

INSPIRED INNOVATION

Despatch
INDUSTRIES

STACKABLE LCC/LCD OVEN OWNER'S MANUAL

C-195
PN 156452
VERSION 26
09/2010

SERVICE AND TECHNICAL SUPPORT

service parts: 1-800-473-7373

international service/main: 1-952-469-8230

service fax: 1-952-469-8193

service@despatch.com

GLOBAL HEADQUARTERS

phone: 1-952-469-5424

toll free usa: 1-888-337-7282

fax: 1-952-469-4513

sales@despatch.com

service@despatch.com

8860 207th Street West
Minneapolis, MN 55044 USA

Despatch
INDUSTRIES

MINNEAPOLIS • SHANGHAI • BERLIN • SINGAPORE • HSINCHU • TOKYO

Revision History

Revision	Date	Author	Description
B	6/01		Various corrections
C	11/01		Corrections, addition of schematic drawings
D	1/02		Corrections, update of schematic drawings
E	4/02		Update of schematic drawings, modified per Rev C Protocol Plus software
F	7/02		Corrections to Protocol Plus software description
G	9/02		Miscellaneous corrections
H	11/02		Modify operating procedure, update schematic drawings
I	1/03		Update Despatch warranty pages
J	5/03		Update of schematic drawings
K	8/03		Update of schematic drawings
L	11/03		Update to Protocol Plus Version 4.0.
M	12/03		Add door lock manual override and Nitrogen needle valve information
N	2/04		Update of schematic drawings
P	9/04		Update of schematic drawings
Q	11/04		Update of schematic drawings
R	3/05		Update of schematic drawings
S	6/05		Update Declaration of Conformity
T	12/05		Update Declaration of Conformity, add LLC notes
U	8/06		Revised Protocol Plus numbers. Updated Despatch address. Updated CE documents.
V	11/07		Updated warranty
W	12/07		Corrected Nitrogen Inlet connection from 3/8" to 1/4"
X	3/09		Updated Controller Section
Y	2/10		Updated Declaration of Conformity and drawings
25	7/10	K. Livingston	Revise format
26	9/10	K. Livingston	Remove Protocol Plus to separate manual

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

Table of Contents

1.	About This Manual	6
1.1.	Important User Information	6
1.2.	Manufacturer & Service.....	7
1.3.	Organization of this Manual	7
1.4.	Conventions	8
1.5.	Specifications	9
1.5.1.	Model Numbering and Naming Conventions	9
1.5.2.	Dimensions.....	9
1.5.3.	Capacities	10
1.5.4.	Power.....	10
1.5.5.	Temperature	11
2.	Safety	12
2.1.	Safety Information	12
2.1.1.	Lockout.....	12
2.1.1.1.	Lockout Requirements.....	12
2.1.1.2.	Lockout Procedure.....	12
2.1.2.	Door and Panel	13
2.2.	Maintenance.....	13
2.3.	Electrical Power	13
2.4.	Fire	14
2.5.	Equipment Lockout Requirements	14
2.5.1.	Emergency Stop	14
3.	Theory of Operation.....	15
3.1.	The Stackable LCC/LCD Series Oven	15
3.2.	The Protocol Plus Controller	16
3.3.	HEPA Filters.....	17
3.3.1.	Definitions.....	17
3.3.2.	Filter Packaging, Shipping and Handling	17
3.3.3.	HEPA Filter Validation Testing.....	18
3.3.3.1.	D.O.P. Testing	18
3.3.3.2.	Class 100 Testing.....	18
3.3.3.3.	Validation Testing	19
3.3.3.4.	HEPA Filter Burn-off Process Not Necessary	19
3.3.4.	HEPA Filter Unit Replacement.....	19
3.3.5.	HEPA Filter: Magnehelic Pressure Gauge.....	20
4.	Assembly & Setup	21
4.1.	Unpack & Inspect The LCC/LCD Oven.....	21
4.1.1.	If Damaged During Shipping	22
4.2.	Set-up The LCC/LCD Oven	22
4.2.1.	Select Oven Location	22
4.2.1.1.	Single Oven Placement Requirements	22
4.2.1.2.	Multiple Oven Placement Requirement	22
4.2.2.	Oven Utility Connections.....	23
4.2.2.1.	Nitrogen With Water-Cooled Models	24

4.2.2.2.	Air Atmosphere with Optional Water Cooling Model	25
4.2.3.	Exhaust Connections	27
4.2.4.	Wiring & Power Connections	27
4.3.	HEPA Filter Installation	29
4.3.1.	HEPA Filter Burn-Off.....	33
4.3.1.1.	HEPA Filter Burn-Off Process	33
4.3.1.2.	Location of HEPA Filter Burn-Off Process	33
4.3.1.3.	Recommended HEPA Filter Burn-Off Process	34
4.4.	MRC5000 Setup (Optional).....	35
5.	Operation.....	37
5.1.	Load Oven.....	37
5.2.	Pre-Startup Checklist	38
5.3.	Operating Procedure	39
5.3.1.	Start Oven.....	39
5.3.2.	Working with Protocol Plus Operating Modes	39
5.3.3.	Sequence of Operation for Ovens Equipped with Optional Beacon Light 39	
5.3.4.	Sequence of Operation for Ovens Equipped for Inert Atmosphere Oven	41
5.3.5.	Manual Unlock and Main Disconnect.....	43
5.3.5.1.	Manual Unlock	43
5.3.5.2.	Main Disconnect Switch.....	43
6.	Maintenance	44
6.1.	Checklist	44
6.2.	Lubrication	44
6.3.	HEPA Filter Replacement.....	44
7.	Troubleshooting: Error Messages and Alarm	45
8.	Appendices.....	46
8.1.	HEPA Filter Pressure Reading Worksheet	46
8.2.	Standard Products Warranty	47
8.3.	EC Declaration of Conformity.....	48
8.4.	Electrical Schematics	48

Figures

Figure 1.	Stackable LCC/LCD Series Oven.	15
Figure 2.	Protocol Plus Displays and Control Buttons.	16
Figure 3.	This Side Up graphic.	17
Figure 4.	Magnehelic Pressure Gauge Measures Pressure in front of the HEPA filter. ...	20
Figure 5.	Door Lock Manual Override Key (LCC/LCD/LLC/LLD).	21
Figure 6.	LCC/LCD Connections Panel.	24
Figure 7.	Exhaust Port on the Left Side of the LCC/LCD Oven.	27
Figure 8.	Open the front panel for access.	28
Figure 9.	Conduit entrance at rear of oven and open front panel.	29
Figure 10.	Example HEPA Filter (Silicone-free) and Close-Up.	31
Figure 11.	Remove inner casing to install HEPA filter.	32

Figure 12. Options for Starting Termikfil 2000 Filter.	34
Figure 13. Power the Oven.	39
Figure 14. Nitrogen Flowmeter.....	41
Figure 15. Adjust Nitrogen Maintain Needle Valve.....	42
Figure 16. Water and Nitrogen Piping Schematic.	42
Figure 17. LCC1-16-3 (Drawing 150008-01).....	49
Figure 18. LCC1-16-3 (Drawing 150008-02).....	49
Figure 19. LCC1-16-3 (Drawing 150008-03).....	49
Figure 20. LCC1-16N-3 (Drawing 150047-01).....	49
Figure 21. LCC1-16N-3 (Drawing 150047-02).....	49
Figure 22. LCC1-16N-3 (Drawing 150047-03).....	49
Figure 23. LCC1-51-3 (Drawing 150044-01).....	49
Figure 24. LCC1-51-3 (Drawing 150044-02).....	49
Figure 25. LCC1-51-3 (Drawing 150044-03).....	49
Figure 26. LCC1-51N-3 (Drawing 159135-01).....	49
Figure 27. LCC1-51N-3, Drawing 159135-02).....	49
Figure 28. LCC1-51N-3 (Drawing 159135-03).....	49
Figure 29. LCC1-51N-3 (Drawing 159135-04).....	49
Figure 30. LCC1-51-3 (Drawing 159159-01).....	49
Figure 31. LCC1-51-3 (Drawing 159159-02).....	49
Figure 32. LCC1-51-3 (Drawing 159159-03).....	49
Figure 33. LCC1-51N-3 (Drawing 163141-01).....	49
Figure 34. LCC1-51N-3 (Drawing 163141-02).....	49
Figure 35. LCC1-51N-3 (Drawing 163141-03).....	49
Figure 36. LCC1-51N-3 (Drawing 163141-04).....	49

Tables

Table 1. Model Number Key.	9
Table 2. HEPA Filter Pressure Reading Worksheet.	20
Table 3. Oven Utility Connections.	23
Table 4. Exhaust Connection Requirements.	27
Table 5. MRC 5000 Settings.....	36
Table 6. Desired Oxygen Concentration.....	41
Table 7. Error Messages and Next Steps.	45

1. About This Manual

1.1. Important User Information


Copyright © 2010 by Despatch Industries.


All rights reserved. No part of the contents of this manual may be reproduced, copied, or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of the publisher, unless it is for the purchaser's personal use.

Printed and bound in the United States of America.

The information in this manual is subject to change without notice and does not represent a commitment on the part of Despatch Industries. Despatch Industries does not assume any responsibility for any errors that may appear in this manual.


In no event will Despatch Industries be liable for technical or editorial omissions made herein, nor for direct, indirect, special, incidental, or consequential damages resulting from the use or defect of this manual.

	<p><i>Values displayed on screens are examples only. Though those values may be typical, contact Despatch Industries for the final value.</i></p>
---	--

	<p><i>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 86 of 1990.</i></p>
---	---

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

	<p><i>Danger!</i></p> <p><i>Only fully-trained and qualified personnel should setup and maintain this equipment. Improper setup and operation of this equipment could cause an explosion that may result in equipment damage, personal injury or possible death.</i></p>
---	--

The information in this document is not intended to cover all possible conditions and situations that might occur. The end user must exercise caution and common sense when installing or maintaining Despatch Industries products. If any questions or problems arise, call Despatch Industries at 1-888-DESPATCH or 1-952-469-5424.

1.2. **Manufacturer & Service**

The Stackable LCC/LCD Oven is manufactured by Despatch Industries.

Despatch has specialized in thermal processing for over 100 years. Technical expertise gained over those years helps provide innovative solutions to critical applications in vertical markets and cutting edge technology worldwide. Despatch products are backed by a drive for long-term customer satisfaction and a strong sense of responsibility. The worldwide network of factory-trained Service Professionals is available to support your Despatch equipment. From full service preventive maintenance to routine repair and certified calibration and uniformity, the Despatch service network is positioned to respond to your business needs. Our service programs are customized to meet your specific needs using our Advantage Service Assurance Program (ASAP). For more information on ASAP, visit www.despatch.com.


Global Headquarters	Contact	Service & Technical Support
Despatch Industries 8860 207th Street Lakeville, MN 55044 USA	International/Main: 1-952-469-5424 US toll free: 1-888-337-7282 Fax: 1-952-469-4513 info@despatch.com www.despatch.com	Service: 1-952-469-8230 US toll free: 1-800-473-7373 Service @despatch.com

1.3. **Organization of this Manual**



This owner's manual contains the most comprehensive set of information for the Despatch Stackable LCC ovens, including installation instructions, theory of operation, operating instructions, among other things.

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

	<p><i>Danger!</i></p> <p><i>Failure to heed warnings in this instruction manual and on the oven could result in personal injury, property damage or death.</i></p>
---	---

1.4. Conventions

	<p><i>This icon signifies important information.</i></p>
	<p><i>This icon signifies information that describes an unsafe condition that may result in death, serious injury, or damage to the equipment.</i></p>
<p>Danger!</p>	<p><i>A condition that may result in death, serious injury, or damage to equipment.</i></p>
<p>Warning!</p>	<p><i>A condition that may result in serious injury or damage to equipment.</i></p>
<p>Caution!</p>	<p><i>A condition that may result in damage to equipment or product.</i></p>
<p>LOG OUT</p>	<p><i>Reversed-out, Bold, 10pt Arial typeface indicates a specific key or button on screen to click.</i></p>

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

1.5. Specifications

1.5.1. Model Numbering and Naming Conventions

Table 1 lists the model numbers and follows these conventions:

Model Number	L			1	-					-	3
Position in Number	1	2	3	4	5	6	7	8			

Table 1. Model Number Key.

Position in Model Number	Letter / Number	Letter Meaning
2	C	Model has a HEPA filter
2	L	Model does not have a HEPA filter
3	C	Model operates at 260°C
3	D	Model operates at 350°C
5 & 6	16	1.6 cubic foot model
5 & 6	51	5.1 cubic foot model
7 & 8	N	Model uses a nitrogen atmosphere
7 & 8	V	Model uses Viton [®] synthetic rubber (Silicone-free option)


Example: **LLD1-51NV-3**

This 5.1 ft³ model does not have a HEPA filter, operates at 350°C, uses nitrogen and is silicone-free.

1.5.2. Dimensions

Models	Chamber Size inches (cm)			Capacity ft ³ (liters)	Overall Size inches (cm)			Maximum number of Shelves
	W	D	H		W	D	H	
LCC1-16-3 LCD1-16-3 LCC1-16N-3 LCD1-16N-3	15 (38)	14 (36)	14 (36)	1.6 (45)	32.5 (83)	35.5 (90)	20.75 (53)	5
LCC1-51-3 LCD1-51-3 LCC1-51N-3 LCD1-51N-3	23 (58)	20 (51)	20 (51)	5.1 (144)	40.5 (103)	42.5 (108)	27 (69)	8

*LLC & LLD models have same dimensions.

	<p><i>The LCC/LCD oven is not intended to process solvents or other volatile or flammable materials. Oven exhaust is intended for cooling purposes only.</i></p>
---	---

* Trademark of E. I. Du Pont De Nemours & Company Corporation.

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

1.5.3. Capacities

Model	LCC1-16-3 & LCD1-16-3 LCC1-16N-3 & LCD1-16N-3	LCC1-51-3 & LCD1-51-3 LCC1-51N-3 & LCD1-51N-3
Maximum Load (Lbs)	200	200
Maximum shelf load (Lbs)	50	25
Recirculating fan (CFM) (H.P.)	240 1/4	435 1/4
Net weight (Approximate) (Lbs) (KG)	250 114	380 172
Shipping weight (Approximate) (Lbs) (KG)	350 159	525 238
Exhaust capacity (forced exhaust) (CFM)	35	73
Exhaust Outlet (Inch) (mm)	1.88 x 2.88 (48.0 x 73.4)	1.88 x 2.88 (48.0 x 73.4)

1.5.4. Power

If the line voltage for your LCC/LCD Oven varies more than 10% from the oven voltage rating, electrical components such as relays and temperature controls may operate erratically.

- If the line voltage is lower than the oven voltage rating, heat-up time may be significantly longer and motors may overload or run hot
- If the line voltage is higher than the nameplate rating, motors may run hot and draw excessive amperage

Model	Volts *	Amps	Hertz	Heater Phase	KW	Cord and Plug
LCC1-16-3 LCD1-16-3	240	14.8	50/60	1	3	None, hardwired
LCC1-16N-3 LCD1-16N-3	240	14.0	50/60	1	3	None, hardwired
LCC1-51-3 LCD1-51-3	240	27.7	50/60	1	6	None, hardwired
LCC1-51N-3 LCD1-51N-3	240	27.7	50/60	1	6	None, hardwired

*The LCC/LCD Oven is designed for 240 volts (see oven nameplate) will operate satisfactorily on a minimum of 208 Volts, but will result in 25% reduced heater output. If your power characteristic is lower, contact Despatch Industries.

1.5.5. Temperature

Model		LCC1-16-3 LCD1-16-3	LCC1-16N-3 LCD1-16N-3	LCC1-51-3 LCD1-51-3	LCC1-51N-3 LCD1-51N-3
Time to Temperature (approximate minutes) (no load)	40°C – 100°C	7 min.	7 min.	5 min.	5 min.
	40°C – 200°C	30 min.	30 min.	27 min.	27 min.
	40°C – 260°C	45 min.	45 min.	35 min.	35 min.
	40°C – 350°C [†]	60 min.	60 min.	50 min.	50 min.
Cooling Time to Temp Minutes (No Load) [‡]	100°C – 55°C	35 min.	30 [§] min.	40 min.	25 [§] min.
	200°C – 55°C	65 min.	55 [§] min.	75 min.	40 [§] min.
	260°C – 55°C	75 min.	60 [§] min.	85 min.	45 [§] min.
	350°C – 55°C [†]	130 min.	80 [§] min.	115 min.	50 [§] min.
Temperature Uniformity at**	100°C	±1°C	±1°C	±1°C	±1°C
	200°C	±2°C	±2°C	±2°C	±2°C
	260°C	±3°C	±3°C	±3°C	±3°C
	350°C	±4°C	±4°C	±4°C	±4°C
Maximum Operating Temperature	LCC	260°C	260°C	260°C	260°C
	LCD	350°C	350°C	350°C	350°C
Operating Range w/20°C Ambient	LCC	40°C-260°C	35°C-260°C ^{††}	45°C- 260°C	35°C-260°C ^{††}
	LCD	40°C-350°C	40°C-350°C ^{††}	40°C-350°C	40°C-350°C ^{††}
Control Stability		+/- 0.5°C	+/- 0.5°C	+/- 0.5°C	+/- 0.5°C

[†] For LCD & LLD only, LCC & LLC maximum temperature: 260°C.

[‡] Minimum operating temperatures and cooling times are based on a 20°C ambient temperature measured at the fresh air inlet.

[§] Based on cooling water supplied at 2 GPM (7.6 LPM), 16°C for nitrogen atmosphere units.

** Uniformity figures are based on a nine-point test conducted in an empty oven with thermocouples connected at 3 inches (7.6 cm) from walls after the oven temperature has reached stabilization. Uniformity can vary slightly depending on unit and operating conditions. Class 100 HEPA filtration will limit ramp rates.

