMP FUSE
1SSR	057345	B100MP1215-XX TRANSFORMER
1SW/1LT	074182	1/4 HP MOTOR
2SW/1LT	074183	3KW HEATER SSI
		MU3A1 CABINET FAN
		JH2A-W-AC120V-Q RELAY 20 AMP
		5ORID SOLID STATE RELAY
		SPST SWITCH W/PILOT LIGHT AMBER
		SPST SWITCH W/PILOT LIGHT WHITE



= OVEN TERMINALS  
 = OVEN JUMPERS

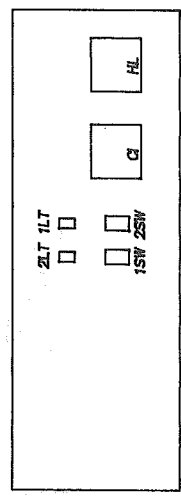
LCC1-11 AND  
LCC1-11N

LCC-111

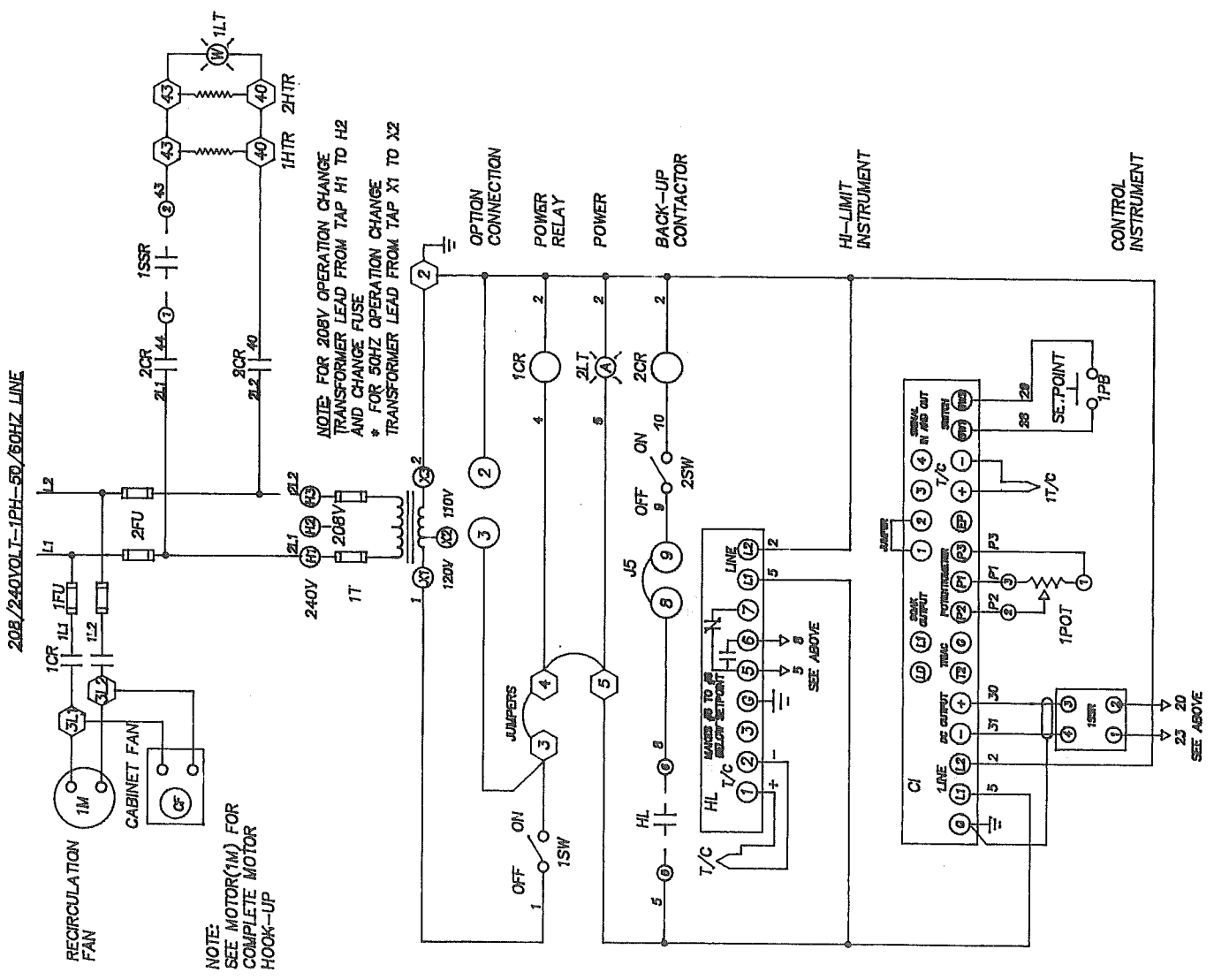


### MATERIAL LIST

ITEM	PART #	QTY	DESCRIPTION
CI	060822	1	6106-AR00-1602 DESPATCH DIGITRONIC TYPE J T/C 120V
1PB	030525	1	6106 SWITCH AY
1POT	080734	1	A1557AB123 HONEYWELL AAY
HL	005423	1	A1557AB123 HONEYWELL HI-LIMIT 3-300°C TYPE J T/C 120V
T/C	054771	1	J39018U-00-16-2060-2(024) T/C
1FU	007471	1	F030A2 FUSEBLOCK
2FU	007471	2	FRN 5.0 AMP FUSE
	007458	2	F030A2 FUSEBLOCK
	007458	2	A25X30 AMP AMP-TRAP FUSE
1T	013315	1	BX200MP1215PK TRANSFORMER
1M	061036	1	FNM 2.0 AMP FUSE
1-2HTR	055166	2	3.0KW HEATER SST
CF	015229	1	MU3A1 CABINET FAN
1-2CR	057310	2	301-121200 RELAY 30 AMP
1SSR	057345	1	240D45SP SOLID STATE RELAY
1-2SW	074116	1	T76K-51-65-WH-NBL SWITCH
1LT	008670	1	WHITE PILOT LIGHT 250V
2LT	008662	1	RED PILOT LIGHT 125V



