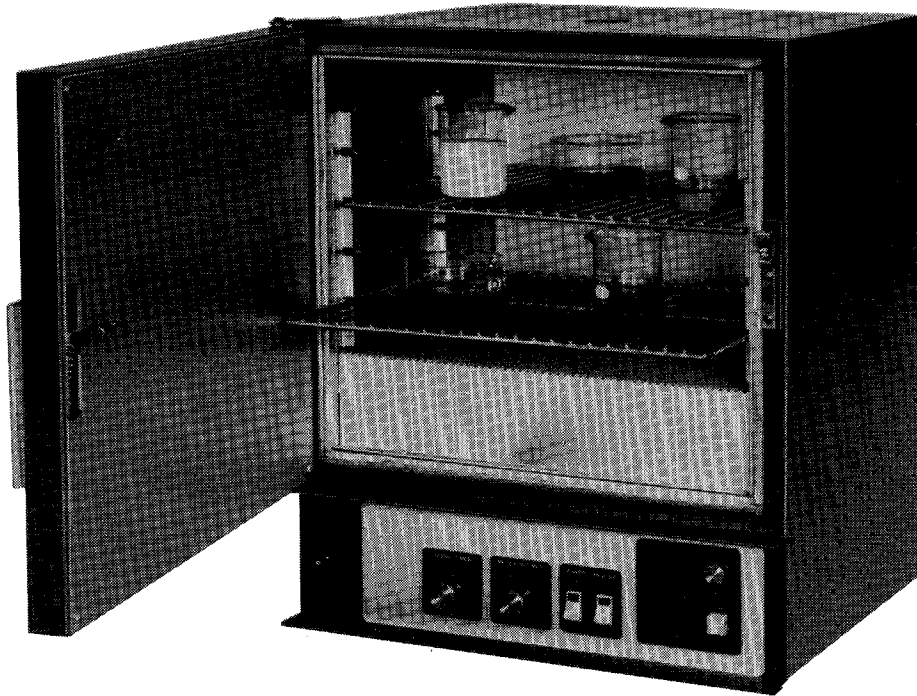


Instruction Manual for LDB series ovens with Digitronic Control

C-58
P/N-054117
REV. 10/83



LDB series Despatch ovens are bench ovens to 204°C (400°F) with forced convection airflow. (Oven shown with optional accessories)

MODEL	VOLTS	HEATER WATTS	AMPS	HZ	PHASE
LDB 1-17AD	120	1200	11.6	60	1
LDB 1-24AD	120	1200	11.6	60	1
LDB 1-43AD	120	1600	15.0	60	1
LDB 1-69AD	120	2400	21.6	60	1
LDB 1-17BD	240	1200	5.8	60	1
LDB 1-24BD	240	1200	5.8	60	1
LDB 1-43BD	240	1600	7.5	60	1
LDB 1-69BD	240	2400	10.8	60	1
LDB 2-18BD	240	3600	16.6	60	1
LDB 2-27BD	240	4800	21.6	60	1



DESPATCH
INDUSTRIES, INC.

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INTRODUCTION

The Despatch LDB series ovens are sturdy, compact and economical units with forced airflow for reliably uniform heat. To obtain optimal results from your Despatch oven, thoroughly familiarize yourself with this manual and the various procedures outlined.

WARNING: Failure to heed these restrictions can result in property damage, serious bodily injury or death.

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

DO NOT attempt any service on this equipment without disconnecting the main power switch or power cord.

DO NOT exceed maximum operating temperature of 204°C (400°F).

DO NOT use any flammable solvent or other flammable materials or enclosed containers in the oven.

REPLACE 3F fuses with NON-6 or OT-6 (250V, 6 AMP) only.

FOR supply connections on LDB 1-69 (240V) use 14 AWG or larger wires; LDB 2-18 use 12 AWG or larger wires; and LDB 2-27 and LDB1-69 (120V) use 10 AWG or larger wires. All wires must be suitable for at least 75°C (167°F).

Unpacking, Inspection and Packing List

Remove all packing materials and inspect the oven for damage. If damaged, and damage is due to shipment, contact the shipper immediately. If oven parts are damaged, or if parts are missing, contact Despatch Customer Service at 800/328-5476. (In MN 800-462-5396)

You should have in this box:

- One oven
- Two shelves
- One package containing four rubber feet
- One operators manual
- Warranty card

Any optional accessories ordered will be shipped separately.

Installation

Remove the adhesive backing sheet from the rubber feet and attach the rubber feet to the bottom corners of the oven.

Place the oven on a bench top or an optional cabinet base. The oven must have a minimum of 2" clearance in the rear to provide proper ventilation but may be placed next to another cabinet or oven with 1/2" clearance (the doors will still open).

Make sure oven is level and plumb, this will assure proper heat distribution and operation of all mechanical components.

LDB 1-17 or LDB 1-24 uses a standard 120 volts, 15 amp circuit. LDB 1-43 uses a standard 120 volt 20 amp circuit.

If you have an LDB 1-69, 2-18 or 2-27, check the oven power requirements for amperage and voltage on the cover of this manual. Connect the electric supply directly to your oven (see electrical schematic in back of manual) with all required grounding and safety equipment, in compliance with applicable codes, ordinances and accepted safe practices.

A note on line voltage: Line voltages may vary according to your geographical location. If line voltage is significantly lower than oven voltage rating, heat up times will be extended, and motor may overheat. If line voltage varies $\pm 10\%$ from the oven voltage rating, temperature control will operate erratically.

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

A. PRE-START-UP

1. 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.

2. CHECK LINE VOLTAGE

This must correspond to nameplate requirements of motors and controls. A wrong voltage can result in serious damage.

3. FRESH AIR DAMPER

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.

B. START-UP

1. START FAN AND CHECK ROTATION

Rotation MUST correspond to the directional arrows provided.

2. ADJUST OPTIONAL HI-LIMIT TO OPERATING POSITIONS

The hi-limit thermostat can be used for the protection of the equipment or the product against excessive temperatures when set properly.

Hi-limit thermostats of the non-indicating type (ones which do not show the temperature) can be properly set only after oven is in operation. Until then, such thermostats should be set at their maximum positions so all

preliminary testing and adjusting can be done. Before putting oven into production, adjust this type of thermostat as follows: Set the temperature control thermostat at 14°C (25°F) above the desired operating temperature. Operate oven until the control thermostat is regulating. Carefully adjust the hi-limit downward until it trips. Reset the temperature control thermostat at the desired operating temperature. The two instruments are now set in their correct positions.

NOTE: Never operate oven at a temperature in excess of the maximum operating temperature which is 204°C (400°F).

NOTE: All ovens are tested at the factory; however, shipping may cause damage or deviation. Therefore, before oven is put into regular service, the following items should be inspected and adjusted if necessary: thermostat calibration, doors, hinges, latches and other miscellaneous parts.

3. OPTIONAL PROCESS TIMER (SPRING WOUND)

Turn process timer to the desired time interval. The heater will shut off after the timer times out. Turn timer knob to hold position to eliminate the timer function.

C. OPERATION

1. KEEP EQUIPMENT CLEAN

Gradual dirt accumulation retards air flow. A dirty oven can result in unsatisfactory operation such as unbalanced temperatures 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 results.

Keep all equipment accessible. Do not permit other materials to be stored or piled against it.

2. 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.

3. ESTABLISH MAINTENANCE AND CHECK-UP SCHEDULES

Do this promptly and follow them faithfully. Careful operation and maintenance will be more than paid for in continuous, safe and economical operation.

4. MAINTAIN EQUIPMENT IN GOOD REPAIR

Make repairs immediately. Delays may be costly in added expense for labor and materials and in prolonged shut down.

5. 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.

6. CHECK SAFETY CONTROLS

This should be done as indicated.

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 (40 hours)

Observe heater indicator light flashes every 1 to 2 seconds when the control is operating at set point temperature.

b. OPTIONAL HI-LIMIT (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 is in control when the heater indicator light is on for 3 or more seconds at a time rather than a fraction of a second.

IMPORTANT

WARNING: Failure to heed these restrictions can result in property damage, serious bodily injury or death.

THE USER(S) OF THIS EQUIPMENT MUST COMPLY WITH OPERATING PROCEDURES AND TRAINING OF OPERATING PERSONNEL AS STATED IN THE OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA) of 1970, SECTION 5, AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 86A of 1973 (ARTICLE 100, SECTION 2d, 5 AND APPENDIX 1).

DO NOT use any flammable solvent or other flammable materials or enclosed containers in the oven.

DO NOT attempt any service on this equipment without first disconnecting the main power switch or power cord.