^{††} Requires water cooling be activated for minimum temp rating and operation below 85°C.

2. Safety

2.1. Safety Information

Do not work on the Stackable LCC/LCD Oven without reading and understanding this section which contains important information and warnings. Ignoring these warnings can result in death, serious injury or damage to the machine and product.

2.1.1. Lockout

Machine lockout places the Stackable LCC/LCD Oven into a zero energy state and prevents accidental machine start up. Always follow the Lockout Procedure described in this Section before cleaning, maintaining or repairing the Stackable LCC/LCD Oven. An accidental start-up, while working on the Stackable LCC/LCD Oven, can result in serious injury or death.

2.1.1.1. Lockout Requirements

1. Every power source that can energize any element of the Stackable LCC/LCD Oven must be shut off at the closest possible power source. This includes air, water and electricity, including the Disconnect Switch.
2. After energy sources are locked out, test to ensure circuits are de-energized.

2.1.1.2. Lockout Procedure

Personnel authorized to lockout equipment must have the necessary locks to perform the lockout.

1. Physically disconnect all electrical power to the machine or lockout the appropriate breaker or disconnects.
2. Close all valves and bleed off any pressure.
3. Test for power by attempting a start with the machine controls.
4. Identify the Lockout Condition with a tag on the electrical disconnect and pneumatic shut off valve.
5. When work is complete, remove all tags and restore the machine to its working state.



Danger!

Electrical panels contain high voltage. Disconnect and lock out the power supply before working inside any electrical panels. Failure to lock out the power supply can result in death or injury.

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

2.1.2. Door and Panel

The door and rear panel on the Stackable LCC/LCD Oven protect against hazards. Power is required to open the door and the oven heater is OFF when the door is open. Operation without these safety devices in place creates hazards that the doors and covers are intended to render safe for personnel.

	<p><i>Danger!</i></p> <p><i>Electrical panels contain high voltage. Disconnect and lock out the power supply before working inside any electrical panels. Failure to lock out the power supply can result in death or injury.</i></p>
---	---


The door requires a Manual Override Key for use when power is off. The door and panel that require a tool to open are part of the safety system of the Stackable LCC/LCD Oven. Do not open the door while the machine is running.

2.2. Maintenance

Only qualified and trained personnel should perform maintenance or repair.

2.3. Electrical Power

Only qualified and trained personnel should perform electrical maintenance or electrical repair.

	<p><i>Danger!</i></p> <p><i>Contact with energized electrical sources may result in serious injury or death.</i></p>
---	--

- Before performing maintenance, disconnect all electrical power from the machine. Use a padlock and lockout all disconnects feeding power to the machine.
- Never clean, or repair the oven when in operation.
- Unauthorized alterations or modifications to Stackable LCC/LCD Oven are strictly forbidden. Never modify any electrical circuits. Unauthorized modifications can impair the function and safety of the Stackable LCC/LCD Oven.


Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

2.4. Fire

Keep the Stackable LCC/LCD Oven clean and free of scrap materials, oil or solvents to prevent the possibility of fire. In the event of fire, use a fire extinguisher as follows.

1. De-energize the machine immediately by turning OFF the **DISCONNECT SWITCH**.
2. Turn off the remote main disconnect (customer supplied disconnect).
3. Extinguish the fire.

	<p><i>Danger!</i></p> <p><i>Always disconnect all power before extinguishing a fire. Attempting to extinguish a fire in a machine connected to electrical power can result in serious injury or death!</i></p>
---	---

2.5. Equipment Lockout Requirements

To prevent injury or equipment damage during inspection or repair, the Stackable LCC/LCD Oven must be locked out.

2.5.1. Emergency Stop

When a risk of personal injury or damage to the Stackable LCC/LCD Oven exists, turn OFF the **DISCONNECT SWITCH** on the front of the oven. This shuts off all electrical power to the oven.

3. Theory of Operation

3.1. The Stackable LCC/LCD Series Oven

The Stackable LCC/LCD Series Oven (Figure 1) offers HEPA (High Efficiency Particulate Air) filtration for processes where minimized contamination is essential. The removable HEPA filter is designed to provide a constant flow of 99.97% clean air to the product being heated. The HEPA filter with silicone seal provides 99.99% filtration.

The oven operator interface is located on the hinged control panel at the front of the oven (Figure 1). Power components are located on the equipment panel, behind the hinged control panel, for easy access (Figure 8). Electrical components are either touch-proof or are shielded with Lexan⁷ material to prevent accidental exposure during maintenance and troubleshooting.

The cooling fan is controlled on/off by an event relay in the Protocol Plus Control. The cooling fan is used for rapid cool-down at the end of the process cycle, or to maintain low temperature setpoints during process cycle. It may also be turned on at the start of a process cycle to assure that starting temperature is less than 70°C.

The nitrogen models have stainless steel water coil which permits rapid cool down and lower temperature operation. The nitrogen oven comes with an adjustable flowmeter a for adjusting purge rate, and needle valve for setting maintain rate, separate solenoid valves for purge and maintain operation and a pressure relief exhaust port. An exhaust fan which powers on whenever the oven is running maintains consistent chamber pressure control with varied exhaust stack conditions.



Figure 1. Stackable LCC/LCD Series Oven.



Danger!


Use care when working with nitrogen. Nitrogen presents an asphyxiation hazard. Handle nitrogen according the safe handling procedures listed in the material safety data sheet.

⁷ Trademark of SABIC Innovative Plastics.

The oven has a type 304-2B stainless steel interior and a type 304-#4 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. Interior ductwork may be easily removed for cleaning. Heater frame, fan wheel and motor shaft are constructed of stainless steel.

Two electropolished stainless steel wire shelves are provided. The shelves are removable and adjustable on two inch centers.

The LCC/LCD series design offers a stackable oven body. Multiple oven systems of two or three oven stack options are available. When operating multiple ovens, network the Despatch Protocol Plus controllers together with a Modbus communication option. Use the optional Despatch Protocol Manager software to enable customer PC control of multiple ovens.

	<p>Stackable units are available in air or nitrogen atmosphere models. Nitrogen atmosphere models are noted with an N suffix. Model numbers beginning with "LL*1-*" do not use a HEPA filter.</p>
---	--

3.2. The Protocol Plus Controller

The Protocol Plus controller has two displays. A dedicated LED upper display shows the oven temperature (Figure 2). A two line LCD lower display provides information on control status, high limit temperature and allows changes to be made to the control settings. Review the Protocol Plus controller Owner's Manual for more information.

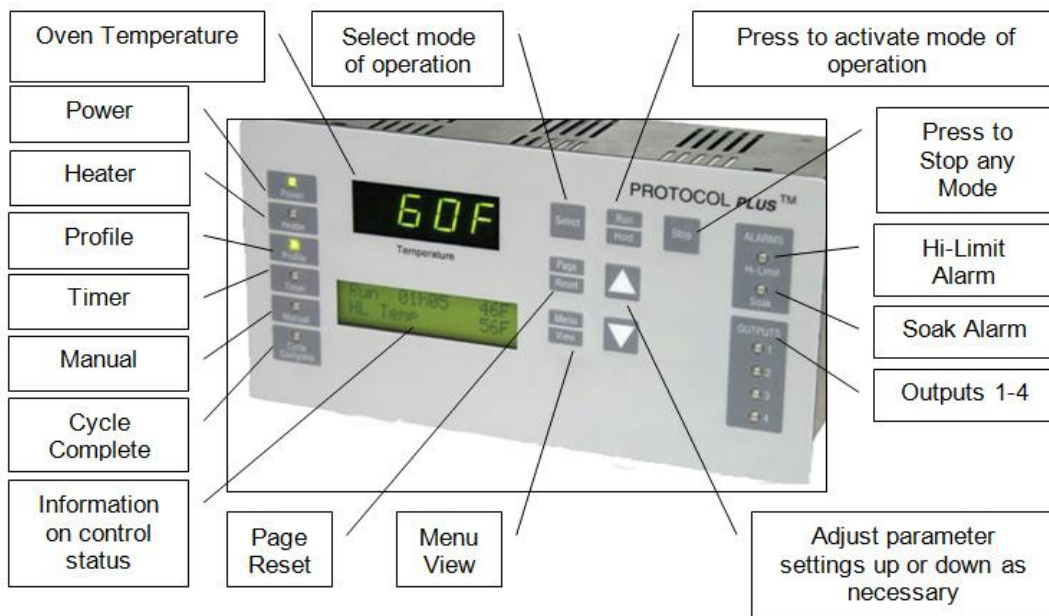



Figure 2. Protocol Plus Displays and Control Buttons.

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

3.3. HEPA Filters

The Stackable LCC/LCD Ovens use HEPA (High Efficiency Particulate Air) filters limit particulate size in the work chamber to 0.3 microns or less.

	<p><i>LCC oven chamber temperature transitions must not exceed 1.5°C/minute to maintain class 100 chamber conditions. For ramp rates greater than 1.5°C/minute and up to 5°C/minute, the LCD model will maintain class 100 chamber conditions.</i></p>
---	---

3.3.1. Definitions


- **Binder:** Organic substance used in filter construction to provide the media with structural strength
- **Burn-Off:** Process for eliminating the binder and D.O.P. contained in the filter from the manufacturing and testing function.
- **D.O.P.:** Dioctyl Phthalate - Aerosol particles of submicron size used in testing phase to spot defects or measure filter efficiency.
- **HEPA:** High Efficiency Particulate Air

3.3.2. Filter Packaging, Shipping and Handling

Packaging practice varies among the filter unit manufacturers. Filter units are typically packaged in cardboard cartons with varying approaches for strengthening the container and making it impact-resistant. Shipping cartons are typically marked with a vertical arrow and "This Side Up" (Figure 3). A filter unit is placed in the carton so the pleated folds are vertical (running from top to bottom), versus side to side.



Figure 3. This Side Up Graphic.

	<p><i>Ship, handle, store and install HEPA filters with pleats positioned vertically. Horizontally-positioned pleats risk breaking at the adhesive line of the filter medium. Horizontally-positioned pleats also collect entrapped material on "shelves." The accumulated weight of the entrapped material may cause sag and lead to early failure of the filter unit.</i></p>
---	--

The filter is typically shipped in the original carton or package provide by the filter manufacturer. This carton or package provides good storage and maximum protection from dirt and moisture. Store and move HEPA filters upright in the shipping carton. Minimize handling of the filter. During installation, remove the filter from the shipping carton and install directly into the oven.


If an unpackaged HEPA filter unit must be placed with its face on the floor or other surface, clear the surface entirely of every object or irregularity which might damage the filter pack.

3.3.3. HEPA Filter Validation Testing

Despatch Industries guarantees the HEPA filters will meet specified efficiency ratings when the following recommendations are followed:

- The filter is properly installed
- The filter is run at or below 200°C, at a constant temperature
- The filter is run before burn-in

3.3.3.1. D.O.P. Testing

	<p>Caution!</p> <p><i>Despatch does not recommend D.O.P. filter testing.</i></p>
---	---

D.O.P. testing uses aerosol particles of submicron size to spot defects or measure filter efficiency. Degenerative by-products of this test are distributed throughout the oven chamber upon heat-up. Despatch does not recommend D.O.P. filter testing.

3.3.3.2. Class 100 Testing

Despatch guarantees a Class 100 environment within the oven. This classification is based on measurement of the particulate level within the oven work chamber.

Class 100 testing may be performed before or after a proper filter burn-in procedure has been performed. Despatch guarantees Class 100 condition measurements based on two methods of test. The direct method employs an extraction-type particulate analyzer. The indirect method involves particle settling over a specified period of time onto a clean disk.

3.3.3.3. Validation Testing

Despatch recommends the following test sequence for pharmaceutical Class 100 ovens.

1. Proper installation of the HEPA filters (Section 3.3.2).
2. Ambient air challenge to determine integrity of oven chamber and filter gaskets.
3. Proper filter burn-off procedure.
4. Class 100 testing inside the work chamber.

3.3.3.4. HEPA Filter Burn-off Process Not Necessary

HEPA filters contain a binder material which protects the filter media during production and shipping. Smoke produced from burning this binder at elevated temperatures is undesirable during normal oven operation. Burning off the binder will ensure a clean process at elevated temperatures.

However, when the binder is burned out of the filter media, the filter becomes very fragile: too fragile to withstand normal shipping and handling. For this reason, Despatch does not perform the burn-off procedure. The burn-off process is not necessary at temperatures under 200°C.

3.3.4. HEPA Filter Unit Replacement

Periodic replacement the HEPA filter unit due to:

- 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. Adequate fan capacity 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 media in a unit.
- Change in process application.
- Excessive build-up of lint or combustible particulate matter on the filter unit.
- 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.

3.3.5. HEPA Filter: Magnehelic Pressure Gauge

The LCC Series oven is equipped with a Magnehelic pressure gauge which measures the pressure in front of the HEPA filter (Figure 4). As the filter becomes dirty, pressure increases. Despatch recommends changing the filter when the pressure is 1" w.c. greater than when the filter was first installed (Refer to section 4.3 for filter replacement).



Figure 4. Magnehelic Pressure Gauge Measures Pressure in front of the HEPA filter.

Since pressure can be affected by many factors involved in the installation, it is important to record the pressure of a new filter as a baseline. Recorded pressure readings allow for new readings to be periodically checked against this baseline. Use Table 2 for recording this information (See Section 8.1 for a blank worksheet).

For a nitrogen atmosphere oven, pressure readings also give an indication of the integrity of the seals. If the pressure recorded in Columns D or E decrease over time, inspect the oven seals.

Table 2. HEPA Filter Pressure Reading Worksheet.

A	B	C	D	E	F
Date	Comments	Pressure (inches of water) ⁸	Pressure with: 150 SCFH (LCC1-16); 200 SCFH (LCC1-51) nitrogen purge ⁹	Pressure with: 75 SCFH (LCC1-16); 150 SCFH (LCC1-51) nitrogen maintain ⁹	Oven Temperature
	Typical Values	2-3"	1.5-2" above value in Column C	0.5-1" above value in Column C	60°C
	Filter first installed				

⁸ With Purge and Maintain valves off for a nitrogen atmosphere oven. Cooling fan off for an air atmosphere oven.

⁹ For a nitrogen atmosphere oven only.


4. Assembly & Setup


Assembly and Setup provides directions for unpacking and installing your LCC/LCD.

4.1. *Unpack & Inspect The LCC/LCD Oven*

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

- Note whether the carton and plastic cover sheet inside carton are still in good condition
- Observe all outside surfaces and corners of the oven for scratches and dents
- Check 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 (Figure 5)
- Check the filter carton for damage

	<p>Warning!</p> <p><i>The LCC door requires a Manual Override Key for use when power is OFF. The door and panel that require a tool to open are part of the safety system of the Stackable LCC/LCD Oven. Do not attempt to permanently mount the Manual Override Key.</i></p>
---	--

	<p>Do not remove torx screw from door release mechanism. Manual Override Key cannot be permanently mounted.</p>
---	--

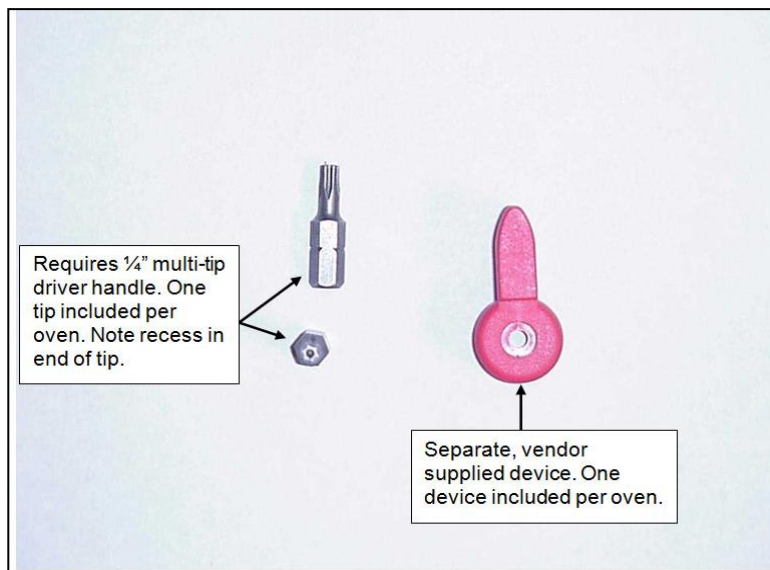


Figure 5. Door Lock Manual Override Key (LCC/LCD/LLC/LLD).

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.


4.1.1. *If Damaged During Shipping*

If damage occurred during shipping:

1. Contact the shipper immediately and file a written damage claim.
2. Contact Despatch Industries (1-800-473-7373 or 1-952-469-8230 or service@despatch.com) to report your findings and to order replacement parts for those damaged or missing. Send a copy of your filed damage claims to Despatch industries (Despatch Industries, 8860 207th Street, Lakeville, MN 555044, USA).
3. Check the packing list to ensure you received all the specified components of the oven system. If any items are missing, contact Despatch Industries to have missing products forwarded to you.
4. Complete the warranty card and mail it to Despatch within 15 days after receipt of the equipment.

4.2. *Set-up The LCC/LCD Oven*

4.2.1. *Select Oven Location*

	<p>Warning!</p> <p><i>Do not use the oven in wet, corrosive or explosive atmospheres unless this oven is specifically designed for a special atmosphere.</i></p>
--	---

4.2.1.1. *Single Oven Placement Requirements*


- Bench top (or other framework) capable of holding at least 250 Lbs (113.4 Kgs).
- A minimum of three (3) inches (7.6 cm) available in the rear of the oven for proper ventilation.
- Leave room at the oven sides and rear for maintenance.
- Oven exhaust opening is at the rear of the left side of the oven. Allow at least two (2) inches (5.1 cm) clearance here as well. The oven may be placed next to another cabinet on its right, or next to another oven, with three-quarters of an inch (19 mm) clearance (measure with door open).
- Plumb and level the oven to assure proper heat distribution and operation of all mechanical components.