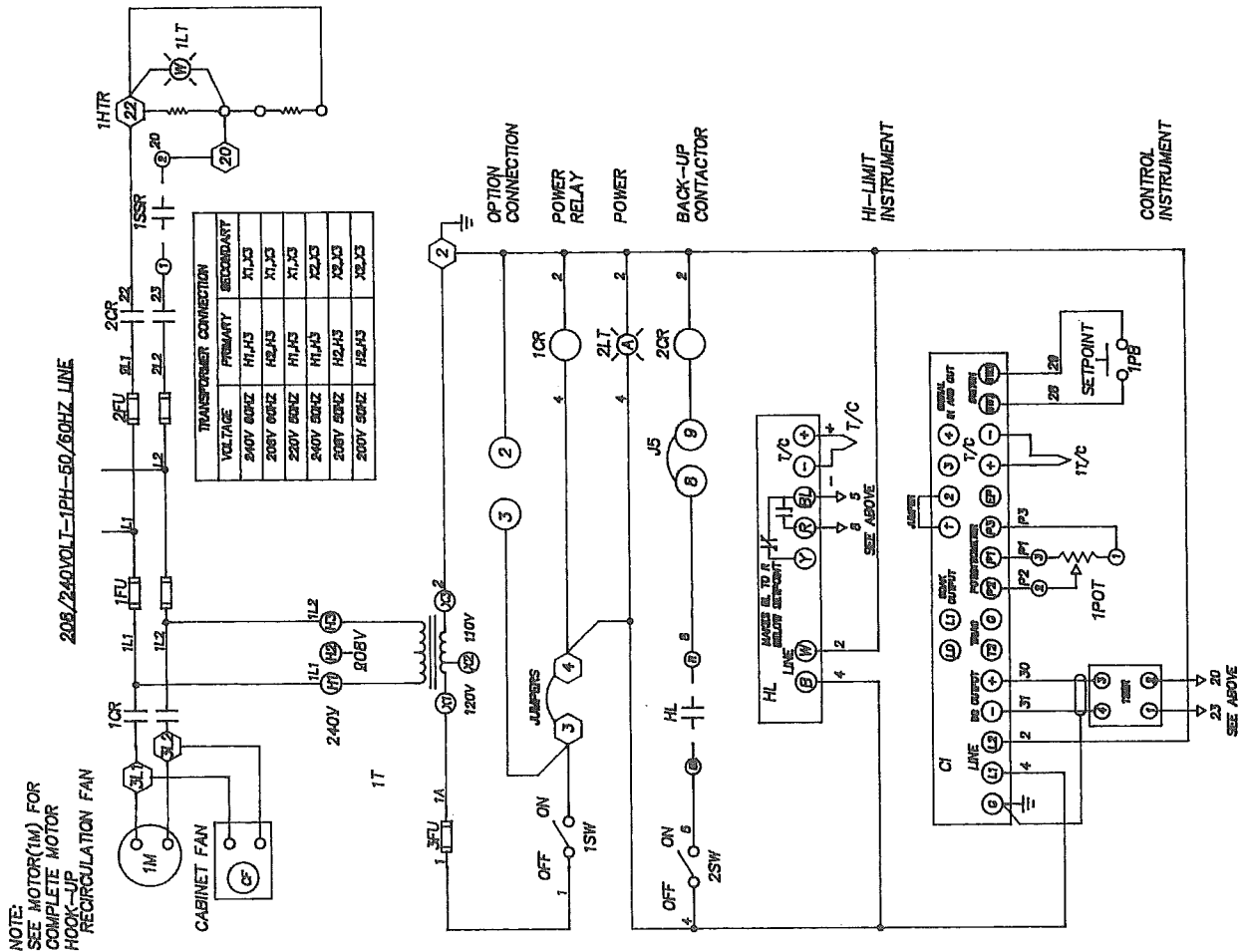
= OVEN TERMINALS  
 = OVEN JUMPERS  
 LCC1-54 AND LCC1-54N





# MATERIAL LIST

ITEM	PART #	QTY	DESCRIPTION
CI	080822	1	6106-AR00-1602 DESPATCH DIGITRONIC
IFB	030525	1	TYPE J T/C 120V
IPOT	080734	1	6106 SWITCH AY
HL	086420	1	6106 POTENTIOMETER AAY
T/C	054771	1	HI-LIMIT
1FU	007471	1	0-400°C TYPE J T/C 120V
2FU	007536	2	43601BU-00-16-2080-2(024) T/C
3FU	007484	2	F030A2 FUSEBLOCK
1T	007500	1	FRN 8.0 AMP FUSE
1M	074601	1	A25 X 50 AMP AMP-TRAP FUSE
1HTR	086421	1	3945 FUSEBLOCK
1CR	080187	1	FNM 1.0 AMP FUSE
2CR	005417	1	B100MP1215-XX TRANSFORMER
1SSR	073203	1	3/4 HP MOTOR
1SW/ALT	074182	1	9KW HEATER SST
2SW/ALT	074183	1	MU3A1 CABINET FAN
			4H2A-W-AC120V-Q RELAY 20 AMP
			60R1D SOLID STATE RELAY
			6PST SWITCH W/PILOT LIGHT AMBER
			6PST SWITCH W/PILOT LIGHT WHITE



LCC1-87 AND  
LCC1-87N





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**Despatch**