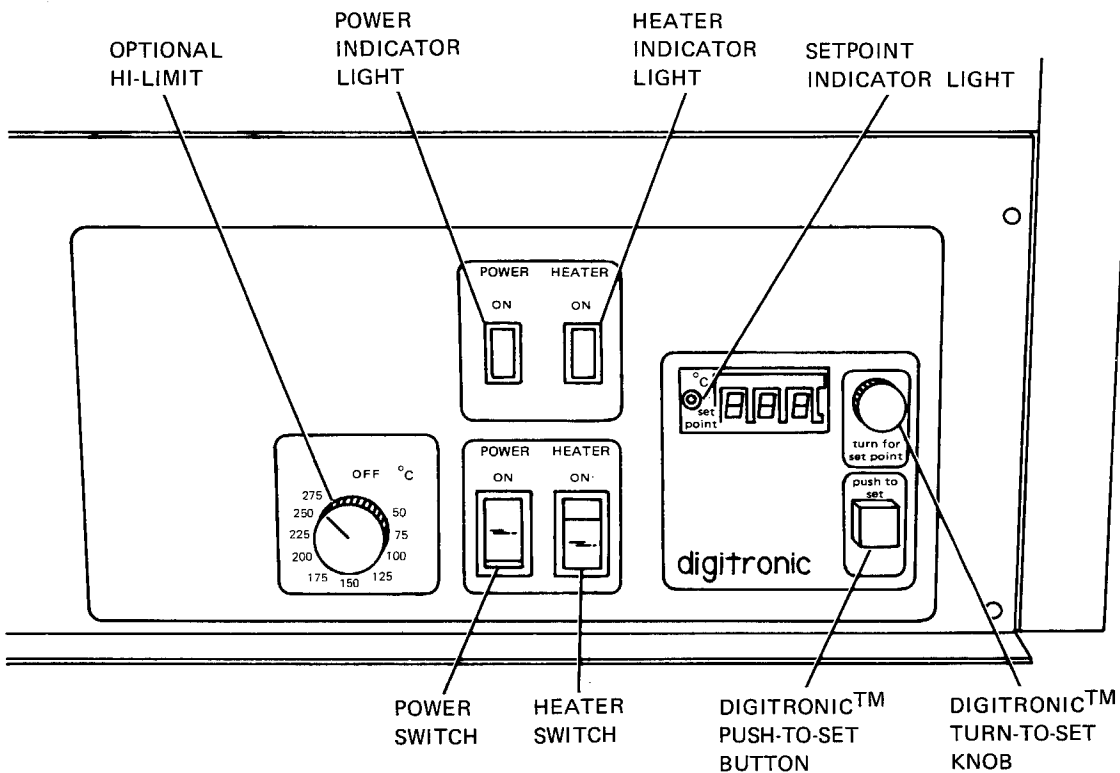
DO NOT exceed the maximum operating temperature, 204°C (400°F).

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

REPLACE 3F fuses with NON-6 or OT-6 (250V, 6 AMP) only.

FOR supply connections on LDB 1-69 (240V) use 14 AWG or larger wires; LDB 2-18 use 12 AWG or larger wires; and LDB 2-27 and LDB1-69 (120V) use 10 AWG or larger wires. All wires must be suitable for at least 75°C (167°F).

Operation



7. VENTILATION

There is a small fresh air opening in the bottom of the unit that is always open. The exhaust can be adjusted open or closed by lining up the openings in the rotating part of the vent mechanism on the top of the oven.

8. PRACTICE SAFETY

Make it a prime policy to "know what you are doing before you do it." Make **CAREFULNESS, PATIENCE** and **GOOD JUDGEMENT** the safety watchwords for the operation of your oven.

Starting the Oven

1. Push power switch to "ON" (indicator light should light). This activates the fans and control circuit.
2. Press and hold "push-to-set" button on the Digitronic™ temperature control. The display will be in the set point mode and the set point indicator light is on as long as the button is depressed.
3. Rotate "turn-to-set" knob until the desired chamber temperature is displayed. Release the "push-to-set" button. Note that the set point will be changed if knob is turned when button is not depressed.
4. Set optional hi-limit device by rotating hi-limit control knob to 10-15°C (18-27°F) above process temperature. Set point should be low enough to prevent damage to the workload but high enough to allow the Digitronic to control at set point. Hi-limit will assume control of heater if chamber temperature exceeds high limit set point.
5. Push heater switch to "ON". Heater indicator light should light. This activates the heating elements. 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.

6. The readout area will alternatively display set point and actual chamber temperature. Set point is on display when the small light shows above the "set point" label.
7. 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.
8. When the operating temperature is approximately 65°C (149°F) or lower, the vent(s) should be wide open to assure these low temperatures can be achieved. The exhaust vent is on top of the oven.

Loading the Oven

1. Avoid spills of anything onto the heater elements or floor of oven.
2. The two shelves are designed to be pulled out about half-way without tipping.
3. The support capacity of the shelves is 25 pounds. Do not overload the shelves.
4. Do not place the load on the oven floor plate. Placing the load on the oven floor plate may cause the load to heat unevenly and the weight may cause shorting out of the heater elements. Use the shelves provided.
5. Distribute workload evenly so that airflow is not restricted.
6. Do not overfill your oven. The workload should not take up more than two-thirds of any dimension of the inside cavity.

Shutting down the oven

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.

How to replace parts

WARNING—Disconnect main power switch or power cord before attempting any repairs or adjustments.

Replacing control unit (Tools needed: screwdriver, either an adjustable wrench or a nut driver, pliers)

1. Disconnect power. Remove screws from the face of the control panel and slide it forward.
2. Locate the Digitronic printed circuit (PC) board.
3. Remove wires from terminal strip, noting which numbered wires connect to which terminals. Refer to wiring diagram in this manual.
4. Remove the screws holding the terminal board onto sub-panel. Replace old PC board with new PC board. Attach board to sub-panel.
5. Reattach wires to terminal strip making sure the correct ones are connected.
6. Replace control panel.

Replacing heater unit (Tools needed: crescent wrench, screwdriver)

1. Disconnect power. Remove floor plate by removing screws and lifting it out.
2. Disconnect heater leads from heater element with wrench. Note which wires go on which terminals.
3. Unscrew the screws holding the frame to the oven body. Remove the heater and discard.
4. Screw down new heater frame.
5. Attach heater leads to appropriate terminals.
6. Replace interior floor.

Replacing fan motor (Tools needed: screwdriver, 5/32" Allen wrench, and crescent wrench)

1. Disconnect power. Remove chamber floor by removing screws and lifting it out.
2. Remove the screws from heater frame then tip up and to the right.
3. Loosen set screws on fan wheel inside fan housing.
4. Remove the screws from the face of the control panel and slide it forward to uncover motor.
5. Tip oven on its back.
6. Unbolt the four bolts holding the motor to the motor mount.
7. Remove motor (NOTE: 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.
8. Disconnect motor leads from terminal block.
9. Hold new motor in place while you remount fan wheel to motor shaft. Reattach motor to motor mount.

10. Attach motor lead wires to terminal block (see wiring diagram).
11. Replace oven control panel and bottom, then tip oven upright again.
12. Adjust fan wheel for 3/16" clearance between wheel and inlet ring.
13. Tighten set screws making sure set screws hit the flats machined into the motor shaft.
14. Bolt heater back in place.
15. Replace interior floor.

Replacing the optional hi-limit (Tools needed: small screwdriver)

1. Disconnect power. Remove the screws from the face of the control panel and slide it forward.
2. Locate control thermocouple along the right side of the control chamber.
3. Remove floor plate from inside of oven.
4. Tip oven on its back and remove bottom plate.
5. Carefully uncoil the new capillary tube, taking care not to kink it.
6. Feed the hi-limit capillary from bottom into oven chamber and clip it into the mounting clips.

NOTE: The end of the capillary tube closest to the hi-limit body is electrically insulated, but be sure that the uncoiled portion of the tube is **not** near any wire terminals.

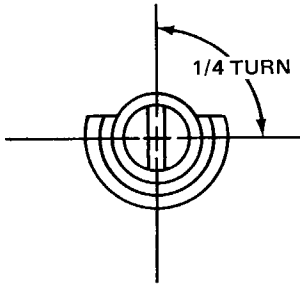
7. Replace oven bottom. Tip oven right side up. Replace chamber floor.
8. Remove the "hi-limit" label on the outside of the control panel.
9. Detach the old hi-limit body by unscrewing the screws that were underneath the label.
10. Remove the hi-limit and discard.
11. Attach the new hi-limit. Put on the new label. Reattach the knob.
12. Replace control panel of oven.

Recalibrating the hi-limit (Tools needed: small screwdriver)

The hi-limit device was calibrated at our factory; however it may need periodic checking and recalibration. If the hi-limit overrides the Digitronic when the hi-limit is set above Digitronic set point, the hi-limit needs recalibration. The hi-limit is in control when heater indicator light is lit for 2-3 seconds at a time rather than for a fraction of a second. Recalibrate using the following procedures:

1. Turn oven on and set controller at 204°C (400°F). It should be stabilized at temperature for about one hour before adjustments are made.
2. Set hi-limit to 204°C (400°F). Pull hi-limit control knob off. Calibration screw is located in the center of the thermostat shaft.
3. 1/4 turn of the screw equals approximately 20°C (68°F).

4. If hi-limit set point is HIGHER than actual oven temperature, (Digitronic readout) turn calibration screw counterclockwise.
5. Turn the screw until the heater shuts off.
6. If set point is LOWER than actual temperature, turn screw clockwise.
7. Turn the screw until the heater turns on.
8. If readings do not coincide within 30 minutes, repeat operation.
9. Replace knob on shaft.