4.2.1.2. *Multiple Oven Placement Requirement*

- Stack up to three ovens vertically, with or without the optional framework (base) supplied by Despatch.

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

	<p><i>For the LCC1-51 oven model, only two ovens may be stacked vertically.</i></p>
---	--

- Supporting surface must be capable of holding three ovens (750 Lbs or 340.2 Kg) or the weight of two LCC1-51 oven models.
- Use the holes in the rear oven feet to bolt the ovens together by removing the hole plugs in the top of the mating oven beneath.

4.2.2. Oven Utility Connections


Utility connections vary slightly on different LCC/LCD models. Table 3 lists the connection purposes and parameters. Refer to Figure 6 for visual reference.

Table 3. Oven Utility Connections.

Connection (Figure 6)	LCC/LCD Air Atmosphere with optional Water-Cooled Models	LCC/LCD Nitrogen Atmosphere Models with standard water-cooling
NITROGEN INLET	<ul style="list-style-type: none"> • Clean Dry Air Inlet (70-80 psi (4.83-5.52 bar)) • Purge water from coil prior to heating oven • 1/4" NPT female brass connections provided 	<ul style="list-style-type: none"> • Nitrogen Inlet (70-80 psi (4.83-5.52 bar)) • Purge nitrogen, clean dry air and water from coil prior to heating the oven • 1/4" NPT female brass connections provided.
WATER OUTLET	<ul style="list-style-type: none"> • During cooling cycle, water flows through the water coil and out this connection • 3/8" NPT female brass connections provided • Piping must be rated for up to 250 °F (121°C) 	
WATER DRAIN	<ul style="list-style-type: none"> • At the end of a cooling cycle, Nitrogen or Clean Dry Air is purged through the water coil. Water and pressurized nitrogen/air exit this connection for 30 seconds. Must be connected to gravity style drain (no backpressure). • 3/8" NPT female brass connections are provided. • Piping must be rated for up to 250 °F (121 °C) 	
WATER INLET	<ul style="list-style-type: none"> • Water Inlet for cooling • 3/8" NPT female brass connections provided • Requires 2 GPM flow at 61 °F (16°C) to meet published cooling rates. • Maximum Pressure 100 PSI (6.89 Bar) 	<ul style="list-style-type: none"> • Water Inlet for cooling • 3/8" NPT female brass connections provided • Requires 3 GPM flow at 61 °F (16°C) to meet published cooling rates. • Maximum Pressure 100 PSI (6.89 Bar)

4.2.2.1. Nitrogen With Water-Cooled Models

1. Connect nitrogen supply line to **NITROGEN INLET** at the connections panel (Figure 6).

	Nitrogen pressure supplied should be greater than 70 psi (4.83 bar) but not more than 80 psi (5.52 bar).
---	---

2. Install water connection for cooling coils to **WATER INLET** (Figure 6). Verify the valve on the flowmeter is turned OFF, that is, fully clockwise.

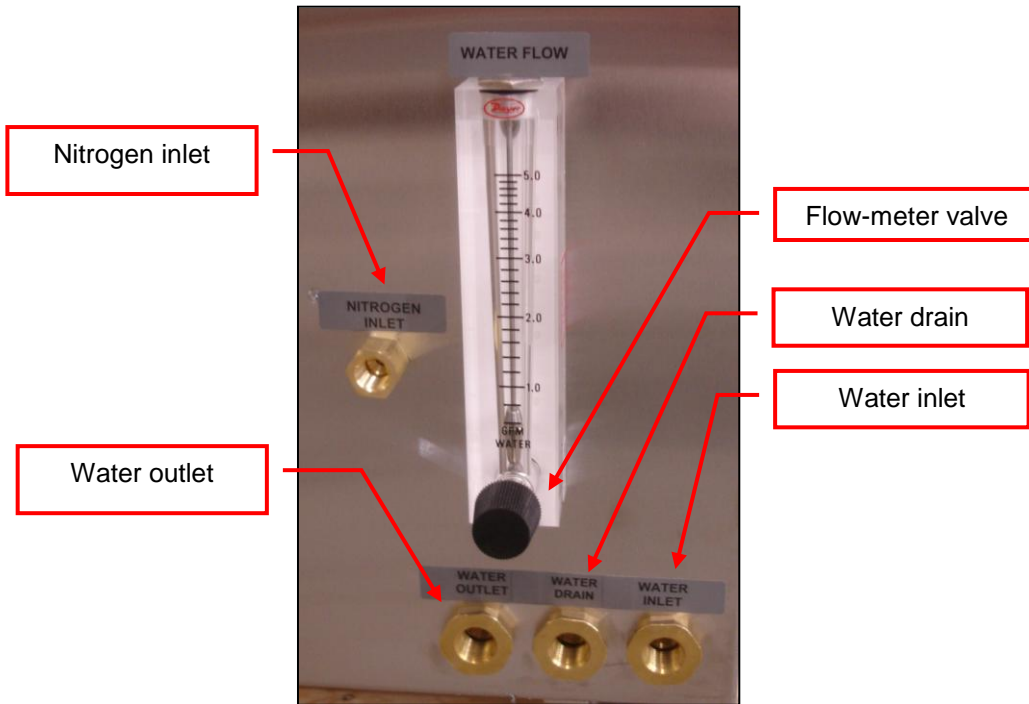





Figure 6. LCC/LCD Connections Panel.


	Water pressure supplied to the oven must not exceed 100 psi (6.89 bar). Despatch recommends installing a regulator to prevent surging.
---	---


3. Check for leaks by slowly opening the valve on the flowmeter and allowing any air to bleed out.

	<p>Caution!</p> <p><i>Failure to allow air to bleed from the flowmeter may damage the flowmeter. Bleed air from the flowmeter after every instance of shutting off the water supply.</i></p>
---	---

4. Adjust the flowmeter to the recommended 3 gpm (11.4 lpm).
5. Complete the drain connection on oven side by connecting **WATER OUTLET** to the closed loop system (Figure 6).


	<p>WATER DRAIN <i>must be left open-to-atmosphere. Make closed-loop connections using WATER OUTLET (Figure 6).</i></p>
---	---

	<p>Warning!</p> <p><i>Never allow WATER DRAIN to be plugged. A hot oven generates a small amount of steam when the water is first turned on. Steam can burn skin.</i></p>
--	--

	<p>Caution!</p> <p><i>Design the drain system to prevent operator injury from high temperature or pressure buildup. Piping must withstand short periods of up to 500 °F (260°C) temperatures (662 °F (350°C) for LCD ovens). Insulate drain lines or install warning labels stating the potential high temperature or pressure hazard.</i></p>
---	---


4.2.2.2. Air Atmosphere with Optional Water Cooling Model

1. Connect Clean Dry Air (CDA) line to **DRY AIR 100 PSI** at the connections panel (Figure 6).
2. Install water connection for cooling coils to **WATER INLET** (Figure 6). Verify the valve on the flowmeter is turned OFF, that is, fully clockwise.


	<p>Clean Dry Air <i>pressure supplied should be at 100 psi (6.9 bar).</i></p>
---	--


	<p>Water pressure supplied to the oven must not exceed 100 psi (6.9 bar). Despatch recommends installing a regulator to prevent surging.</p>
---	---


3. Check for leaks by slowly opening the valve on the flowmeter and allowing any air to bleed out.

	<p>Caution!</p> <p>Failure to allow air to bleed from the flowmeter may damage the flowmeter. Bleed air from the flowmeter after every instance of shutting off the water supply.</p>
---	---

4. Adjust the flowmeter to the recommended 3 gpm (11.4 lpm).
5. Complete the drain connection on oven side by connecting **WATER OUTLET** to the closed loop system (Figure 6).

	<p>WATER DRAIN must be left open-to-atmosphere. Make closed-loop connections using WATER OUTLET (Figure 6).</p>
--	--

	<p>Warning!</p> <p>Never allow WATER DRAIN to be plugged. A hot oven generates a small amount of steam when the water is first turned on. Steam can burn skin.</p>
---	--

	<p>Caution!</p> <p>Design the drain system to prevent operator injury from high temperature or pressure buildup. Piping must withstand short periods of up to 500 °F (260°C) temperatures (LCD ovens: 662 °F (350°C). Insulate drain lines or install warning labels stating the potential high temperature or pressure hazard.</p>
---	---

4.2.3. Exhaust Connections

The LCC/LCD Exhaust port is located on the left side of the oven (Figure 7). Table 4 lists the requirements for the exhaust stack for the LCC/LCD Oven.



Figure 7. Exhaust Port on the Left Side of the LCC/LCD Oven.

Table 4. Exhaust Connection Requirements.

	LCC/LCD1-16 Models	LCC/LCD1-51Models
Size	1.88" x 2.88" (4.8 cm x 7.3 cm)	
Flow	35 cfm (991.5 lpm)	73 CFM (2067 lpm)
Temperature	LCC and LLC series: 500 °F (260°C)	LCC and LLC series: 500 °F (260°C)
	LCD and LLD series: 662 °F (350°C)	LCD and LLD series: 662 °F (350°C)

4.2.4. Wiring & Power Connections

	<i>The oven must be hardwired directly to the disconnect switch on the equipment panel (Figure 9).</i>
--	--

	Danger! <i>All grounding and safety equipment must be in compliance with applicable codes, ordinances and accepted safe practices.</i>
--	--

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

- Run line voltage power through the conduit from rear of oven to front (Figure 9). Consult electrical drawings included with the oven for details.
- Access the conduit and Disconnect Switch by opening the front panel (Figure 8).

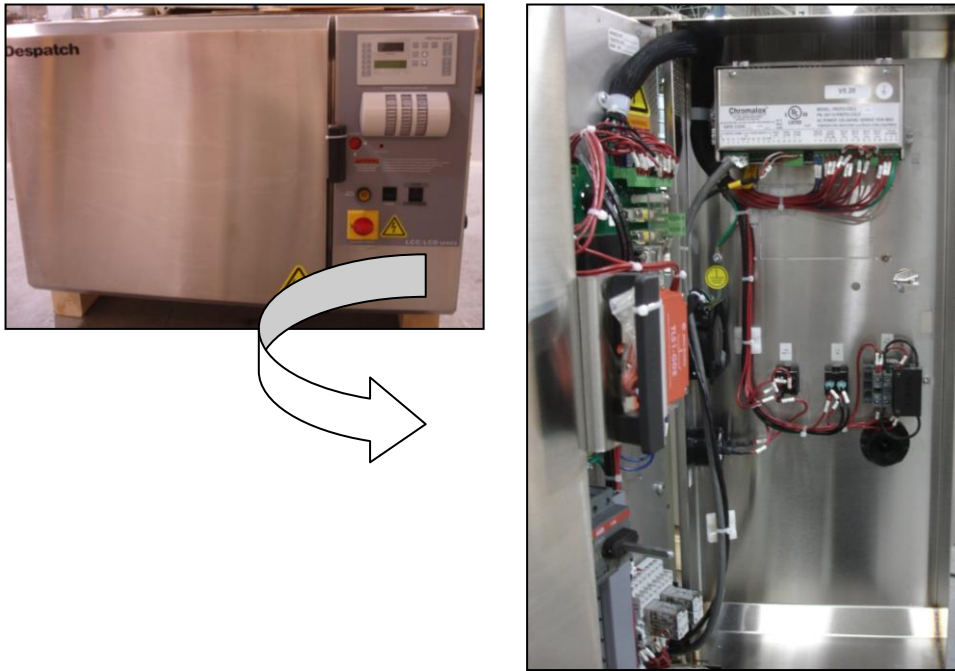


Figure 8. Open the front panel for access.

- Connect the line voltage power to the disconnect switch labeled **LINE CONNECTION** (Figure 9).

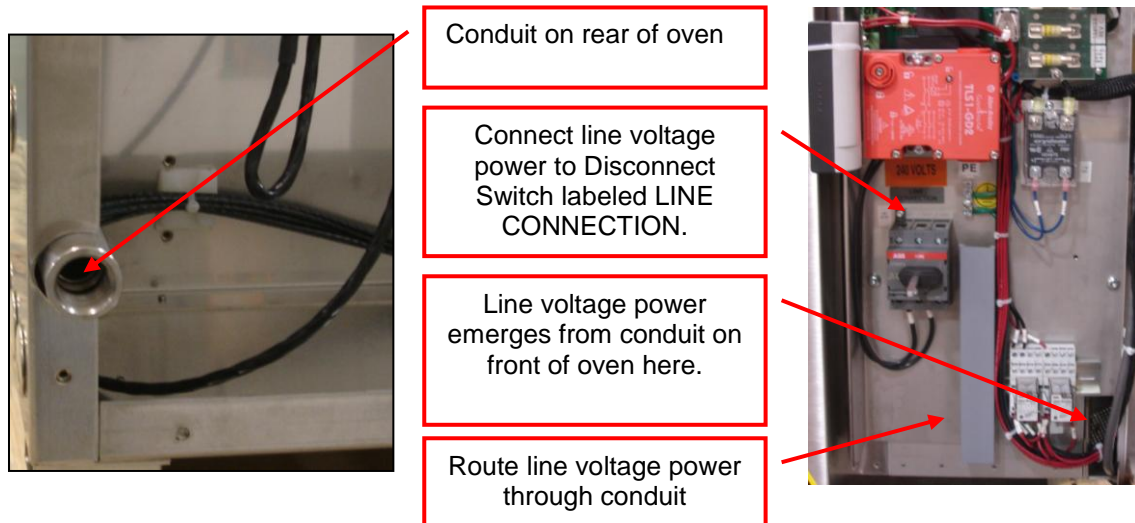





Figure 9. Conduit entrance at rear of oven and open front panel.

4.3. HEPA Filter Installation


	<p>Not all ovens use a HEPA filter. This section applies only to ovens are equipped with a HEPA filter. Model numbers beginning with "LC" have a HEPA filter. For a complete explanation of model numbers, refer to Section 1.5.1.</p>
---	---

	<p>Warning!</p> <p>Make certain power is disconnected from the oven before removing or replacing the HEPA filter. Observe all applicable safety procedures.</p>
---	---

	<p>Caution!</p> <p>The HEPA filter is fragile and care must be taken to avoid damage during installation. If a filter unit is dropped, whether in the carton or not, examine it carefully for damage.</p>
---	---


Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

	<p>Caution!</p> <p><i>The HEPA filter must be installed so that unfiltered air cannot leak past the unit. The HEPA gasket (white triangular gasket) is generally in the downstream position and in contact with the oven-sealing surface</i></p> <p><i>In general, defer to installation instructions provided by the filter manufacturer.</i></p>
---	---

	<p>Termikfil 2000 Filter Installation Notes:</p> <ul style="list-style-type: none">• <i>If a spacer is required for the gasket, place the spacer on the opposite side to the HEPA gasket</i>• <i>If the Termikfil 2000 filter is mounted in a slide, do not rub the filter on its gaskets</i>• <i>Any clamping device used must allow necessary and sufficient pressure on the gaskets provide an airtight fit. NOTE: Over tightening may damage the Termikfil 2000 filter.</i>• <i>Clamping recommendation: Clamp the Termikfil 2000 filter to a residual HEPA gasket thickness of 4 mm (1/6 inch)</i> <p><i>Refer to installation instructions provided by the filter manufacturer for more specific installation notes.</i></p>
---	--

1. Remove filter from carton

	<p><i>Sweep floor clear of nuts, bolts and other protrusions which may damage the unit.</i></p> <p><i>Do not drop or jar the filter carton.</i></p>
---	---

- a. Place carton on floor.
- b. Tilt the carton on one corner. Handle the carton at opposing corners.
- c. Remove sealing tape and fold back flaps of carton.
- 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. Be careful to not pull the filter from the carton.

2. Inspect the filter.
 - a. Visually inspect the two gaskets to ensure they have not been damaged during handling.
 - b. Use a strong lamp to examine the exposed areas of both faces for evidence of breaks, cracks, or pinholes (Figure 10). If a strong lamp is unavailable, use a flashlight in a darkened room.
 - c. 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.
 - d. Check that the adhesive seal around the filter unit faces are complete and unbroken.
 - e. Check frame corner joints for adhesive sealing and tightness.
 - f. Check that gaskets are cemented firmly to the filter frame and that gasket pieces are undamaged and butted or mated at the joints.

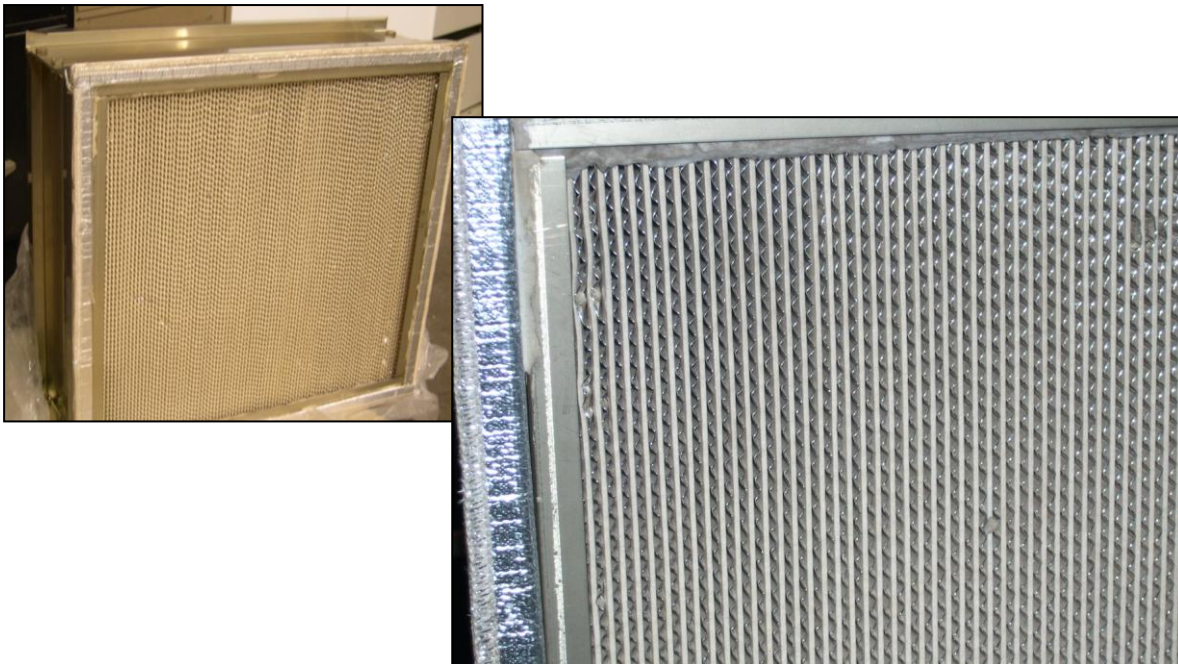



Figure 10. Example HEPA Filter (Silicone-free) and Close-Up.