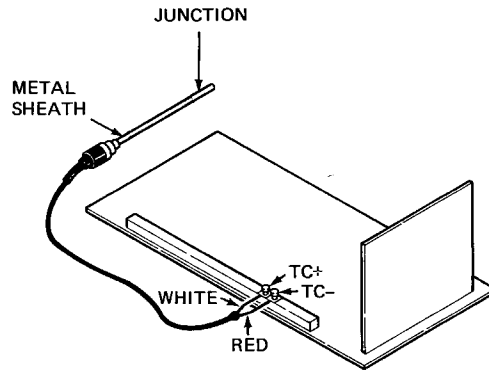


Thermocouple break protection

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.

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 and hi-limit bulb along the right side of the control chamber.
3. Remove floor plate from inside of oven.
4. Tip oven on its back and remove bottom plate.
5. Remove old thermocouple from the bottom of the oven.
6. Feed new thermocouple back through existing holes.
7. Remove old thermocouple from terminals marked "TC+" and "TC-" on PC board.
8. Attach new thermocouple to "TC+" and "TC-" making sure that white lead is attached to the "+" terminal and the red lead is attached to the "-".
9. Replace oven bottom plate and oven control panel.
10. If decimal points still appear between numerals, repeat procedure.



Digitronic Control

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 offset clockwise. If the oven temperature is above the setpoint, turn offset pot counterclockwise. 1/16 turn of the pot is equal to approximately 1°C (2°F). Adjust until both read the same.

Digitronic troubleshooting

DIFFICULTY

PROBABLE CAUSE

SUGGESTED REMEDY

Erratic Sensor Readout

Broken T/C

See Thermocouple Test

Control Malfunction

See Control Output Test

Erratic Setpoint Readout

Bad Slide Wire on 5K Potentiometer

See Potentiometer Test

Control Malfunction

See Potentiometer Test

Inaccurate Temperatures

Control Miscalibration

See Calibration Test

Decimal Points Between the Numerals

Sensor Readout

Thermocouple is Open or Broken

See Thermocouple Break Protection

Setpoint Readout

Overrange

Lower Setpoint Potentiometer or Input Signal Voltage

Tests

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.

Thermocouple Test:

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

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.

Potentiometer Test:

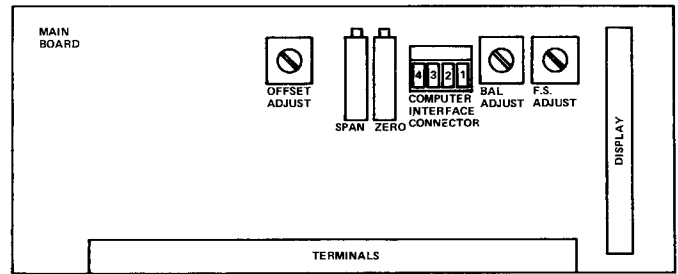
Control:

1. Most controls have a bypass resistor across terminals P₁ and P₂ to limit the maximum operating setpoint temperature.
2. Remove one potentiometer lead leaving the bypass resistor across P₁ and P₂. 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 counterclockwise 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

1. Disconnect line power to the control.
2. Attach an accurate potentiometer with a millivolt of Type "J" thermocouple output to the "TC+" and "TC-" terminals on the control.
3. Attach a multimeter with internal impedance greater than 10,000 OHMS/volt DC across terminal + and - on the control. Remove jumper, if one was installed.
4. Set meter to 30 VDC range.
5. Turn the line voltage on.
6. Set offset, bal. adjust, and FS adjust to mid range.
7. Turn millivolt source to 0.0°C or °F. Adjust zero pot on control when necessary, if the readout is not the same.
8. Turn millivolt source to 538°C (1000°F). Adjust span pot on control when necessary if readout is not the same.
9. Turn millivolt source to 150°C (302°F).
10. Adjust the FC adjust pot if the readout is not 150°C (302°F). Turn the FC adjust clockwise to turn the readout down.
11. Turn the control setpoint pot (5K) until the meter is fluctuating at about 50% on and 50% off.
12. If the setpoint readout is not 150°C (302°F) adjust the bal. adjust until the setpoint is 150°C (302°F). Turn the bal. adjust pot clockwise to turn the setpoint up.
13. Repeat steps 11 and 12 until the setpoint and sensor temperature both read 150°C and the meter is fluctuating at 50%.
14. Disconnect all power, leads and reinstall jumper if necessary.
15. Place nail polish on the zero, span, FS adjust, and bal. adjust pots.

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 don't know what to do, contact Despatch at our toll free "Help Line" 800-328-5476 (In MN 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)
	Broken or frayed cord	Replace with new cord and plug set
	Control malfunction	See troubleshooting 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
	Heating element burned out	Replace burned out element (see warranty statement)
	240 volt oven is connected to a 208 volt line	Reconnect heater for 208V (see wiring diagram)
	Fan motor failure	Replace fan motor
Frequent heater element burn out	Harmful fumes generated by load	Increase vent opening or discontinue process
	Overheating Oven	Do not operate over 204°C (400°F)
Erratic temperatures	Control malfunction	See troubleshooting information on Digitronic
Inaccurate temperatures	Control miscalibration	Recalibrate control (see section on control recalibration)
	Optional hi-limit setting	Hi-limit should be 10-25° higher than control setpoint
Excess surface temperature around door	Door seal deterioration	Replace door seal
Improper airflow	Fan motor failure	Replace fan motor
	Unbalanced fan wheel	Replace fan wheel
Excessive Vibration	Dirty fan wheel	Clean Fan
	Unbalanced fan wheel	Replace fan wheel
Oven will not control at set point	Hi-limit set too low	Set the hi-limit higher
	Hi-limit is out of calibration	Recalibrate the hi-limit (see directions on recalibrating the hi-limit)
	Triac malfunction	Replace Triac
	Control malfunction	See troubleshooting information on Digitronic
	Air friction of recirculation fan	Open exhaust air vent. Unit will not control below room ambient plus 45°C (81°F) with vent closed.
Heater does not shut off until the temperature reaches the hi-limit setting	Triac shorted	Replace Triac

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How to install LDB optional accessories:

Four optional accessories are available for LDB series ovens. They are available at any time from Despatch Industries' Customer Service Department, 800/328-5476 which is our no toll "Help Line". (MN 800-462-5396)

When replacing parts on your oven be sure you obtain the proper item by ordering genuine Despatch parts from your nearest Despatch dealer or from our Customer Service Department, 612/331-1873.

When you order accessories, full instructions for mounting them in the control panel will be enclosed; however, in case they are misplaced, instructions are repeated here.

Over-temperature protection device (hi-limit). This controlling hi-limit is variably settable to 204°C. Should oven temperature exceed hi-limit setpoint, due to heater or controller malfunction, the device will assume control to keep temperature at proper level, protecting your load and the oven. (Tools needed: screwdriver, utility knife.)

- Disconnect power and remove control panel.
- From back of control panel, locate pre-punched holes. Hi-limit may be mounted in either of the two far left sets of holes. From the front of panel, use utility knife to cut holes in the silver overlay.
- Put shaft and mounting screws through holes and screw device into place, taking care that wire terminals are facing upwards.
- Replace control panel.
- Peel top part of backing off black "High Limit" sticker and apply it to front of control panel, using the two locating marks and shaft hole as location guides. Peel remaining backing and smooth sticker down.
- Push knob onto shaft.
- Remove floor plate from inside of oven.
- Tip oven on its back and remove bottom plate.
- Carefully uncoil capillary tube (see photo) taking care not to kink it. Feed capillary up from the bottom into oven chamber and clip it into bulb mounting clips. Note that temperature control thermocouple is already clipped into half of the double clip.

The end of the capillary tube closest to the hi-limit body is electrically insulated, but be sure that the uncoiled portion of the tube is **not** near any wire terminals.

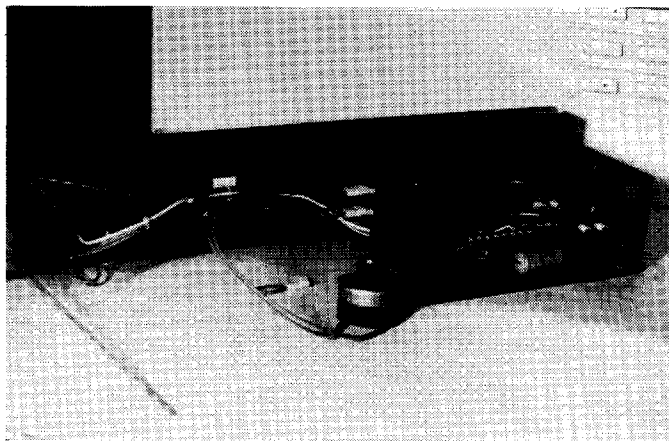
- Replace oven bottom. Tip oven right side up. Replace chamber floor.
- To operate hi-limit, set knob at **maximum** desired temperature.

Remote Setpoint

The control is designed to accept a 0-5 VDC (1 MA at 5 volts) analog signal that will program the setpoint. The feedback or temperature signal is also an analog 0-5 VDC from the signal conditioner. 5 VDC signal corresponds to 1000 engineering units (5mV/unit). Part number 031939 is an optional terminal strip which is required to accomplish this interface with a microprocessor or computer.

Process timers. (spring wound) Available for 1, 6, or 12 hour cycles, these timers are electrically connected into oven control and will shut off the heater at end of cycle. (Tools needed: screwdriver, utility knife.)