Opened pleats in the filter media are normal and result from the tempering process.

3. Pull shelves from the oven and set aside (Figure 11).

 **Danger!**
Make certain power is disconnected from the oven before removing or replacing the HEPA filter.

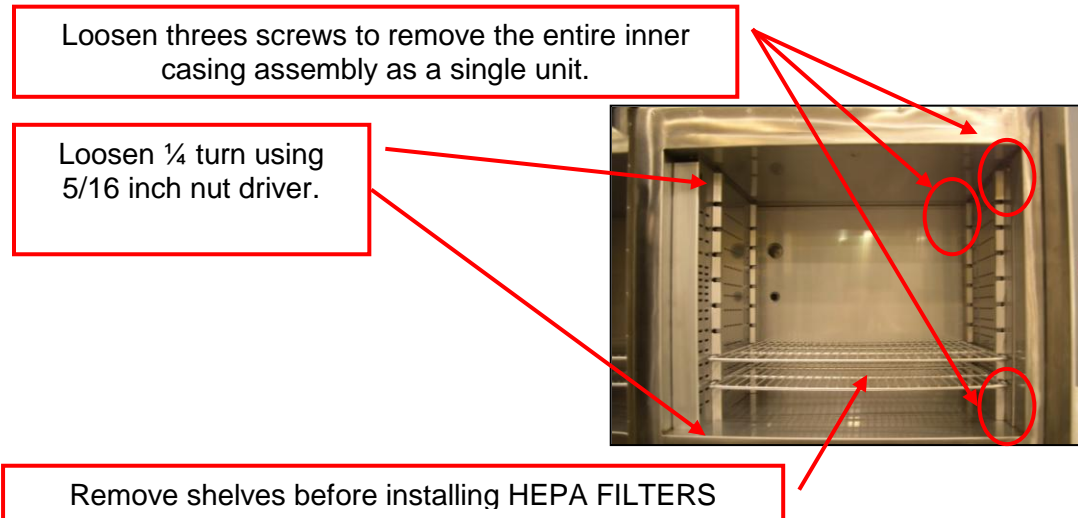


Figure 11. Remove inner casing to install HEPA filter.

4. Loosen the two screws at the upper and lower corners of the right rear of the chamber (Figure 11).
 - a. Pull out the shelf support/duct as a single unit and set it aside.
5. Note the position of the threaded rods behind the duct assembly on the right side. The HEPA filter will be fitted over these rods.
6. Remove the brass nuts and washers from the rods that are temporarily locking the rods to the oven wall.
 - a. Reuse these nuts to hold the filter in place.
7. **This step for the LCC1-16-3 only:**
 - a. Remove filter frame to be reinstalled after filter.
 - b. Remove the HEPA filter (shipped separately) from its container.
 - c. NOTE: The seal side goes toward the wall of the oven.
 - i. Place the filter inside the chamber and install filter mounting frame over rods.
 - ii. Push filter tight to rear wall with mounting frame.

8. This step for the LCC1-51-3 only:

- a. Remove the HEPA filter (shipped separately) from its container.
 - b. NOTE: The seal side goes toward the wall of the oven.
 - i. Place the filter inside the chamber and install filter mounting angles (shipped separately) over rods.
 - ii. Push filter tight to rear wall with mounting angles.
9. Reinstall the washers and brass nuts to tighten the filter frame down.
- a. Tighten the four nuts alternately for even tightness (Correct installation torque is 28 +/- 3 in-lbs. Be careful not to over tighten.
 - b. Correct installation torque is 28 +/- 3 in-lbs.
 - c. Be sure to compress the gasket evenly and equally at all points with the filter frame completely covering the opening.
10. Reinstall the inner casing assembly using the three screws removed earlier (Step 4).
11. Reinstall the oven shelf.

4.3.1. HEPA Filter Burn-Off

4.3.1.1. HEPA Filter Burn-Off Process

The burn-off process takes place in any equipment where a new HEPA filter is used at temperatures above 180°C / 356°F. Expect smoke, possibly a pungent odor and a light residue on interior surfaces. This results from oxidation of the binder. Most of the binder will leave the filter after running at a temperature of 260°C/500°F for 48 hours. Check the oven for particles or the exhaust for smoke and odor to determine that the process is finished.




While the Termikfil 2000 filter has undergone tempering treatment at the factory, smells and/or fumes may be released during the first use at temperature.

4.3.1.2. Location of HEPA Filter Burn-Off Process

Select a location for the burn-off process where generated smoke and odor will be ventilated with the least amount of interruption and inconvenience. Ideally this will be in the final location for the oven. However, it may be a receiving dock, some well ventilated space or even outside if the weather is acceptable. If this location is a very clean area, pay special attention to an exhaust hook-up that fully captures the smoke and odor produced. The post-Burn-off cleaning (that is, oven wipe down) may also generate dust. So take care if in a clean room.

4.3.1.3. Recommended HEPA Filter Burn-Off Process

	<p>LCC oven chamber temperature transitions must not exceed 1.5°C/minute to maintain class 100 chamber conditions. For ramp rates greater than 1.5°C/minute and up to 5°C/minute, the LCD model will maintain class 100 chamber conditions.</p>
---	--

1. Locate the equipment exhaust opening where chamber air is being expelled.
 - a. If the oven filter is burned off in a clean area, be sure to handle the equipment exhaust appropriately.
 - b. If the equipment is large and the exhaust stack is a permanent service connection, connect the equipment and exhaust stack before the burn-off process.
 - c. If the equipment is small with no permanent exhaust duct required, arrange a temporary connection out of the clean area that will handle the maximum temperature of the equipment. Direct the smoke and odor outside, or to a highly ventilated area.
2. Set the temperature control at the maximum process temperature.
 - a. Silicone: Ramp at 1.25°C/min to 260°C and soak for 48 hours.
 - b. Media Pack: Ramp at 1.25°C/min to 260°C and soak for 48 hours.
 - c. Termikfil (Figure 12):
 - i. Option 1: Ramp at 1.7°C/min (or up to 5°C/min) to 350°C and soak for 48 hours.
 - ii. Option 2: Ramp to process temperature and soak for three consecutive three-hour segments over 48 hours.

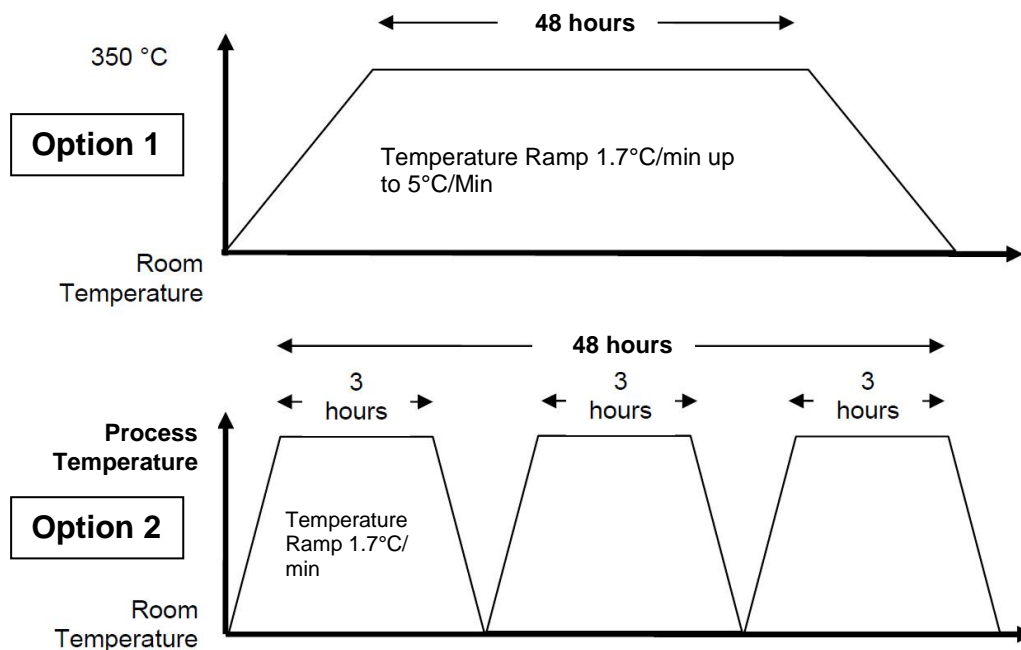



Figure 12. Options for Starting Termikfil 2000 Filter.


Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

3. Start the fan after making the electrical power connections.
4. Energize the equipment heater.
 - a. Use enough fresh air (or N₂) to remove the smoke, while still being able to achieve and maintain the necessary temperature.
 - b. The completion of the burn-off period should be based on the particle level in the oven or smoke-free exhaust and minimal odor level.
 - c. Check the filter hold-down nuts after burn-off and tightened as necessary.
 - d. For best oven particle control, this step should be repeated on a regular basis.

	<p><i>If the equipment must be moved after the burn-off process, use considerable care.</i></p> <ul style="list-style-type: none">• <i>The binder which strengthened new filters is now burned-off and the media is very fragile.</i>• <i>Rough handling of either the filter alone or the equipment with the filter installed is not recommended as it may tear the media and lead to reduced filter efficiency.</i>• <i>Removal of the filter after heating can also result in damage to the frame seal, and is only recommended when replacing the filter.</i>
---	---

4.4. MRC5000 Setup (Optional)

	<p><i>Refer to instructions provided recorder manufacturer for more specific installation notes.</i></p>
---	---

Temperature is retransmitted to the MRC5000 recorder from the controller. Set up the recorder by:


1. Ensure hardware jumper JU1 is in place for the 5 VDC setting (Refer to MRC5000 Manual included).
2. Move Mode to **PROG/TEST/CAL** to display **Prog**.
3. Press ▼ twice to display **Inps**. Move to each Parameter Code using ▼ or ▲. Adjust each Parameter Code using the settings in Table 5.
4. After adjusting all settings, move **Mode** to **RUN**. Display on both the Recorder and controller should read the same.

Table 5. MRC 5000 Settings.


Parameter Code	Degrees C	Degrees F
Inps	18	18
Icor	0	0
diSP	On	On
dPOS	0	0
EUU**	400	752
EUL**	0	32
ChUP	400	800*
ChLO	0	0
DFF	1	1

- * Change 0-400 chart paper to 0-800 chart paper. Depending on the equipment used, 0-600 paper may be used if the maximum temperature is 500 degrees F.
- ** These values must match the settings **sRetOutLo** and **RetOutHi** on the Protocol Plus Control page. For example, if **RetOutLo** is 32, **EUL** must read 32.


5. Operation

	<p>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, and 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 86 of 1990.</p>
---	--

5.1. Load Oven

	<p>Despatch Industries cannot be responsible for either the process or 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.</p> <p>Carefully following the instructions in this manual will help the purchaser and operator in fulfilling that responsibility.</p>
---	---

Avoid spilling on the heater elements or oven floor when loading the oven. Do not place the load on the oven floor plate. Placing the load on the oven floor may cause the load to heat unevenly and the weight may cause shorting out of the heater elements. Use the shelves provided.

	<p>Caution!</p> <p>Always place loads on the shelves provided to avoid possible uneven heating and damage to the oven.</p>
---	--

The two shelves are designed to be pulled out about halfway without tipping. Do not overload the shelves. Distribute the workload evenly so 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.

5.2. Pre-Startup Checklist

- Know the system. Read this manual carefully. Make use of its instructions and explanations. Safe, continuous, satisfactory, trouble-free operation depends primarily on your degree of understanding the system and your willingness to keep all parts in proper operating condition.
- Check line voltage. Voltage must correspond to nameplate requirements of motors and controls. A wrong voltage can result in serious damage. Refer to Section 1.5.4 for more information.
- Check fresh air and exhaust openings. Do not be careless about restrictions in and around the fresh air and exhaust openings and stacks. Under no condition can they be permitted to become so filled with dirt that they reduce airflow.




Warning!

Do not use 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.

5.3. Operating Procedure

5.3.1. Start Oven

1. Turn the yellow/red **DISCONNECT SWITCH** to ON.
2. Press the **POWER** to ON.
 - a. The **DOOR RELEASE** pushbutton will illuminate. This means the door can be opened.

 **During the process cycle, DOOR RELEASE will not be lit, meaning that the oven door may not be opened.**

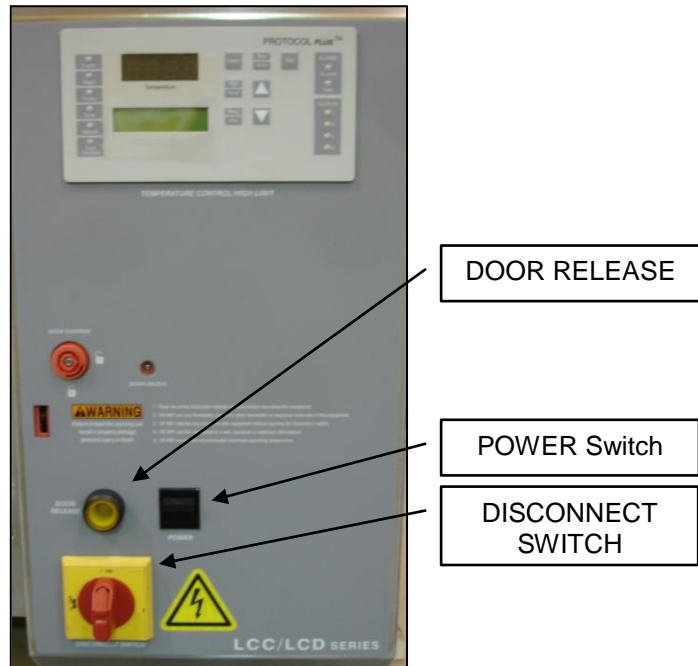


Figure 13. Power the Oven.

- b. **For Optional Beacon Light-equipped Units Only:** The amber (center) beacon light will illuminate, indicating that the oven is ready to receive work to be processed.
3. To open the oven door, press **DOOR RELEASE** while simultaneously pressing on the door. The oven door will unlatch and open.
 4. The heater is wired in series with the door switch. The door must be completely closed and locked to activate the heater.

5.3.2. Working with Protocol Plus Operating Modes

Refer to the Protocol Plus Controller Owner's Manual for specific information for working with the controller.

5.3.3. Sequence of Operation for Ovens Equipped with Optional Beacon Light

1. After starting the oven (refer to Section 5.3.1), the Protocol Plus controller initializes.
 - a. The oven should be idle, empty, with the door closed and awaiting the next lot for processing.
 - b. The Protocol Plus Controller should not be running a profile.
2. Open the oven door.



The amber beacon light will be ON (steady) until the profile is started (at the completion of Step 5).

3. Place the product on the shelf in the oven.
4. Close the oven door.
5. Run the desired profile with the Protocol Plus Controller.
 - a. Press **Select** until **Profile** is displayed.



Press Run at any time to active the Profile Mode.

- b. Press **▲** or **▼** to display the desired profile.
 - c. Press **Run** to start the Profile Mode.




After pressing Run, the display changes from Stop to Run. Segment time remaining and Current Segment number will display.

- a. The green beacon light is ON (steady), the amber beacon light is off.
 - b. When the process is complete, the amber beacon should be ON, and the **DOOR RELEASE** pushbutton light is on.
7. Press **DOOR RELEASE** pushbutton
8. Open the oven door to remove the product workload.
9. Closes the oven door to complete the process cycle. The oven is ready for the next lot.

5.3.4. Sequence of Operation for Ovens Equipped for Inert Atmosphere Oven


1. After starting the oven (Section 5.3.1), the Protocol Plus controller initializes.

	<p>Refer to the Protocol Plus™ Controller Owner's Manual for more information on programming event outputs.</p>
---	--

- a. The oven should be idle, empty, with the door closed and awaiting the next lot for processing.
 - b. The Protocol Plus Controller should not be running a profile.
 - c. Make certain the nitrogen flow meter is in the OFF position, that is, fully clockwise (Figure 14).
2. Open the oven door.
 3. Place the product on the shelf in the oven.
 4. Close the oven door.
 5. Run the desired profile with the Protocol Plus Controller.
 - a. Press **Select** until **Profile** is displayed.



Figure 14. Nitrogen Flowmeter.

	<p>Press Run at any time to activate the Profile Mode.</p>
---	---

- b. Press **▲** or **▼** to display the desired profile.
 - c. Press **Run** to start the Profile Mode.
6. The first segment of the program is the PURGE MODE.
 - a. Set the nitrogen flow meter (Figure 14) to the desired setting (Table 6).
 - b. This program energizes the purge solenoid valve.

Table 6. Desired Oxygen Concentration.