1. Disconnect power, remove screws from the face of the control panel and slide it forward.
2. From back of panel, locate pre-punched holes. Process timer can be mounted in either of the two far left sets of holes. From the front of panel, use utility knife to cut holes in the silver overlay.
3. Put shaft and mounting screws through holes and screw timer into place.
4. Locate connector marked "Process Timers" on the back of the digitronic bracket. Remove jumper. Replace it with connector supplied with the timer.



5. Replace oven control panel.
6. Peel top part of backing off black "Process Timer" sticker and apply it to front of control panel, using the two locating marks and shaft holes as location guides. Peel remaining backing off and smooth sticker down.
7. Push knob onto shaft.

Signal timer. (spring wound) This timer sounds an audible bell at the end of the cycle, up to 60 minutes. It is not electrically connected to oven and does not shut off heater. (Tools needed: screwdriver, utility knife.)

1. Disconnect power, remove screws from the face of the control panel and slide it forward.
2. From back of panel, locate pre-punched holes. Signal timer can be mounted in either of the two far left sets of holes. From the front of panel, use utility knife to cut holes in the silver overlay.
3. Put shaft and mounting screws through the holes and screw timer into place.
4. Replace control panel.
5. Peel top part of backing off black "Signal Timer" sticker and apply it to front of control panel, using the two locating marks and shaft holes as location guides. Peel remaining backing and smooth sticker down.
6. Push knob onto shaft.

Industrial Equipment Commercial Warranty

Despatch Industries, Inc. warrants equipment manufactured by Despatch Industries, Inc., 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 (2100) 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 or materials is not deemed normal.

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

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 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, Inc.

Despatch Industries, Inc. 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 occur 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, Inc. 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, Inc. 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, Inc. 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, Inc. 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.



DESPATCH
INDUSTRIES, INC.

Box 1320, Minneapolis, Minnesota 55440 (612) 331-1873 Telex 29-0704

3965 Nashua Dr., Mississauga, Ontario L4V 1P3 (416) 677-4951 Telex 06-983-598

IM 1283 KP

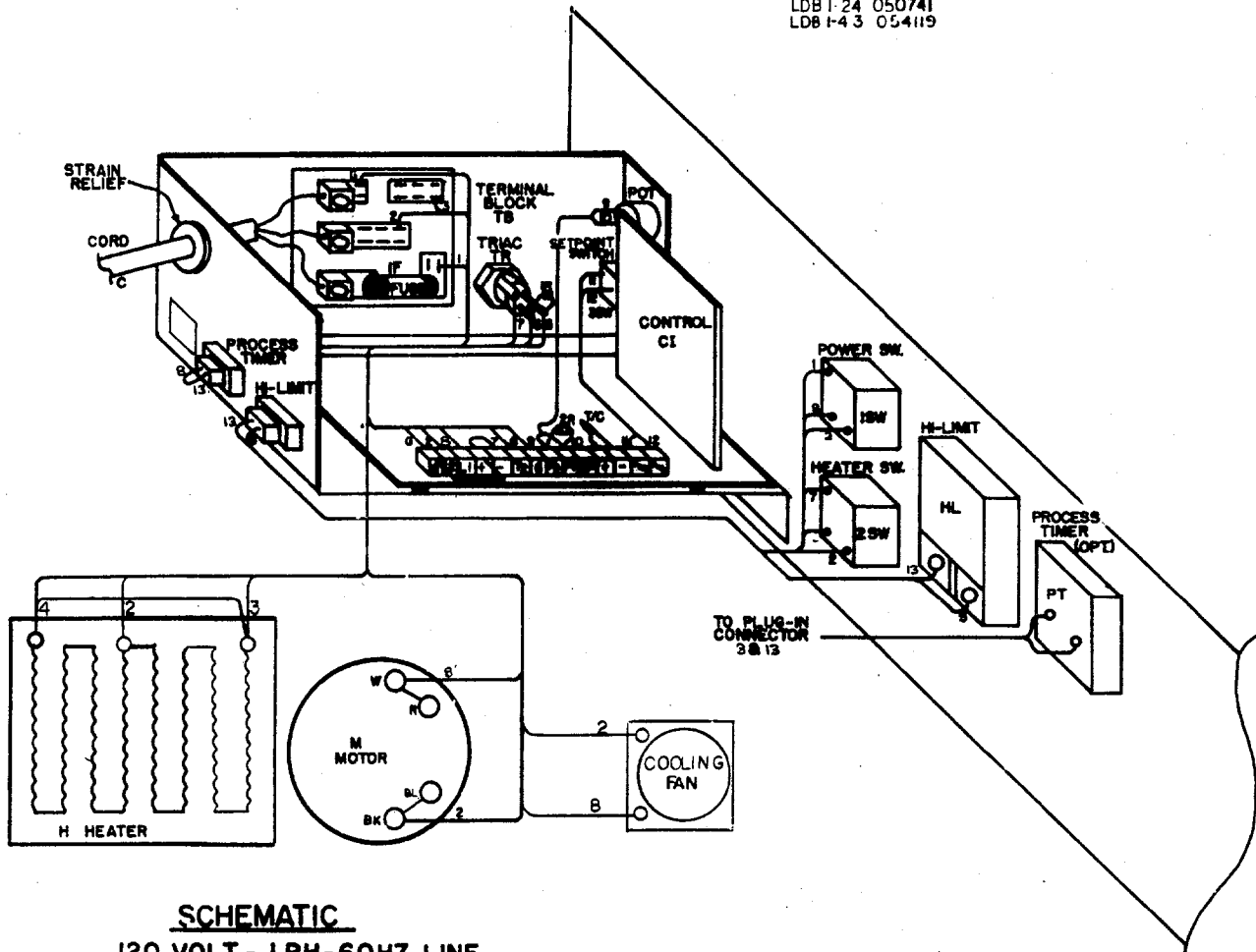
LDB 1-17 LDB 1-24 LDB 1-43

WIRING DIAGRAM

LDB 1-17 050739 COMPLETE PANEL W/DIGITRONIC 120V

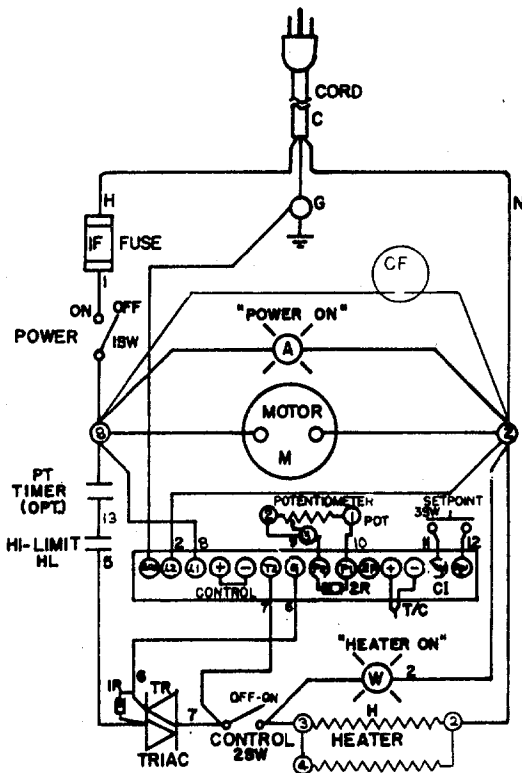
LDB 1-24 050741

LDB 1-43 054119



SCHEMATIC

120 VOLT - 1 PH-60HZ LINE



MATERIAL LIST

ITEM	QTY	DESCRIPTION OF PART
C	1	14/3 SPT CORD 15 AMP
CI	1	61-06-AL CONTROL
HL	1	B-10 HI-LIMIT (OPTIONAL)
M	1	1/25HP MOTOR
IF	1	ABBK15 FUSE
H	1	1200 WATT HEATER
TR	1	T8420D TRIAC
IR	1	100 OHM RESISTOR
2R	1	3.0K OHM RESISTOR
POT	1	5K OHM POTENTIOMETER
1SW	1	LTL-AS1-6S-WH-A-NBL SWITCH
2SW	1	LTL-AS1-6S-WH-W-NBL SWITCH
3SW	1	UP-10M SWITCH
TB	1	DO-04M77 TERMINAL BLOCK
CF	1	COOLING FAN
PT	1	PROCESS TIMER (OPTIONAL)

NO	DATE	BY	AUTHOR	CHANGE
2	6-15-83	TM		ADDED LDB 1-43
1	12/9/82	TM		ADDED COOLING FAN

REVISIONS

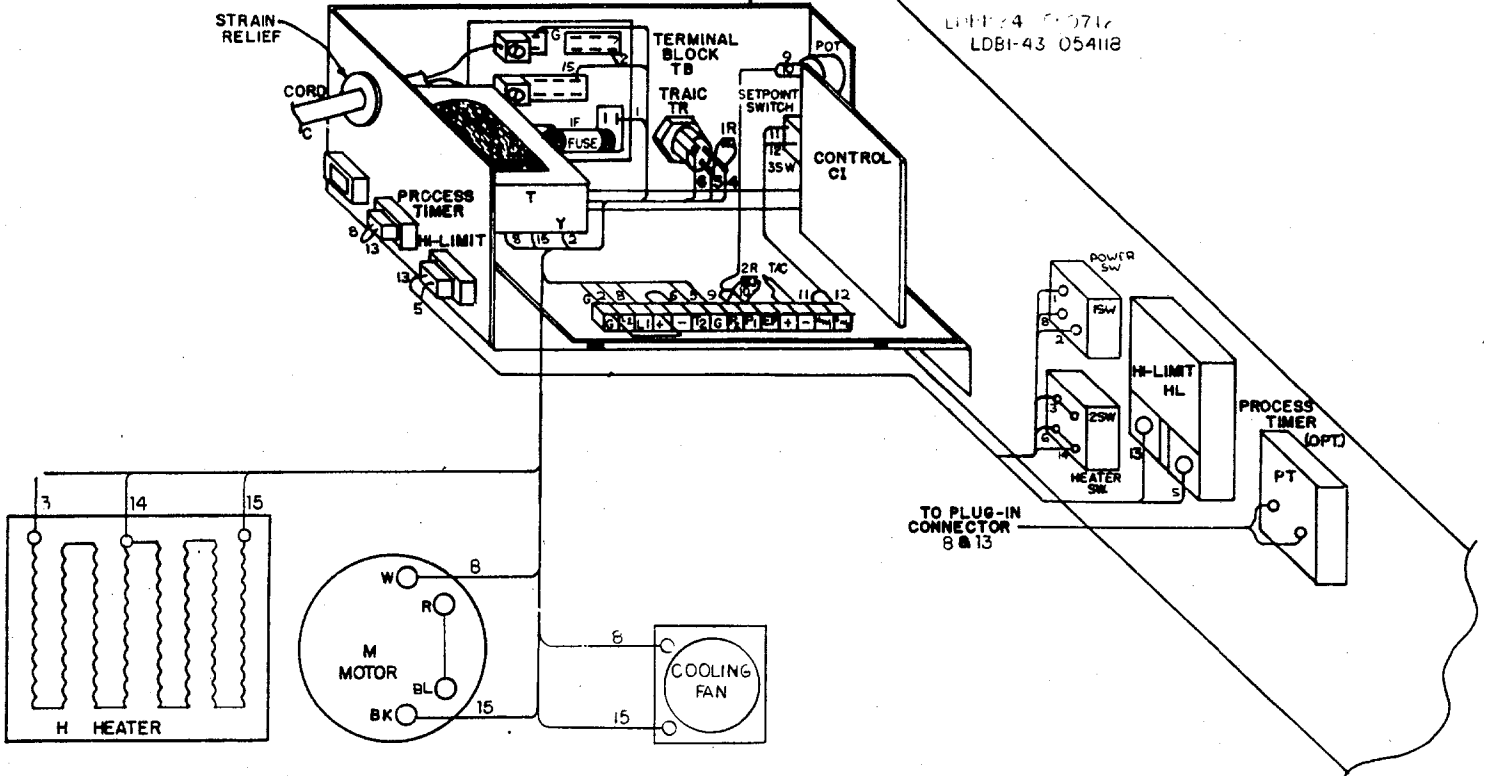
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CUST. NO.	
SERIAL NO.	
DESPATCH INDUSTRIES, INC. Mesa, Arizona 85409	
LDB 1-17	LDB 1-24 WIRING 120V
LDB 1-43	DESIGNED FOR
ENGINEER	SCALE: 1" = 1" DATE: 9/27/81
CHECKED	
APPROVED	BE-7416-11D

LDB1-17 AND LDB1-24 AND LDB1-43

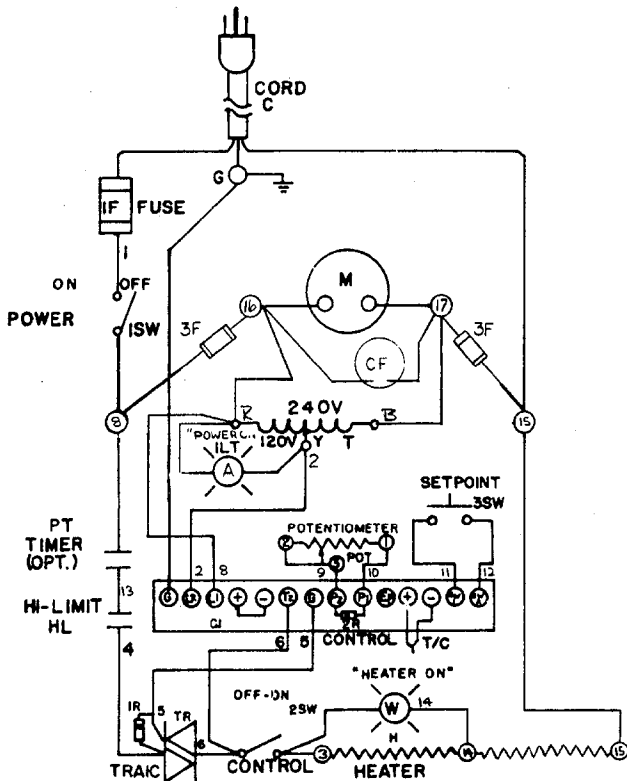
WIRING DIAGRAM

LDB1-17 05140 COMPLETE PANEL W/DIGITRONIC 240V
 LDB1-24 050717
 LDB1-43 054118



SCHEMATIC

240 VOLT-1PH-60HZ LINE



MATERIAL LIST

ITEM	QTY	DESCRIPTION OF PART
C	1	14/3 SJ CORD 15 AMP 250V
CI	1	6I-06-AL CONTROL
HL	1	B-10 H-LIMIT (OPTIONAL)
M	1	1/25 HP MOTOR
IF	1	A25X15 FUSE
H	1	1200 WATT HEATER
3F	2	250V 6AMP FUSE
TR	1	T6420M TRAIC
IR	1	100 OHM RESISTOR
2R	1	3.0K OHM RESISTOR
POT	1	5K OHM POTENTIOMETER
1SW	1	LTL-A516S-WH-A-NBL SWITCH
2SW	1	LTL-A516S-WH-W-NBL SWITCH
3SW	1	UP-10IM SWITCH
TB	1	DO-041877 TERMINAL BLOCK
T	1	50 VA TRANSFORMER P8620
CF	1	COOLING FAN
PT	1	PROCESS TIMER (OPTIONAL)

4	11-7-83	JH	CHANGE T HOKE UP
3	15-83	TM	ADDED LDB1-43
2	6-7-83	TM	ADDED 3F
1	12/8/82	TM	ADDED COOLING FAN
NO	DATE	BY	AUTHOR
			CHANGE

REVISIONS

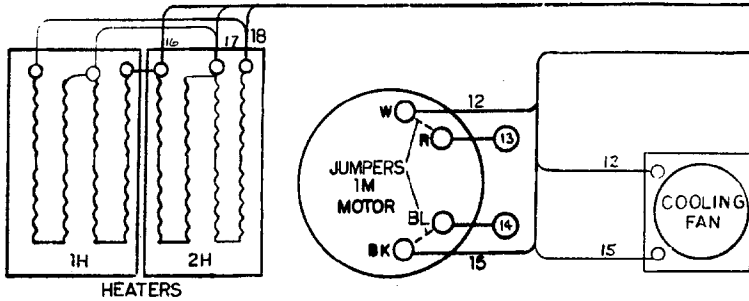
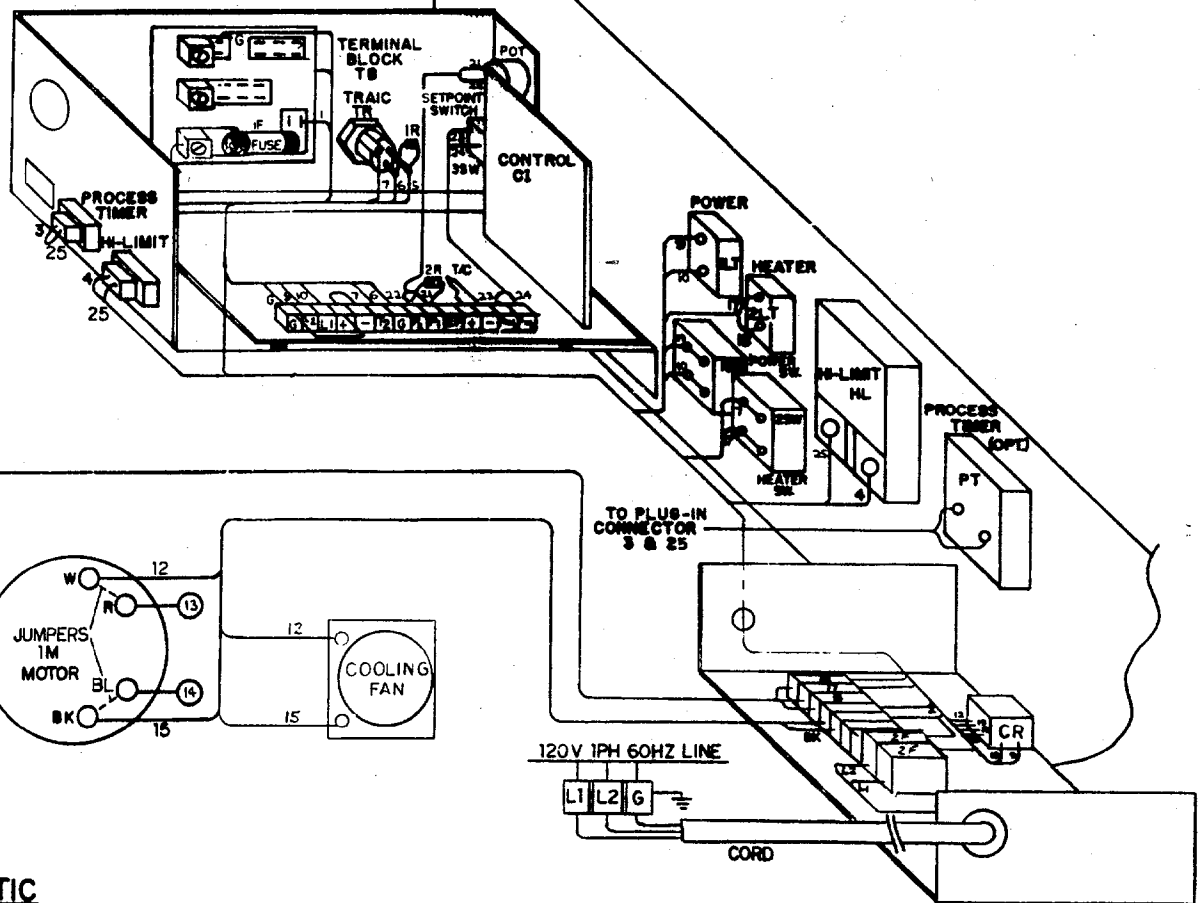
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CUST. NO.	
SERIAL NO.	
DESPATCH INDUSTRIES, INC. Merrimack, Massachusetts 05440	
LDB1-17	LDB1-24 240 VOLT
LDB1-43	DESIGNED FOR
ENGINEER	MB
CHECKED	
APPROVED	
SCALE	1:1 FT
DATE	9/29/78
BE-7416-11H	