Oven Model	Mode	< 100 PPM	<1000 PPM
LCC1-16	Purge	150 scfh	125 scfh
	Maintain	75 scfh	65 scfh
LCC1-51	Purge	200 scfh	175 scfh
	Maintain	160 scfh	140 scfh

7. The second segment is the MAINTAIN MODE:
 - a. The purge solenoid valve is first de-energized and then re-energized to maintain the nitrogen level to less than the purge level.
 - b. Adjust the Nitrogen Maintain needle valve at rear of oven (Figure 15). Leave the maintain valve energized as long as the nitrogen level is maintained (Table 6).

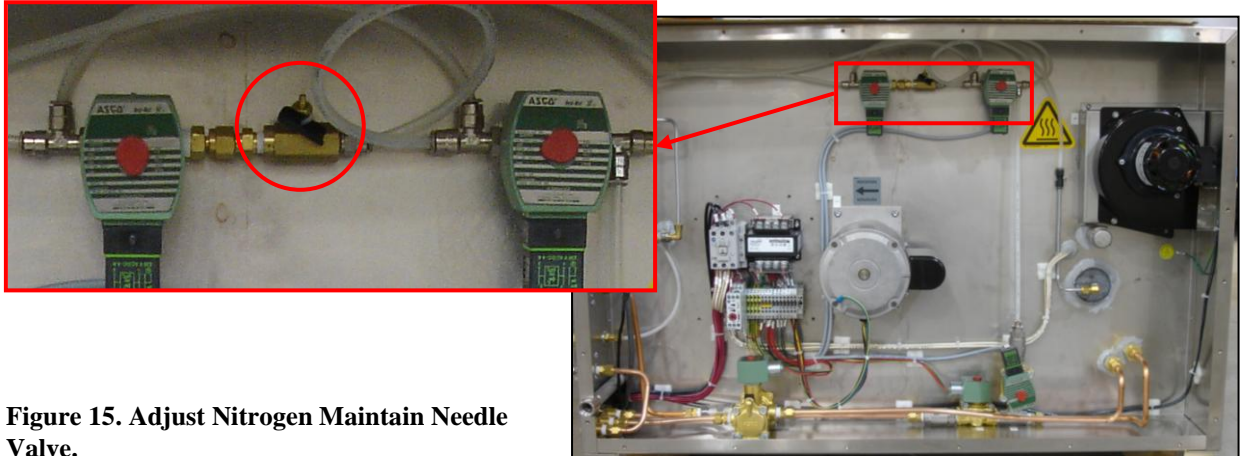


Figure 15. Adjust Nitrogen Maintain Needle Valve.

8. The third and final segment is the COOLDOWN MODE. In Cooldown mode, water valves are energized to bring the chamber to a safe unloading temperature (Figure 16).

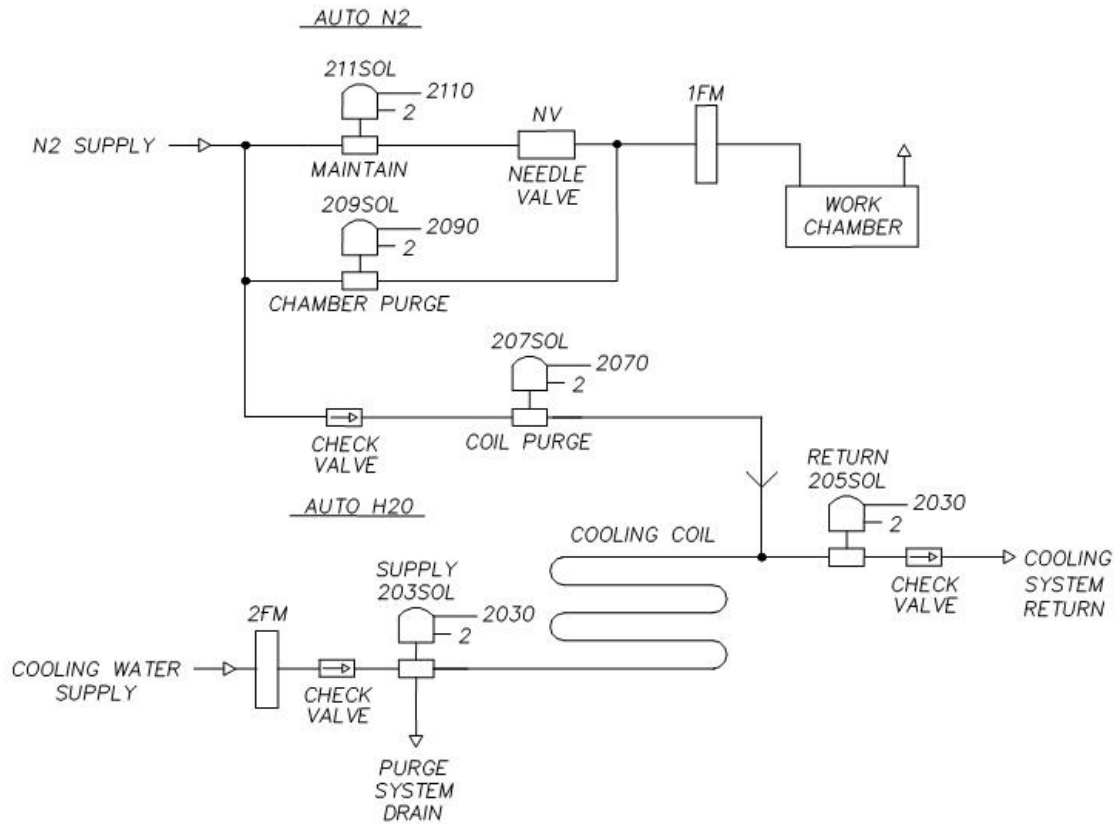


Figure 16. Water and Nitrogen Piping Schematic.

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

5.3.5. Manual Unlock and Main Disconnect

5.3.5.1. Manual Unlock

If a power failure occurs insert a torx tip tool (provided) and rotate 90 degrees counterclockwise to allow the chamber door to open. The tool must be turned back to the locked position to allow electrical operation again.

5.3.5.2. Main Disconnect Switch

This disconnect switch (yellow with red knob) is connected to the load break switch behind the panel that disconnects or connects power from the main line.

6. Maintenance

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

6.1. Checklist

- Keep equipment clean. Gradual dirt accumulation retards airflow. A dirty oven can result in unsatisfactory operation such as unbalanced temperature in the work chamber, reduced heating capacity, reduced production, overheated components, and the like. 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—particularly controls, motors or other equipment containing electronic components. Temperatures greater than 51.5°C (125°F) should be avoided.
- Establish maintenance and checkup schedules. Do this promptly and follow the schedules 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 judgment** the safety watchwords for the operation of your oven.
- Inspect oven seals if pressure readings decrease over time (Refer to Section 3.3.5 as well as Table 2, Columns D and/or E)

6.2. 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.

6.3. HEPA Filter Replacement

Refer to section 4.3 for filter replacement.

7. Troubleshooting: Error Messages and Alarm

Table 7 lists the more common error messages, the possible problems and remedies.

Table 7. Error Messages and Next Steps.

Alarm Status	Possible Problem	Next Step
Hi-Limit LED flashing	<ul style="list-style-type: none"> • Problem with thermocouple • Hi-limit setpoint has been exceeded. 	Once the problem has corrected, press Reset .
Soak LED flashing	Oven temperature has not entered (or dropped out of) the soak band and the soak timer has stopped	Program a slower ramp rate or if oven is not heating check heater circuit.
Top LED displays OPEN and lower LCD displays CONTROL SENS ERR	Control thermocouple is disconnected or broken	Repair or replace the thermocouple.
Lower LCD displays HI LIM SENS ERR	Hi limit thermocouple is disconnected or broken	Repair or replace the thermocouple.
Lower LCD displays HIGH LIMIT ALARM	Hi limit temperature setpoint has been exceeded	Determine if: <ul style="list-style-type: none"> • the setting is too close to the setpoint • the SSR is defective • calibration is incorrect



The lower LCD intermittently displays HL Temp. This is not an error message, but the Hi limit thermocouple temperature reading.

8. Appendices

8.1. HEPA Filter Pressure Reading Worksheet

A	B	C	D	E	F
Date	Comments	Pressure (inches of water) ¹⁰	Pressure with: 150 SCFH (LCC1-16); 200 SCFH (LCC1-51) nitrogen purge ¹¹	Pressure with: 75 SCFH (LCC1-16); 150 SCFH (LCC1-51) nitrogen maintain ⁹	Oven Temperature
	Typical Values	2-3"	1.5-2" above value in Column C	0.5-1" above value in Column C	60°C
	Filter first installed				

¹⁰ With Purge and Maintain valves off for a nitrogen atmosphere oven. Cooling fan off for an air atmosphere oven.

¹¹ For a nitrogen atmosphere oven only.

8.2. Standard Products Warranty



Standard Products Product Warranty

Products Covered by this Warranty

This warranty (the "warranty") applies to the following Despatch products: LEB, LBB, LAC, LCC, LCD, LLD, RAD, RFD, LND, RTFO, TAD, TFD, PR, PN, PW, PTC and the following Ransco products: RTH, RTS, 900 Series.

Parts and Materials

Despatch warrants all parts and materials to be free from defects in material and workmanship for a period of:

1. Five (5) years from date of shipment for laboratory oven electric heaters.
2. Three (3) years from the date of shipment for Protocol Plus and DES 2000 temperature controllers; and
3. One (1) year from the date of shipment, or 2,000 hours of operation, whichever occurs first, for all other components of products covered by this Warranty.

During the applicable Warranty period, Despatch will repair or replace, at Despatch's option, parts and materials covered by this Warranty.

Labor

During the first 90 days of the Warranty period, Despatch will pay labor costs incurred to remove defective parts and materials, and to reinstall repaired or replacement parts or materials; provided, however, that Despatch's obligation to pay such labor costs shall be subject to the limitation that the removal and/or reinstallation service must be performed by a Despatch-authorized technician from Despatch's worldwide network of factory-trained professionals at a location within the contiguous United States.

Transportation Costs

All transportation costs to transport defective parts or materials to Despatch and to transport repaired or replacement parts or materials to Customer shall be the responsibility of Despatch.

Terms and Conditions

This Warranty shall be deemed valid and binding upon Despatch if and only if the Customer:

1. Installs, loads, operates, and maintains the covered product supplied hereunder in accordance with the instruction manual provided upon delivery and product labeling affixed to the subject equipment;
2. If applicable, follows the Emergency Procedure set forth in this Warranty; and
3. Contacts Despatch's Helpline at 1-800-473-7373 for assistance in diagnosing and troubleshooting the problem immediately upon discovering any damage or malfunction.

Despatch's reasonable determination as to whether a repair, replacement, or service is covered by this Warranty shall be final and binding.

Exclusions

This Warranty DOES NOT cover,

1. Damage or malfunctions, or expenses incurred in the process of diagnosing and/or repairing damage or malfunctions, resulting from any of the following: operator

THE REPRESENTATION AND WARRANTIES SET FORTH HEREIN ARE EXCLUSIVE AND IN LIEU OF, AND CUSTOMER HEREBY WAIVES AND DISCLAIMS RELIANCE UPON, ALL OTHER REPRESENTATIONS AND WARRANTIES OF EVERY KIND WHATSOEVER WHETHER EXPRESS OR IMPLIED, OR ARISING BY OPERATION OF LAW OR IN EQUITY, OR BY COURSE OF PERFORMANCE OR USAGE OF TRADE, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.

THIS WARRANTY IS PERSONAL TO THE CUSTOMER AND MAY NOT BE TRANSFERRED OR ASSIGNED. ALL LIMITATIONS HEREUNDER, HOWEVER SHALL BE BINDING ON ALL SUCCESSORS AND ASSIGNS OF CUSTOMER.

error, misuse, abuse, inadequate preventative maintenance, normal wear and tear, service or modifications by other than Despatch authorized technicians, use of the covered product that is inconsistent with the operation manual or labeling, acts of nature (including, without limitation, floods, fire, earthquake, or acts of war or civil emergency), internal or external corrosion, or non-conforming utilities (including, without limitation, electrical, fuel supply, environmental and intake/exhaust installations);

2. Repair or replacement of parts or materials designed and intended to be expendable or consumable; refrigerants, filters, lamps;
3. Routine maintenance; or
4. Labor costs incurred for troubleshooting, diagnostics, or testing (except for testing required to verify that a covered defective part or material has been repaired).

Limitations of Liability

Despatch shall not, in any event, be liable for indirect, special, consequential, incidental, or punitive damages or penalties of any kind, including without limitation loss of revenue, profits or business opportunities resulting from interruption of process or production. In no event shall Despatch be liable for damages in excess of the amounts paid by Customer to Despatch with respect to the applicable product(s). This Warranty does not cover, and Despatch shall not be liable for any losses, costs, damages or expenses resulting from delays in diagnosing or repairing the products, supplying or obtaining replacement parts of materials, strikes, labor stoppages or shortages, fires, accidents, government acts or regulations, or any other causes beyond the control of Despatch.

Non-Compliance By Customer

Despatch reserves the right to suspend and withhold service under this Warranty in the event of non-compliance by the Customer to any terms and conditions of this Warranty or the applicable purchase order or invoice. Further, Despatch shall not be liable for any loss of production, expenses, and inconveniences incurred due to such suspension.

Customer Furnished Equipment Warranty Limitation

This Warranty does not cover diagnosis or repairs of defects in or caused by, lack of performance of, or fitness for purpose of customer-supplied parts or equipment unless specifically noted in the Despatch written order acceptance confirmation.

Performance Commitment

Despatch provides no guarantee of process performance or fitness for purpose, unless specifically noted otherwise in Despatch written order acceptance confirmation. Despatch is providing equipment with design parameters specific only to its equipment.

Procedure Upon Discovery of Defects and Emergencies

In the event Customer becomes aware of any defect in the application products, Customer must immediately: (a) shut off fuel or energy supply (gas and electricity); (b) call for emergency assistance, if needed, and (c) notify Despatch Service.

Service



Worldwide Phone 952-469-8230; Worldwide Fax 952-469-8193; North American Phone 800-473-4373
e-mail service@despatch.com; www.despatch.com

Please see reverse side for other service offerings

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

8.3. EC Declaration of Conformity

Despatch INDUSTRIES		
EC Declaration of Conformity		
Manufacturers Name:	Despatch Industries	
Manufacturers Address:	8860 207th Street Lakeville, MN 55044	
<p>Declare that the machinery described below complies with applicable health and safety requirements of Part 1 of Annex I of the Machinery Directive 2006/42/EC and the EMC Directive 2004/108/EC. Confidential technical documentation has been compiled in accordance with Part A of Annex VII of Machinery Directive 2006/42/EC and is available to European national authorities on written request only. If a request is received documentation may be transmitted by post or electronically.</p>		
Description:	Despatch Industries LCC/LCD Series Ovens.	
Model Numbers:	LCC, LCD, LLC, LLD	
Sizes:	1-16, 1-16V, 1-16N, 1-16NV, 1-51, 1-51V, 1-51N, 1-51NV	
<p>The following standards have either been referred to or been complied with in part or in full as relevant:</p>		
ENISO 12100 - 2	Machinery Safety -	Basic concepts, general principles for design – Part 2: Technical principles and specifications.
EN 13849-1 (954-1)	Machinery Safety -	Safety Related Parts of Control Systems – Part 1: General Principles for Design.
EN ISO 13857 (EN 811 and EN 294)	Machinery Safety -	Safety distances to prevent hazard zones being reached by upper and lower limbs.
EN 953	Machinery Safety -	General requirements for the design and construction of guards.
EN 614	Machinery Safety -	Ergonomic design principles.
EN ISO 13732-1 (EN 563)	Machinery Safety -	Ergonomics of the thermal environment
EN13850 (EN 418)	Machinery Safety -	Emergency stop equipment, functional aspects - Principles for design.
EN 1088:1995+A2:2008	Machinery Safety -	Interlocking devices associated with guards - Principles for design and selection
EN 60204-1	Machinery Safety -	Electrical Equipment of Machines.
EN61000-6-4	EMC	- Generic emissions standard.
EN61000-6-2	EMC	- Generic susceptibility standard.
Full Name:	Kevin Rowekamp	Position: Chief Financial Officer
		Location: Lakeville, MN. USA
Signature:		Date: June 21, 2010
Authorized European Representative		
 QNET BV Hommertweg 286 6436 AM Amstelveen The Netherlands		
Despatch Industries 8860 207th Street West, Minneapolis, MN 55044 Telephone: 952-469-5424		
www.despatch.com		

8.4. Electrical Schematics

The following pages contain electrical schematics for the LCC1-16, LCC1-16N-3, LCC1-51-3 and LCC1-51N-3 ovens.

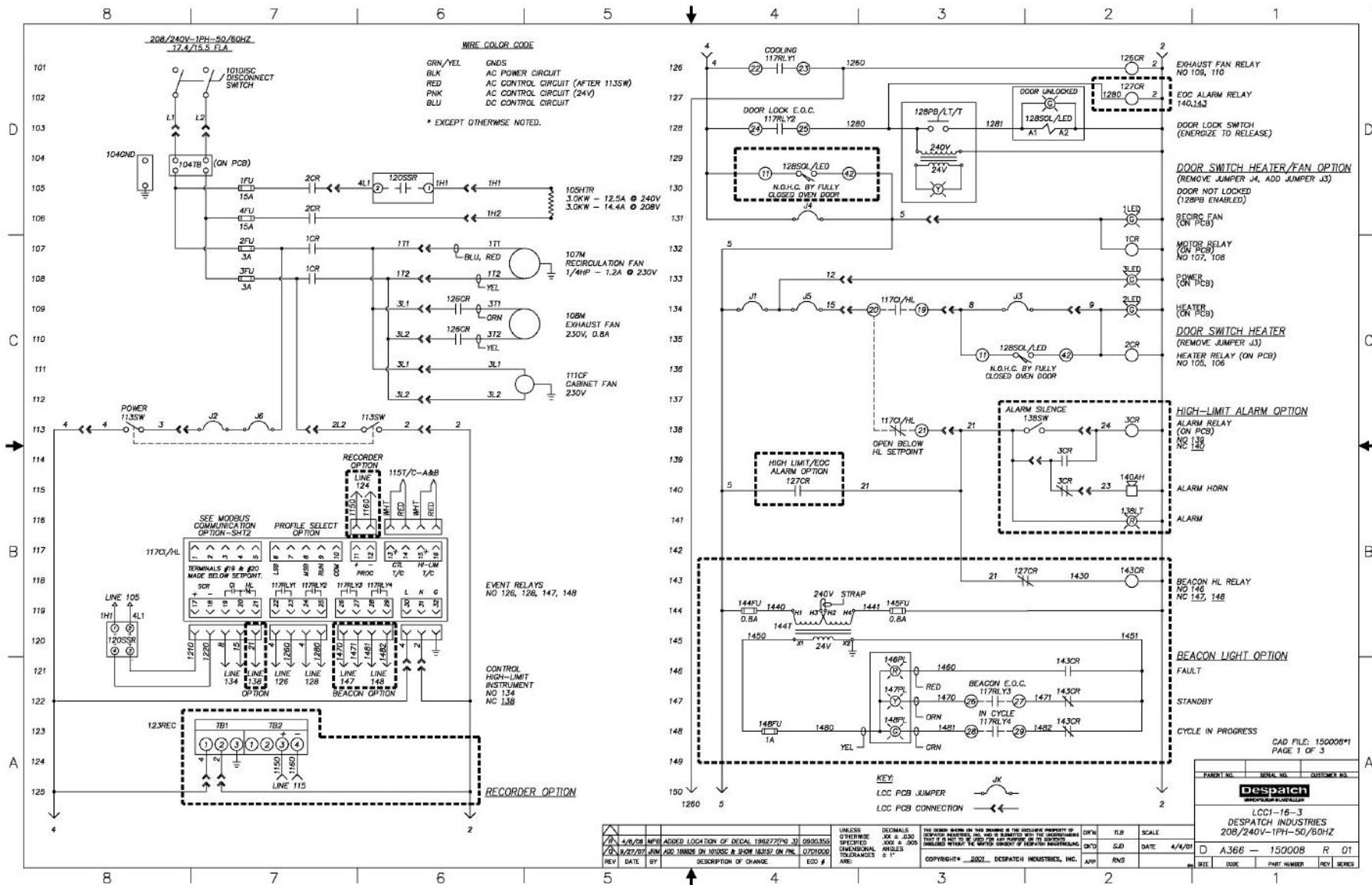


Figure 17. LCC1-16-3 (Drawing 150008-01).

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

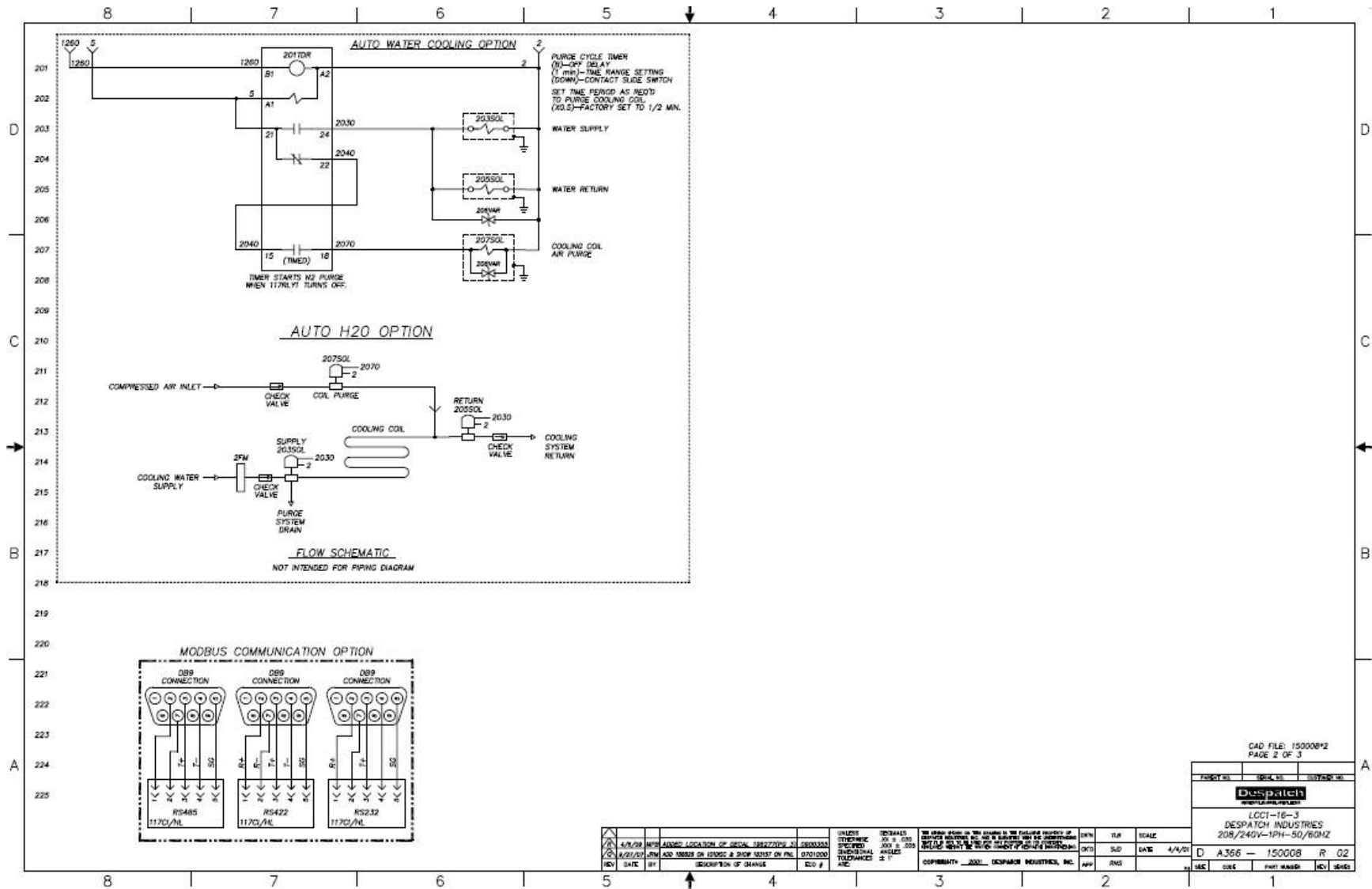


Figure 18. LCC1-16-3 (Drawing 150008-02).

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

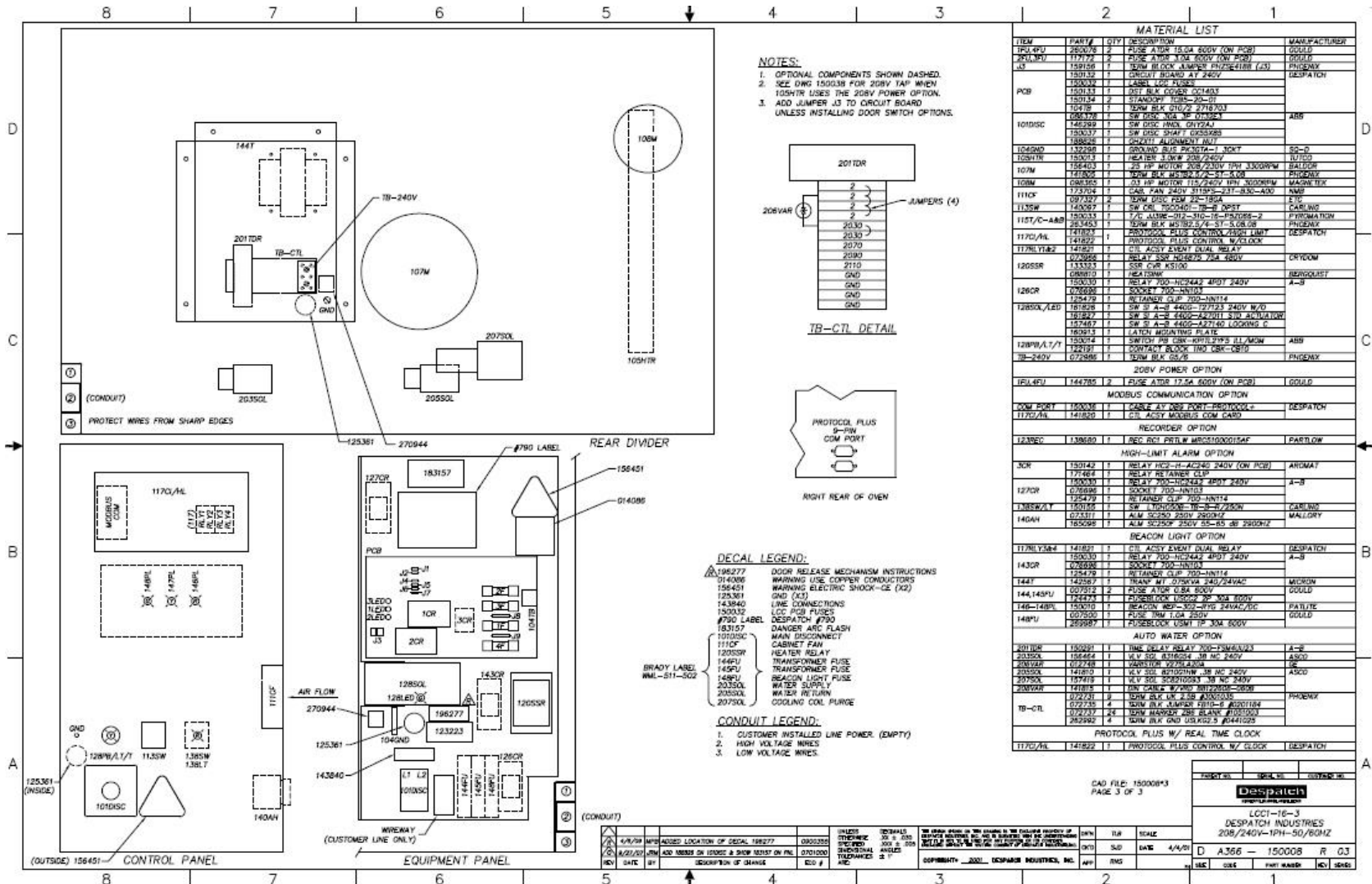


Figure 19. LCC1-16-3 (Drawing 150008-03).

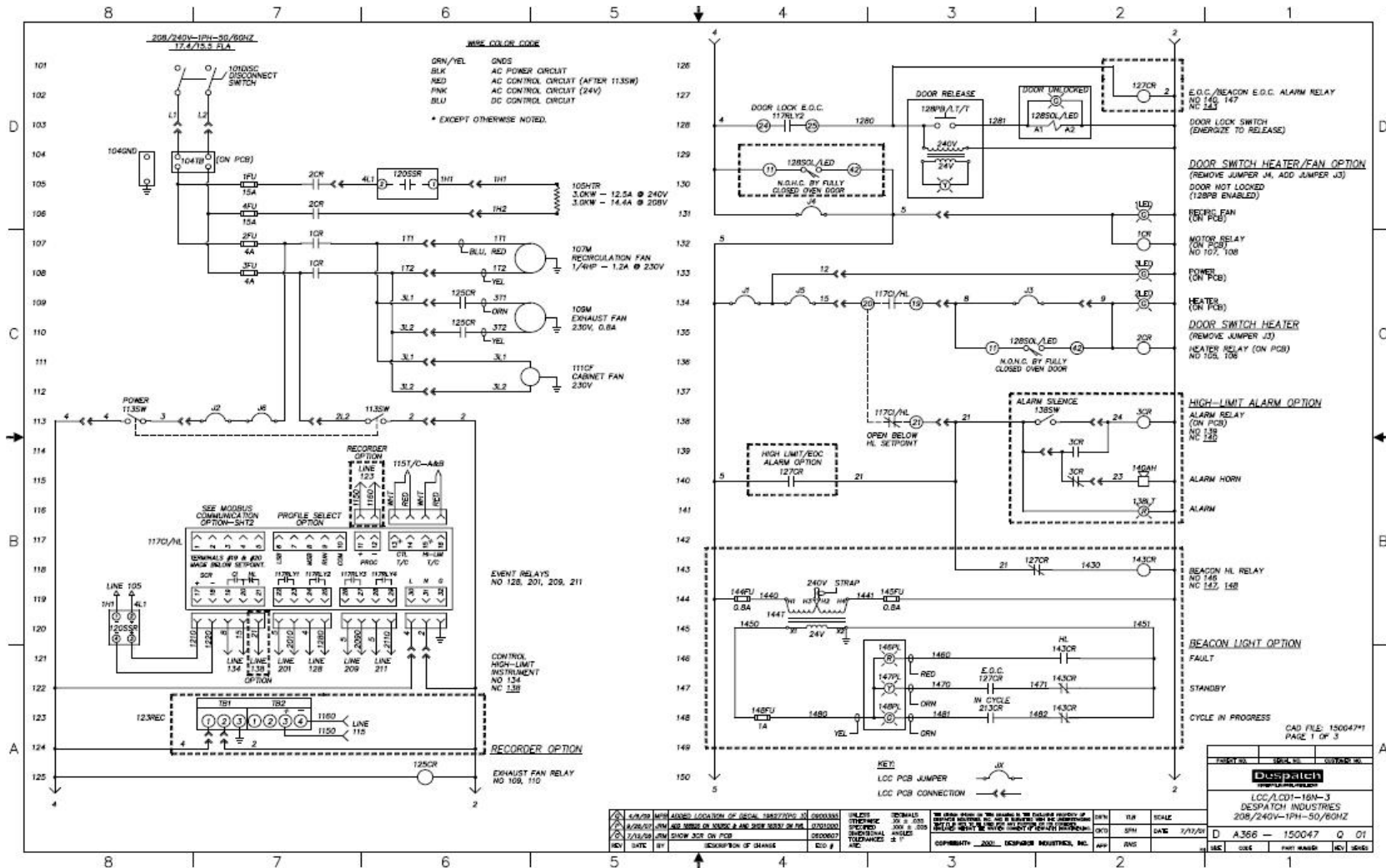


Figure 20. LCC1-16N-3 (Drawing 150047-01).

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

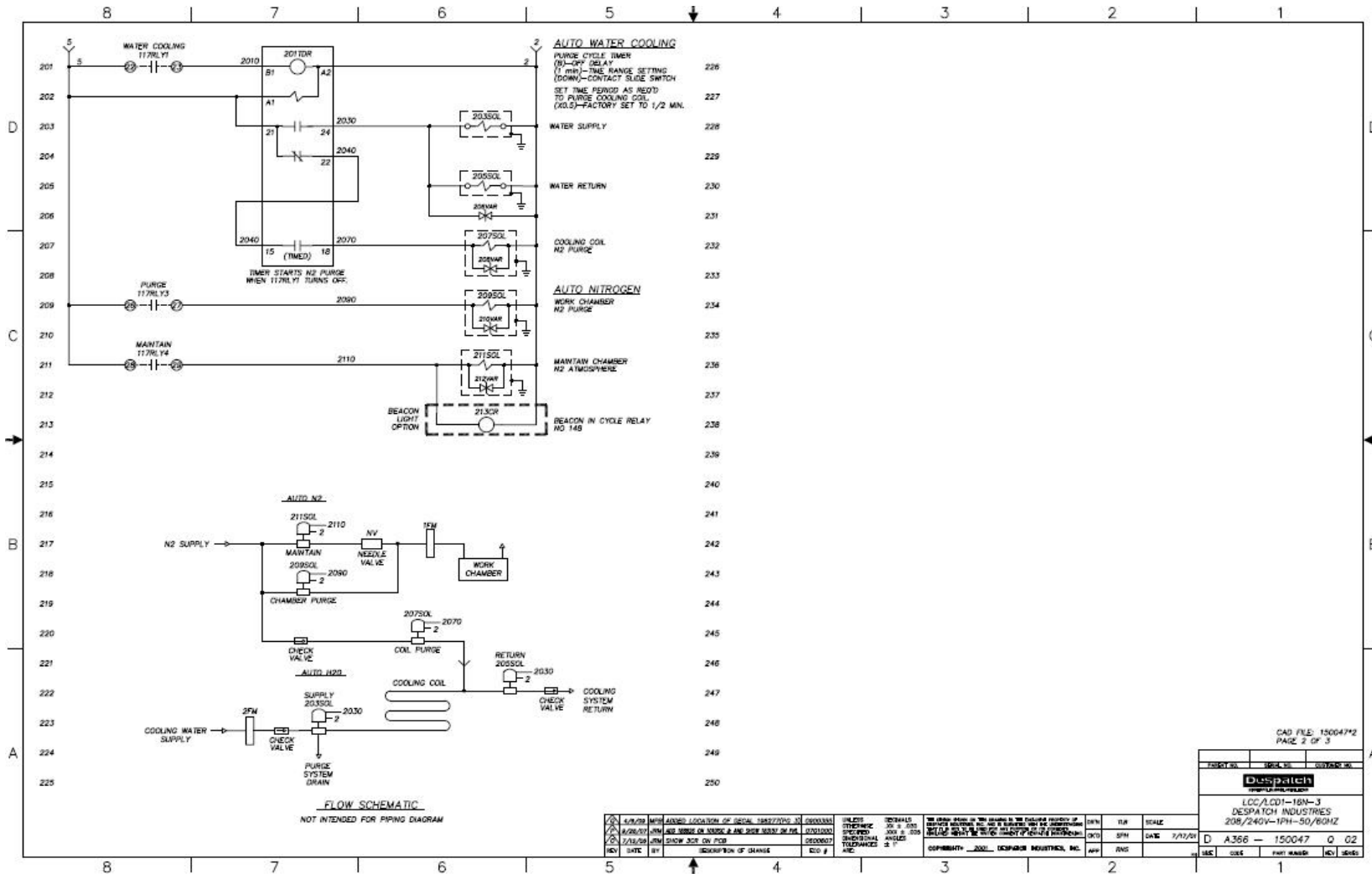


Figure 21. LCC1-16N-3 (Drawing 150047-02).