LDB 1-69

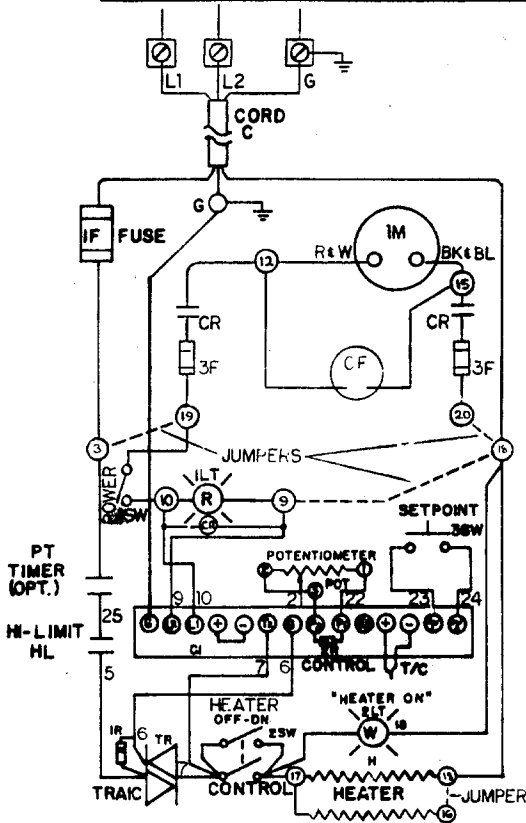
WIRING DIAGRAM

050742 COMPLETE PANEL W/ DIGITRONIC 120VOLT



SCHMATIC

120 VOLT - 1PH - 60HZ LINE



MATERIAL LIST

ITEM	QTY	DESCRIPTION OF PART
C	1	1073 SO CORD 15 AMP 250V
CI	1	61-06-AL CONTROL
HL	1	8-10 M-LIMIT (OPTIONAL)
M	1	1/25 HP MOTOR
F	1	A25X30 FUSE
3F	2	250VOLT 1/4AMP FUSE
1-2H	2	1200 WATT HEATER
TR	1	T6420D TRAC
IR	1	100 OHM RESISTOR
2R	1	3.7 K OHM RESISTOR
POT	1	5K OHM POTENTIOMETER
1LT	1	LT-C2-NR-NI-MF LIGHT
2LT	1	LT-C2-NW-NI-MF LIGHT
1-2SW	2	T1GK-SI-6S-WH-NBL SWITCH
3SW	1	UP-101M SWITCH
TB	1	DO-04877 TERMINAL BLOCK
CF	1	COOLING FAN
PT	1	PROCESS TIMER (OPTIONAL)
CR	1	RELAY 120V COIL

NO	DATE	BY	AUTHOR	CHANGE
6	1/25/69	TM	WDBS	REVISE WTR CONNECTION
5	1/17/69	TM		CHANGE REF TO 3F
4	5/6/68	RLD		MOVED CF TO WTR/12
3	12/8/62	TM		ADDED COOLING FAN
2	5/24/61	RLN		ADD 2F FUSES
1	1/26/61	RLD		DELETE TRANSFORMER

CUST. NO.
SERIAL NO.

DESPATCH INDUSTRIES, INC.
Merrimack, Massachusetts 02540

LDB 1-69
DESIGNED FOR

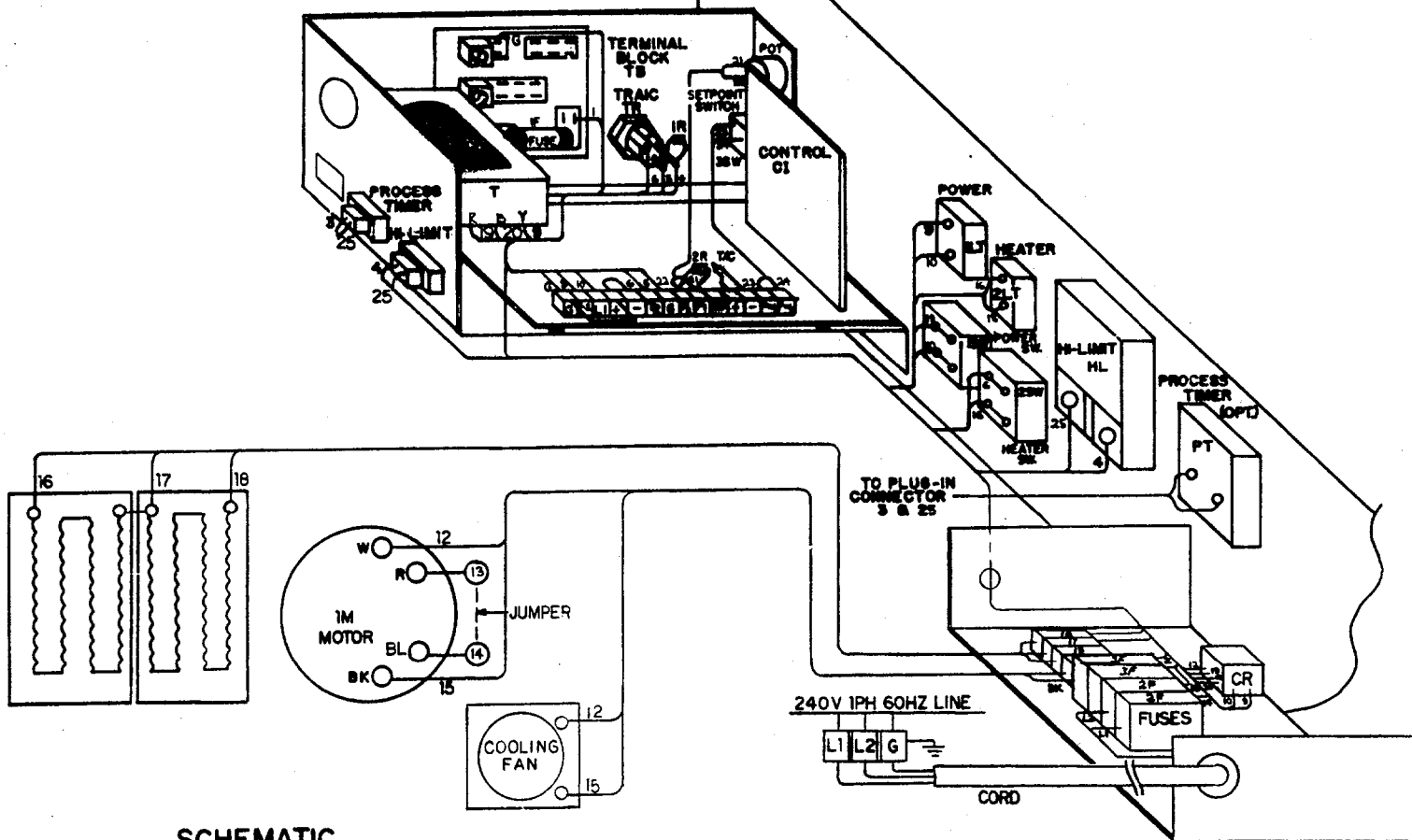
REVISIONS					ENGINEER	JR	SCALE	1/1	DATE	3-31-61
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					APPROVED					