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

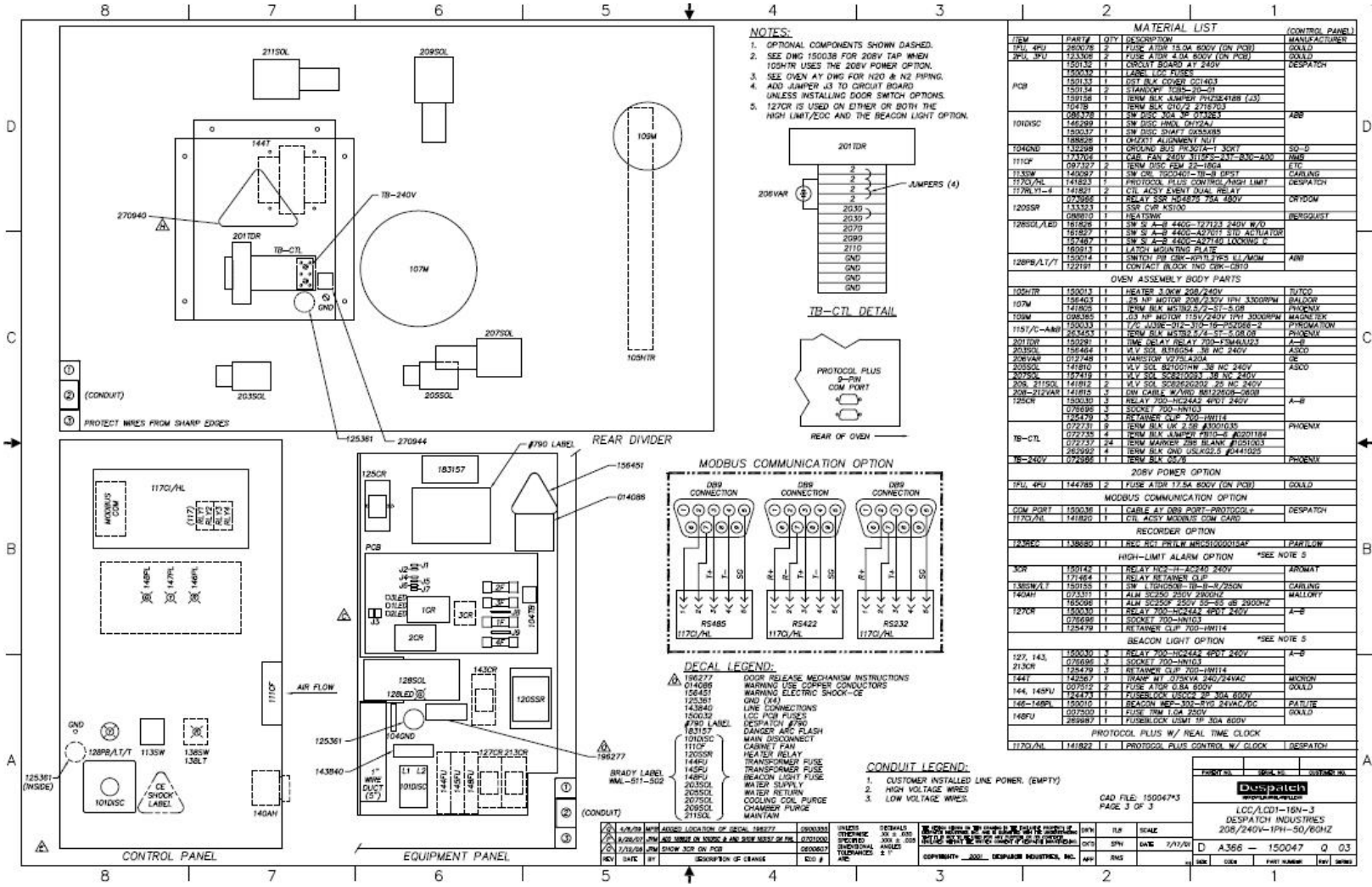


Figure 22. LCC1-16N-3 (Drawing 150047-03).

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

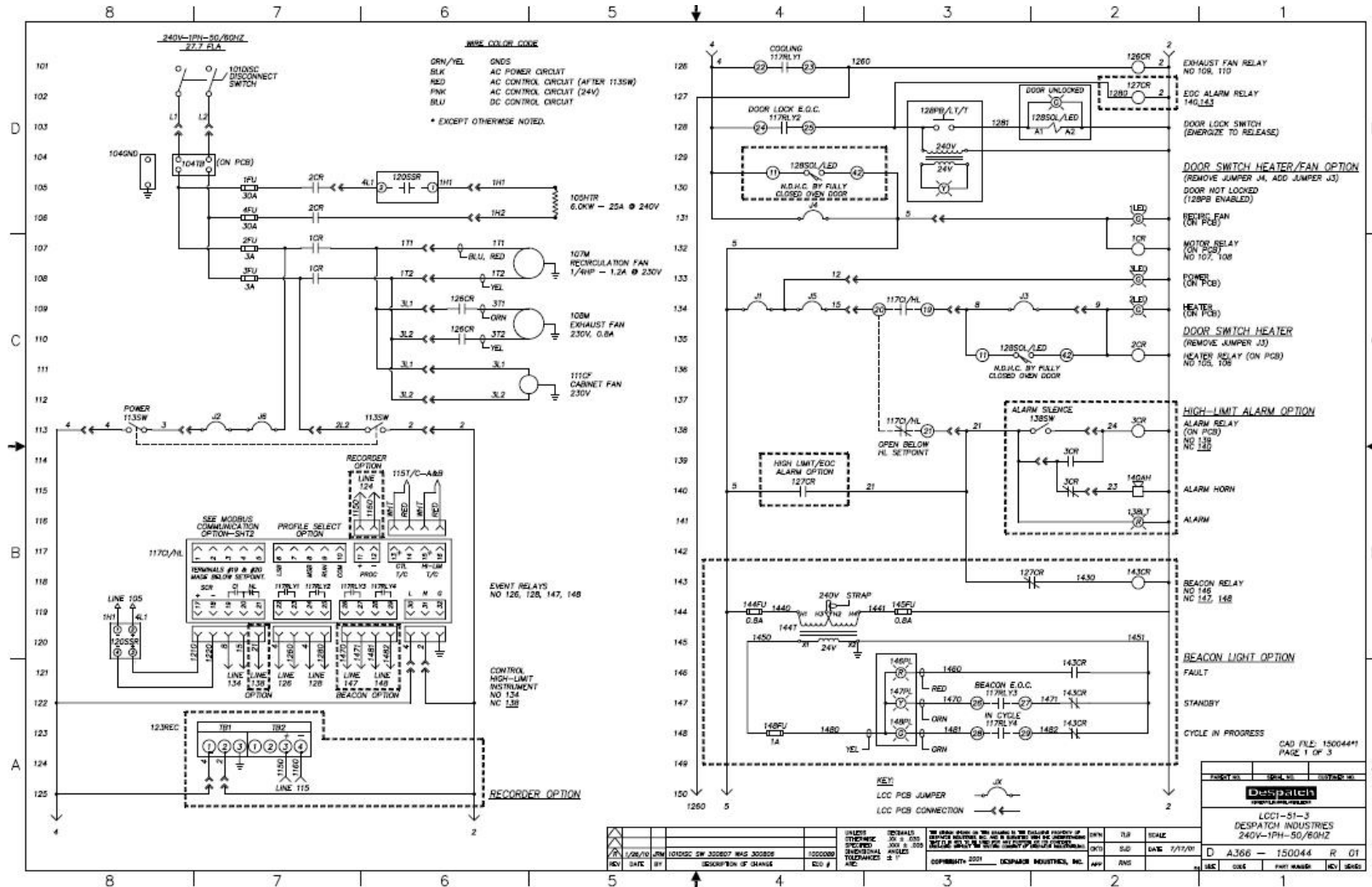


Figure 23. LCC1-51-3 (Drawing 150044-01).

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

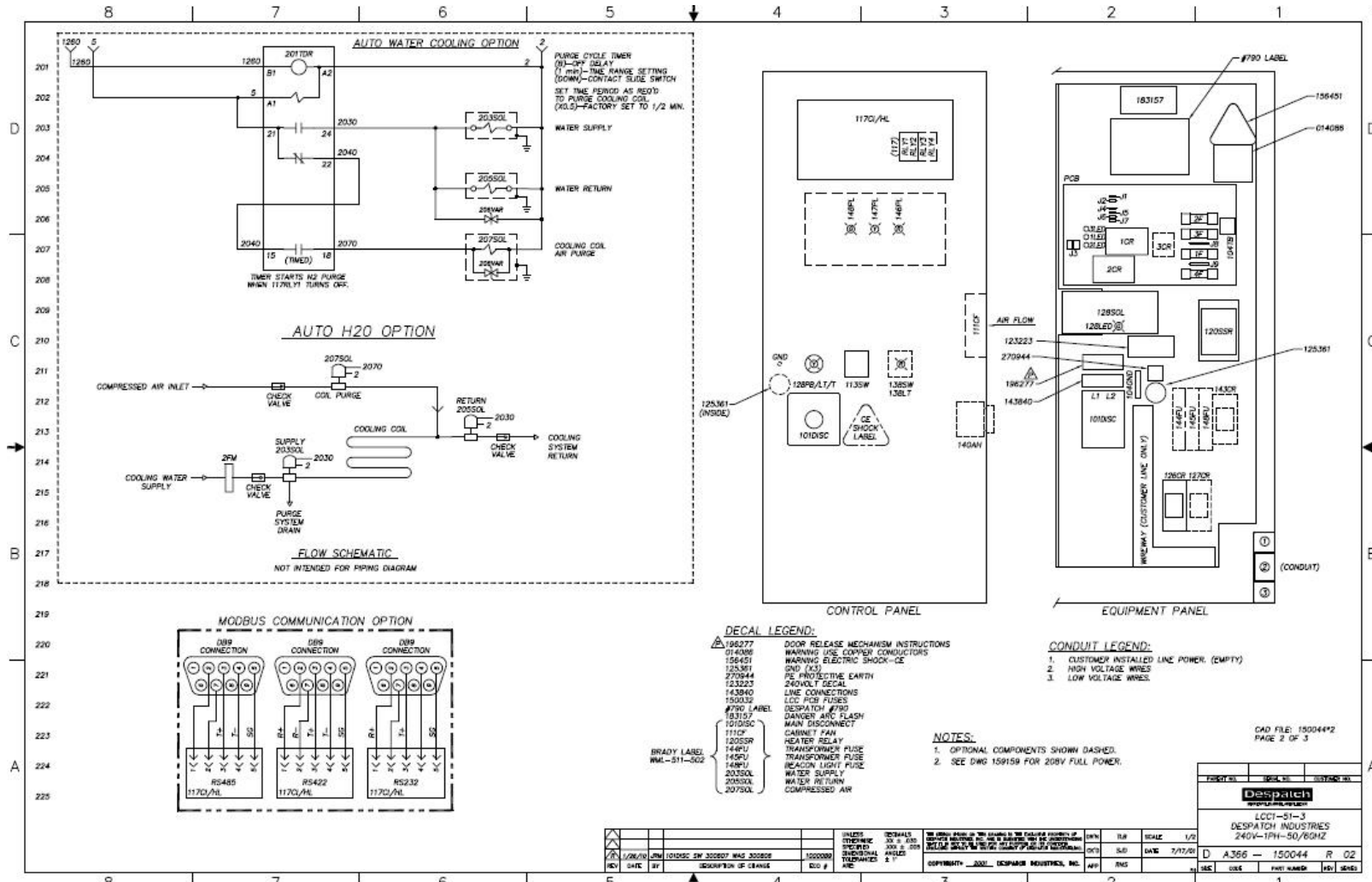


Figure 24. LCC1-51-3 (Drawing 150044-02).

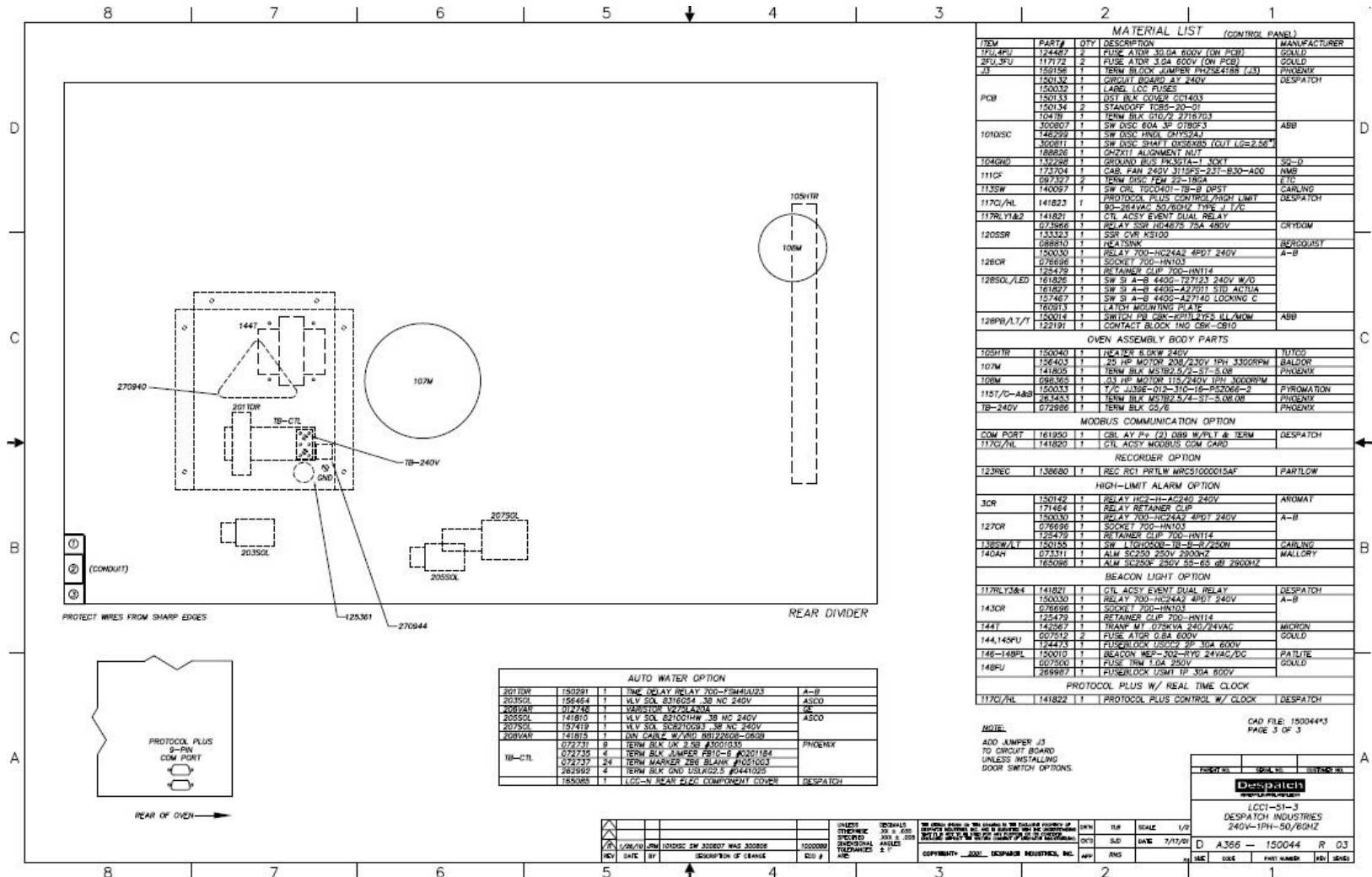


Figure 25. LCC1-51-3 (Drawing 150044-03).