BE-7416-11K

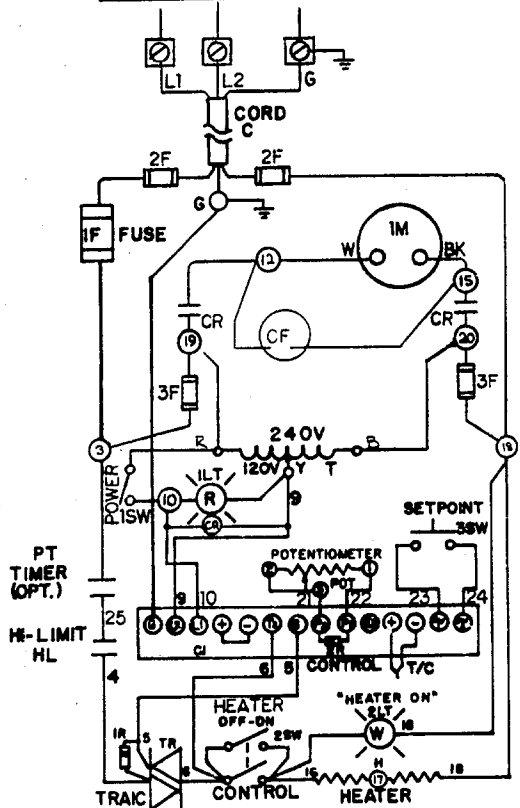
LDB 1-69

WIRING DIAGRAM

050744 COMPLETE PANEL W/ DIGITRONIC 240VOLT



SCHEMATIC
240 VOLT-1PH-60HZ LINE



MATERIAL LIST

ITEM	QTY	DESCRIPTION OF PART
C	1	1075 50 CORD 15 AMP 250V
CI	1	61-06-AL CONTROL
HL	1	B-10 H-LIMIT (OPTIONAL)
M	1	1/25 HP MOTOR
F	1	A25X15 FUSE
2F	2	250 VOLT 15 AMP FUSE
12H	2	1200 WATT HEATER
TR	1	T6420M TRAAC
IR	1	100 OHM RESISTOR
2R	1	3.0 K OHM RESISTOR
POT	1	5K OHM POTENTIOMETER
1LT	1	LT-C2-NR-NI-MF LIGHT
2LT	1	LT-C2-NW-N2-MF LIGHT
1-2SW	2	T16K-SI-68-WH-NBL SWITCH
3SW	1	UP-101M SWITCH
TB	1	D0-041877 TERMINAL BLOCK
T	1	50 VA TRANSFORMER P8620
3F	2	250 VOLT 6 AMP FUSE
PT	1	PROCESS TIMER (OPTIONAL)
CR	1	RELAY 120V COIL
CF	1	COOLING FAN

NO.	DATE	BY	AUTHOR	CHANGE
3	11-7-83	TM		CHANGE T HOOD-UP
2	6-21-83	TM		CHANGE COOLING FAN HOOD-UP
1	12-6-82	TM		ADDED COOLING FAN

CUST. NO.
SERIAL NO.

DESPATCH INDUSTRIES, INC.
Manchester, Massachusetts 02448

LDB 1-69 DESIGNED FOR

REVISIONS

ENGINEER JR SCALE 1:1 DATE 3-27-81
CHECKED 7/7
APPROVED

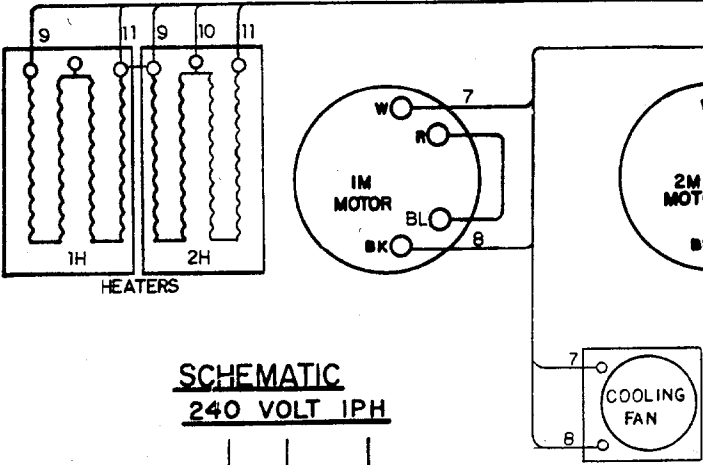
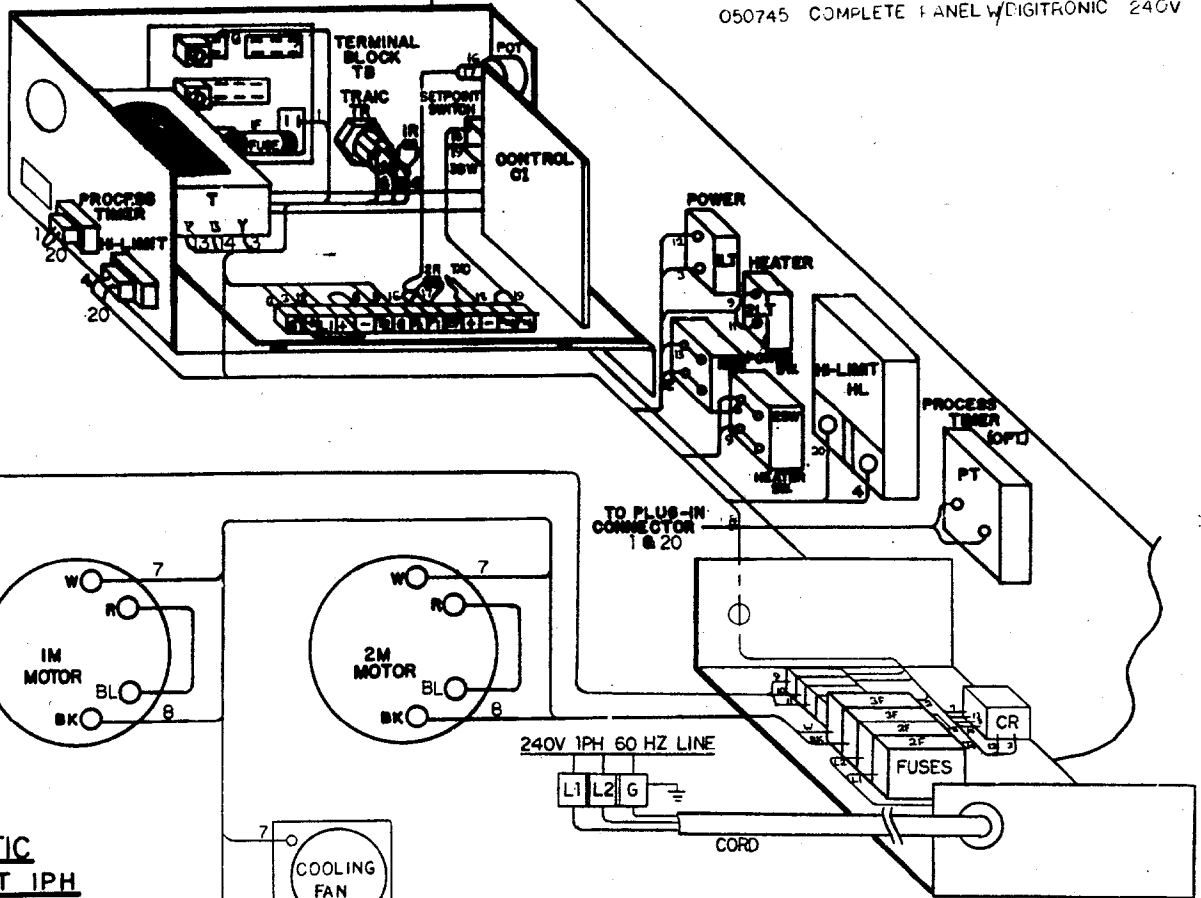
BE-7416-11L

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LDB 2-27

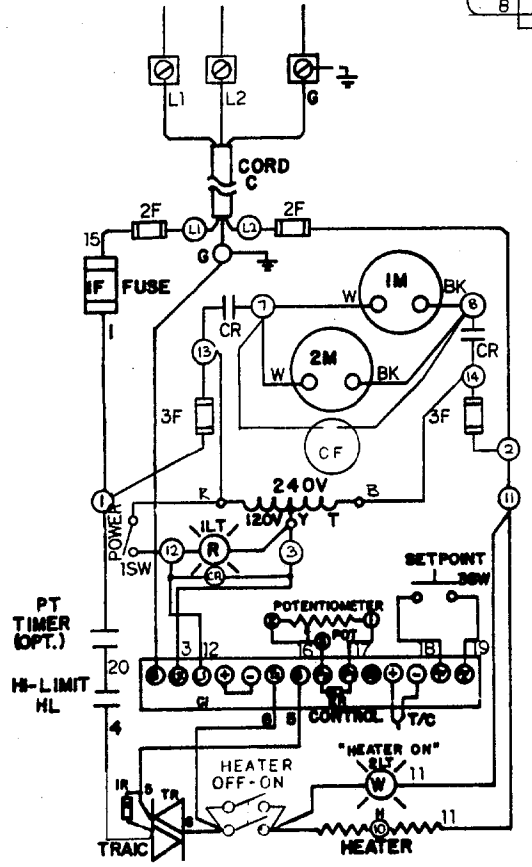
WIRING DIAGRAM

050745 COMPLETE PANEL W/ DIGITRONIC 240V



**SCHEMATIC
240 VOLT 1PH**

MATERIAL LIST		
ITEM	QTY	DESCRIPTION OF PART
C	1	10/3 30 CORD
G1	1	61-06-AL CONTROL
HL	1	B-10 H-LIMIT (OPTIONAL)
1-2M	2	1/25HP MOTOR
IF	1	AMB30 FUSE
2F	2	250 VOLT 30AMP FUSE
1-2H	2	2400 WATT HEATER
TR	1	TR-200M TRAC
1R	1	100 OHM RESISTOR
2R	1	30 K OHM RESISTOR
POT	1	5K OHM POTENTIOMETER
1LT	1	LT-CE-NR-NI-MF LIGHT
2LT	1	LT-CE-NW-NR-MF LIGHT
1-SSW	2	TRK-51-02 WH-NBL SWITCH
SSW	1	UP-101M SWITCH
TB	1	60-04677 TERMINAL BLOCK
FB	2	F30A2 FUSE BLOCK
T	1	50 VA TRANSFORMER PB420
3F	2	250 VOLT 6 AMP FUSE
PT	1	PROCESS TIMER OPTIONAL
CR	1	RELAY 120 V COIL
CF	1	COOLING FAN



NO	DATE	BY	AUTHOR	CHANGE
3	11-7-83	TM		CHANGE T HOOD-UP
2	6-17-83	TM		CHANGED COOLING FAN HOOD-UP
1	12/8/82	TM		ADDED COOLING FAN

CUST. NO.
SERIAL NO.

DESPATCH INDUSTRIES, INC.
Merrill, Massachusetts

LDB 2-27 WIRING
DESIGNED FOR

REVISIONS

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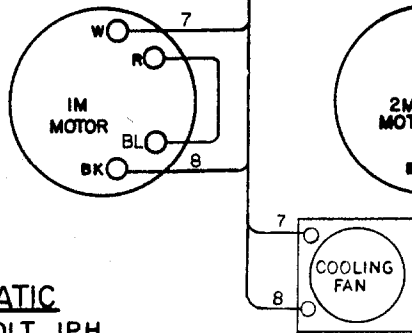
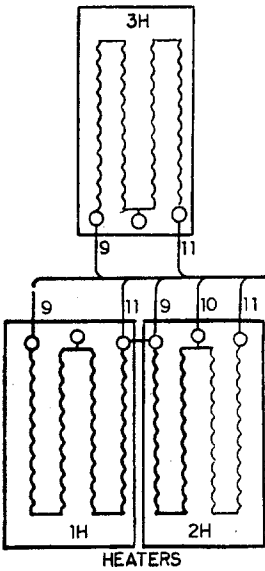
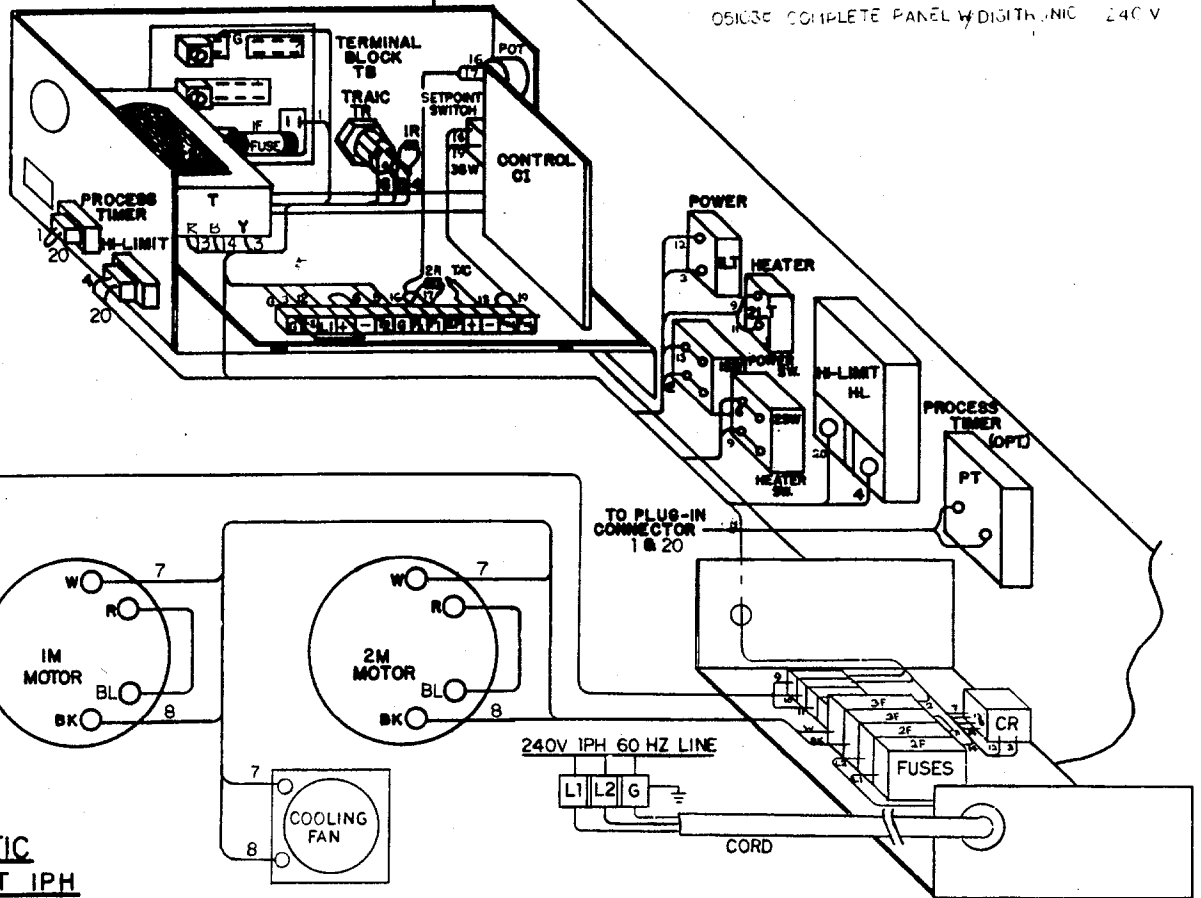
DESIGNED: JR SCALE: 1:1 DATE: 3-30-81
CHECKED: []
APPROVED: []

BE-7416-11R

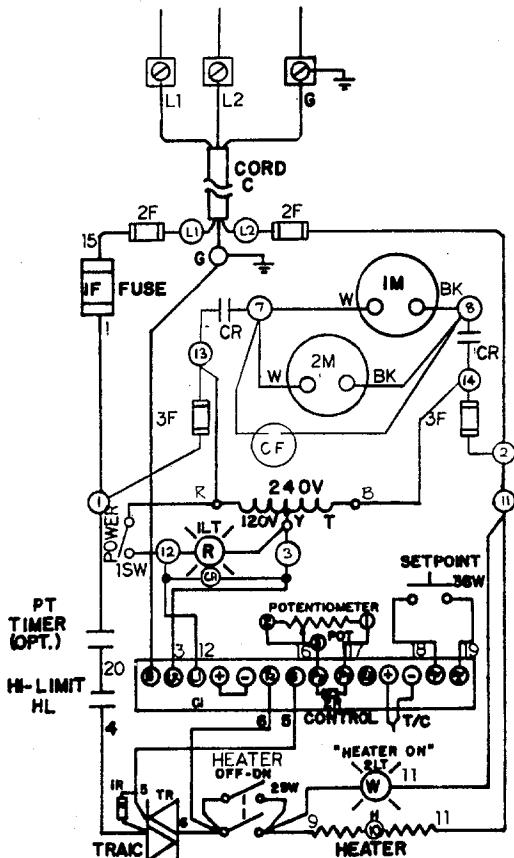
LDB 2-18

WIRING DIAGRAM

051036 COMPLETE PANEL W/ DIGITAL NO. 240 V



SCHEMATIC
240 VOLT IPH



MATERIAL LIST		
ITEM	QTY	DESCRIPTION OF PART
C	1	10/3 50 CORD
CI	1	81-06-AL CONTROL
HL	1	B-10 H-LIMIT (OPTIONAL)
1-2M	2	1/25HP MOTOR
1F	1	A25X25 FUSE
2F	2	250 VOLT 25 AMP FUSE
1-3H	3	1200 WATT HEATER
TR	1	T8420M TRAC
1R	1	100 OHM RESISTOR
2R	1	3.0 K OHM RESISTOR
POT	1	5K OHM POTENTIOMETER
1LT	1	LT-C2-NR-NI-MF LIGHT
2LT	1	LT-C2-NW-N2-MF LIGHT
1-35W	2	T10K-SI-02-WH-NBL SWITCH
35W	1	UP-10IM SWITCH
TB	1	DO-04877 TERMINAL BLOCK
FB	2	F30A2 FUSE BLOCK
T	1	50 VA TRANSFORMER PB620
3F	2	250 VOLT 6AMP FUSE
PT	1	PROCESS TIMER (OPTIONAL)
CR	1	RELAY 120V COIL
CF	1	COOLING FAN

NO.	DATE	BY	AUTHOR	CHANGE
3	11-4-83	TM		CHANGE TRAYS HOOD-UP
2	6-17-83	TM		CHANGE COOLING FAN HOOD-UP
1	12-7-82	TM		ADDED COOLING FAN

REVISIONS

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CUST. NO.	
SERIAL NO.	
DESPATCH INDUSTRIES, INC. Mesa, Arizona 85408	
LDB 2-18	WIRING
DESIGNED FOR	
ENGINEER	JR
DRAWN	
APPROVED	
SCALE	1 FT. DATE 3-30-81
BE-7416-11P	