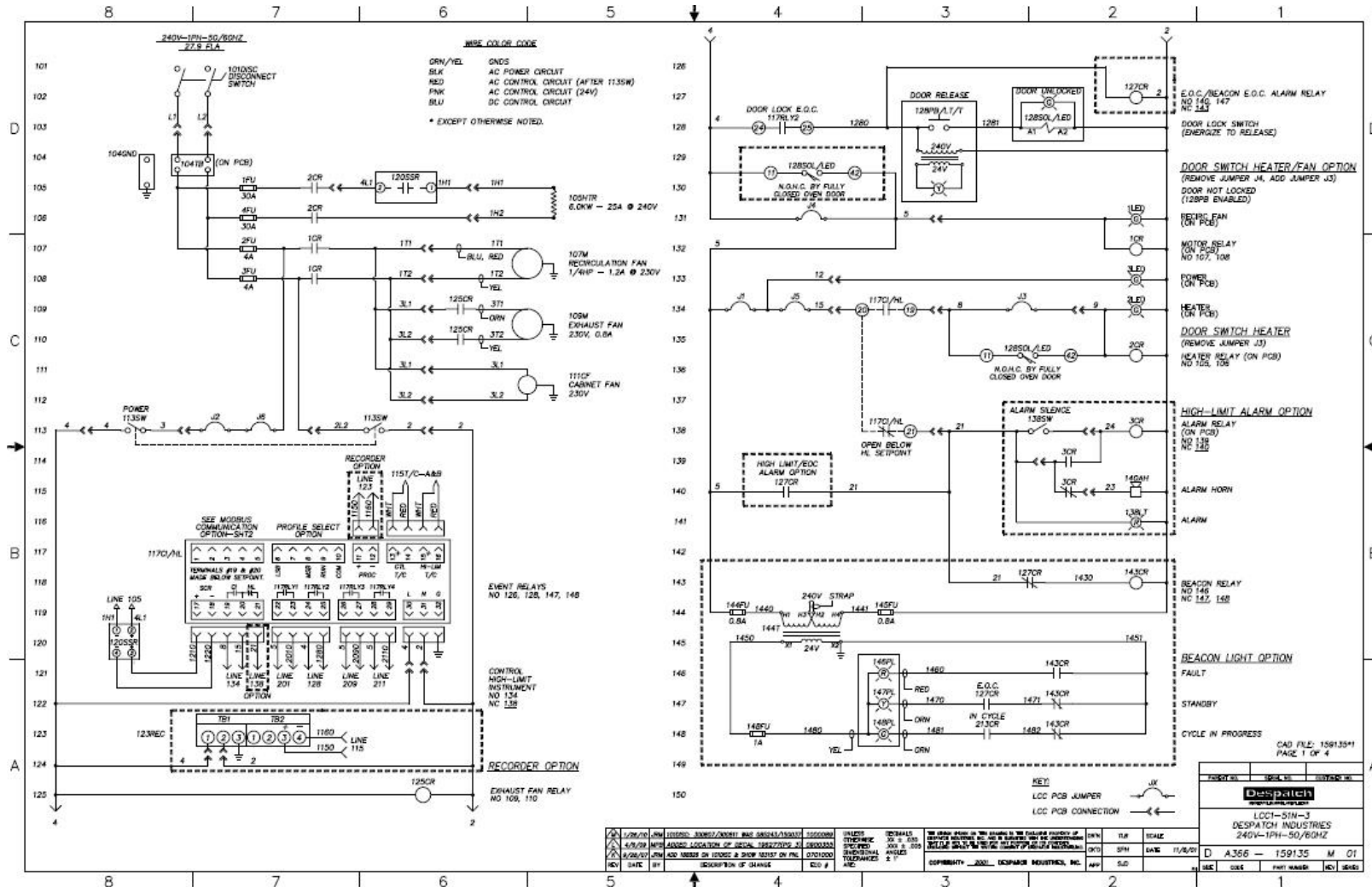


Figure 26. LCC1-51N-3 (Drawing 159135-01).

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

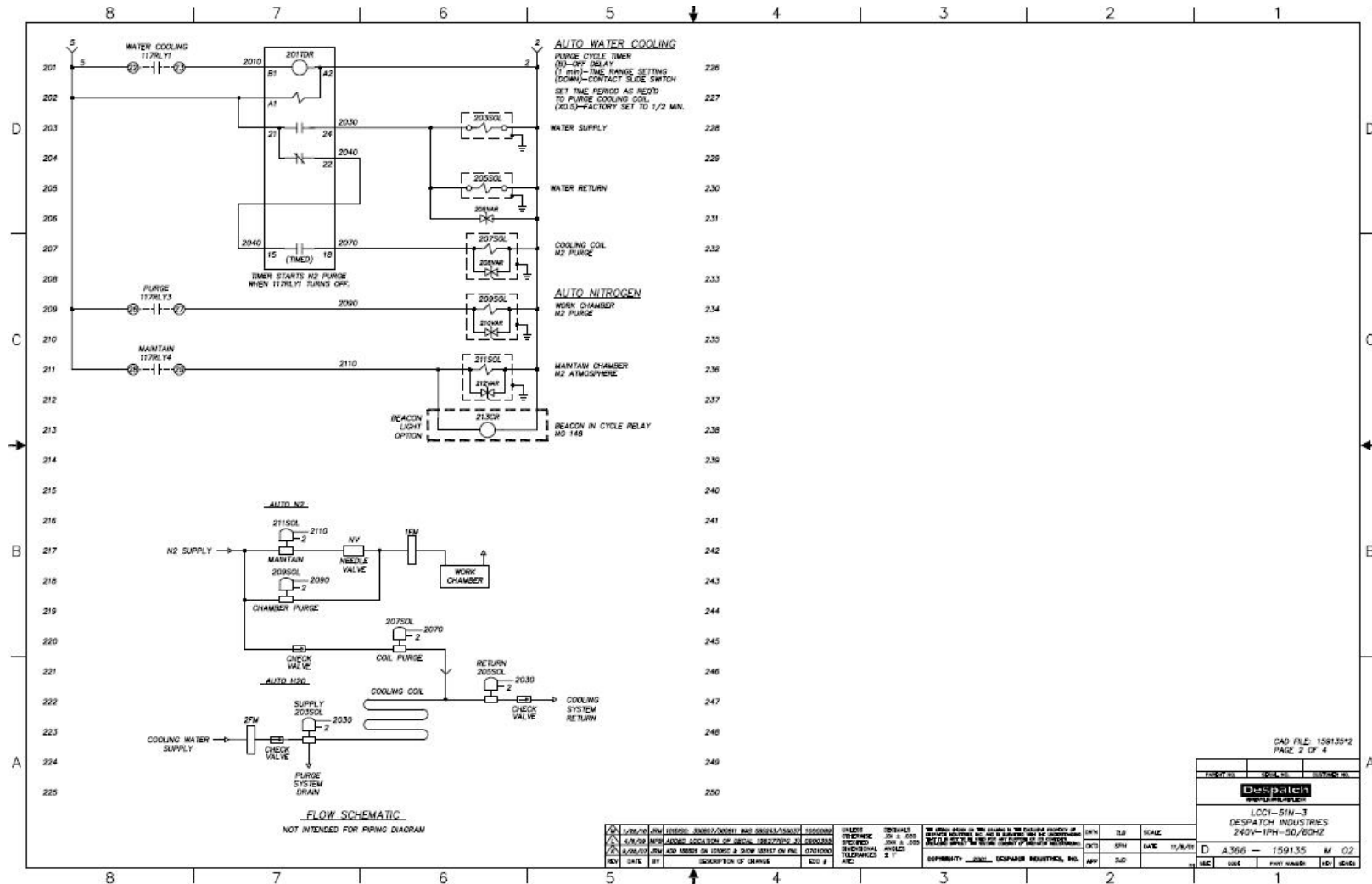


Figure 27. LCC1-51N-3, Drawing 159135-02).

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

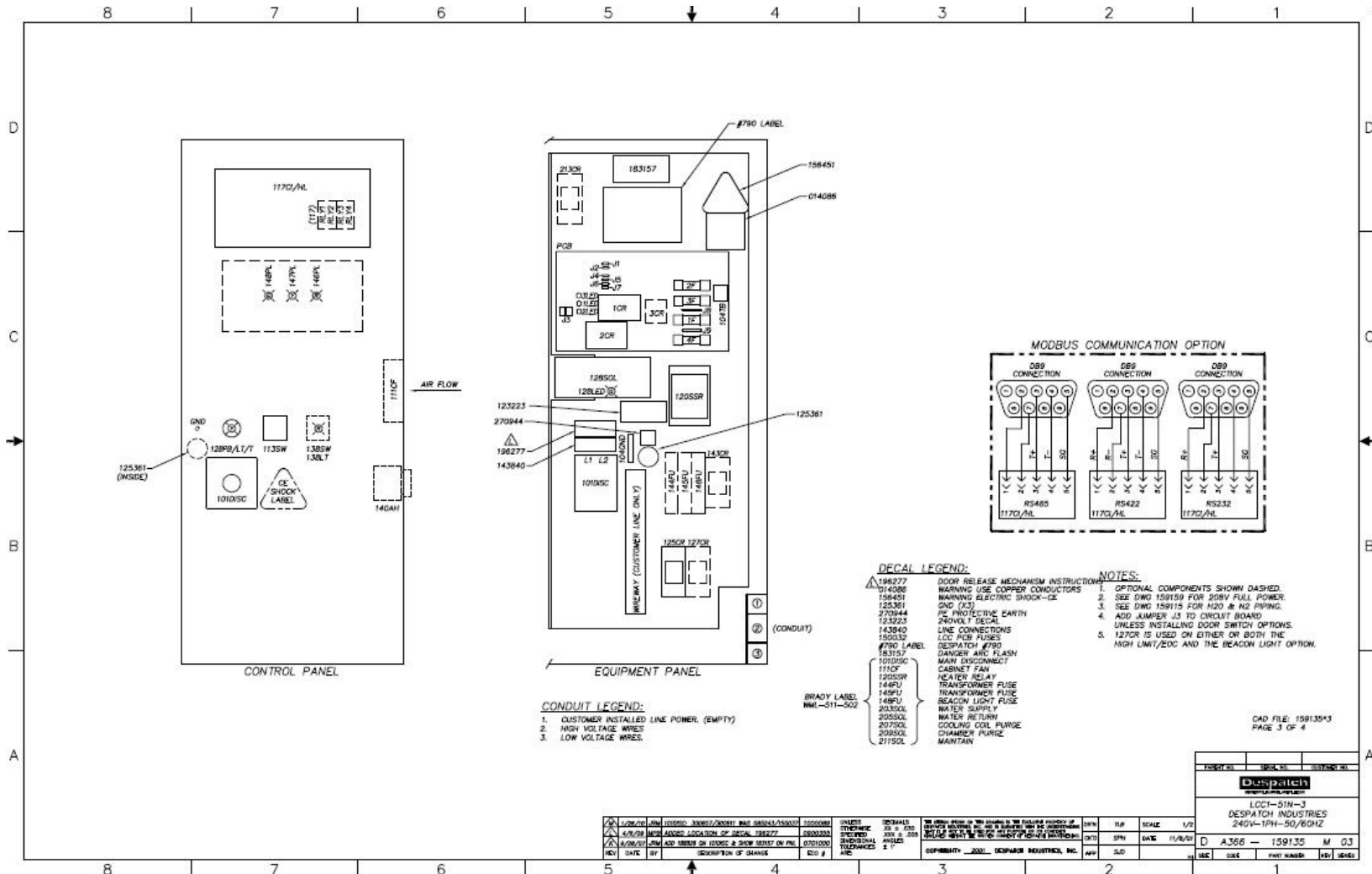


Figure 28. LCC1-51N-3 (Drawing 159135-03).

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

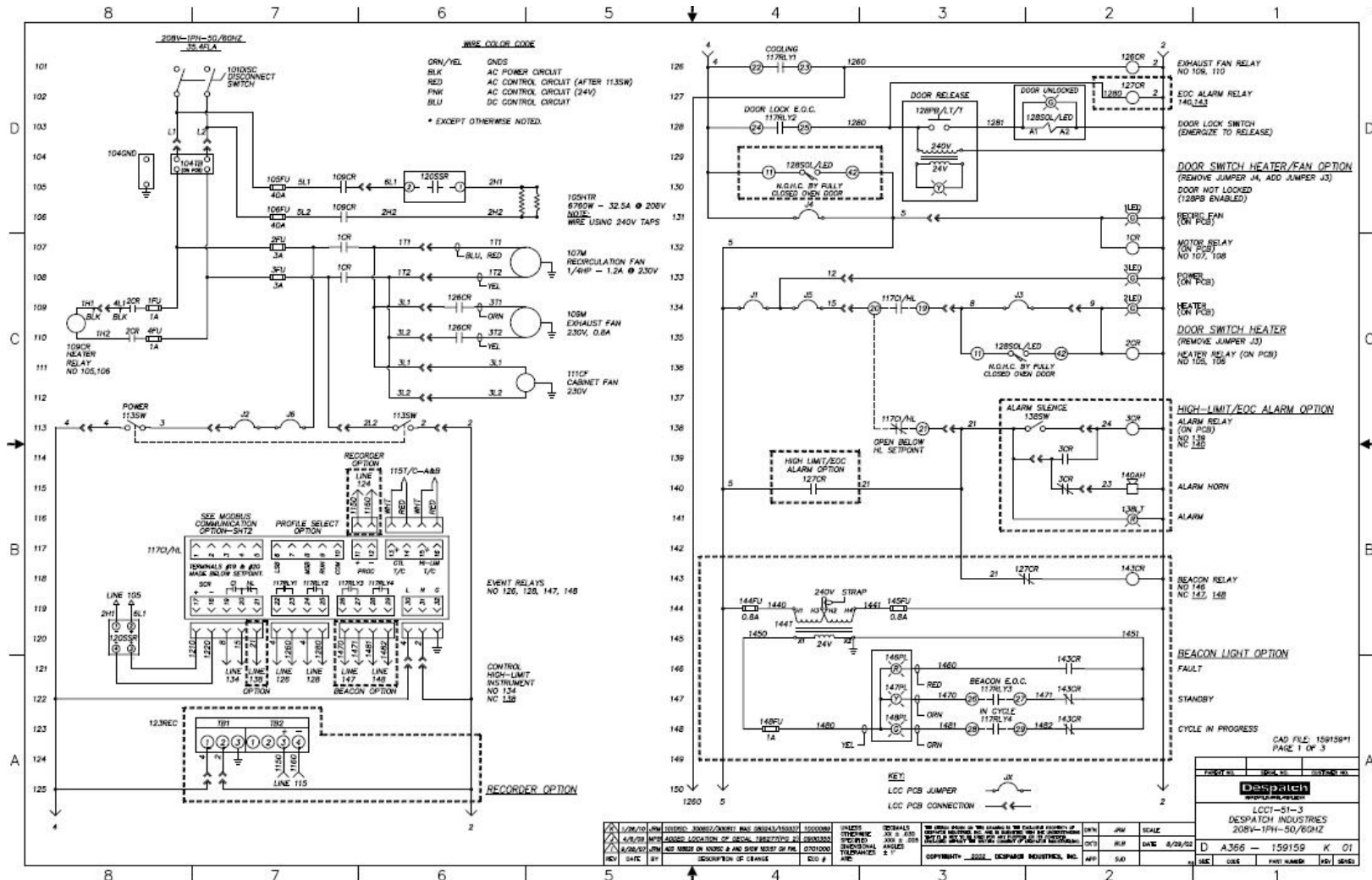


Figure 30. LCC1-51-3 (Drawing 159159-01).

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

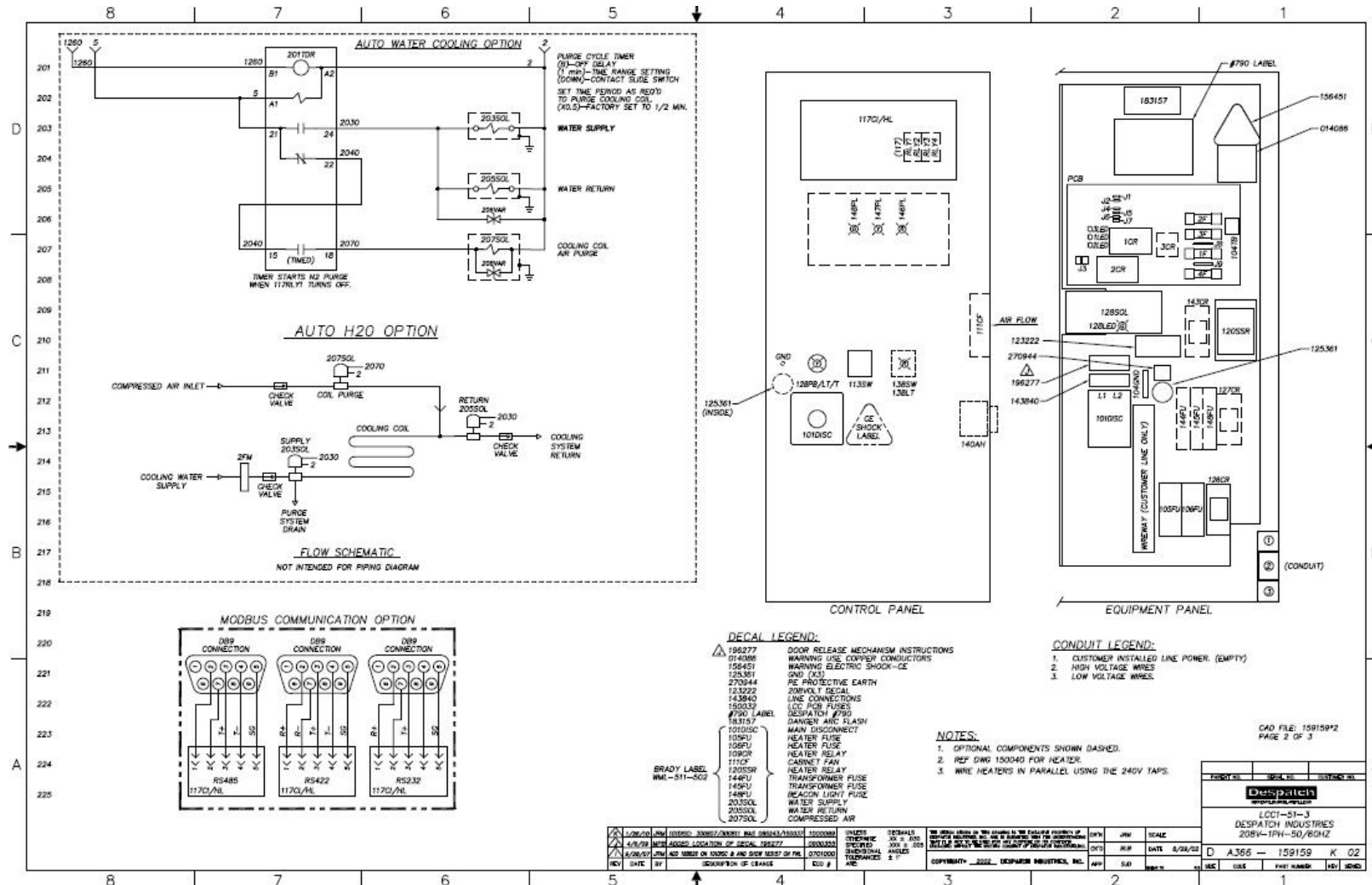


Figure 31. LCC1-51-3 (Drawing 159159-02).

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

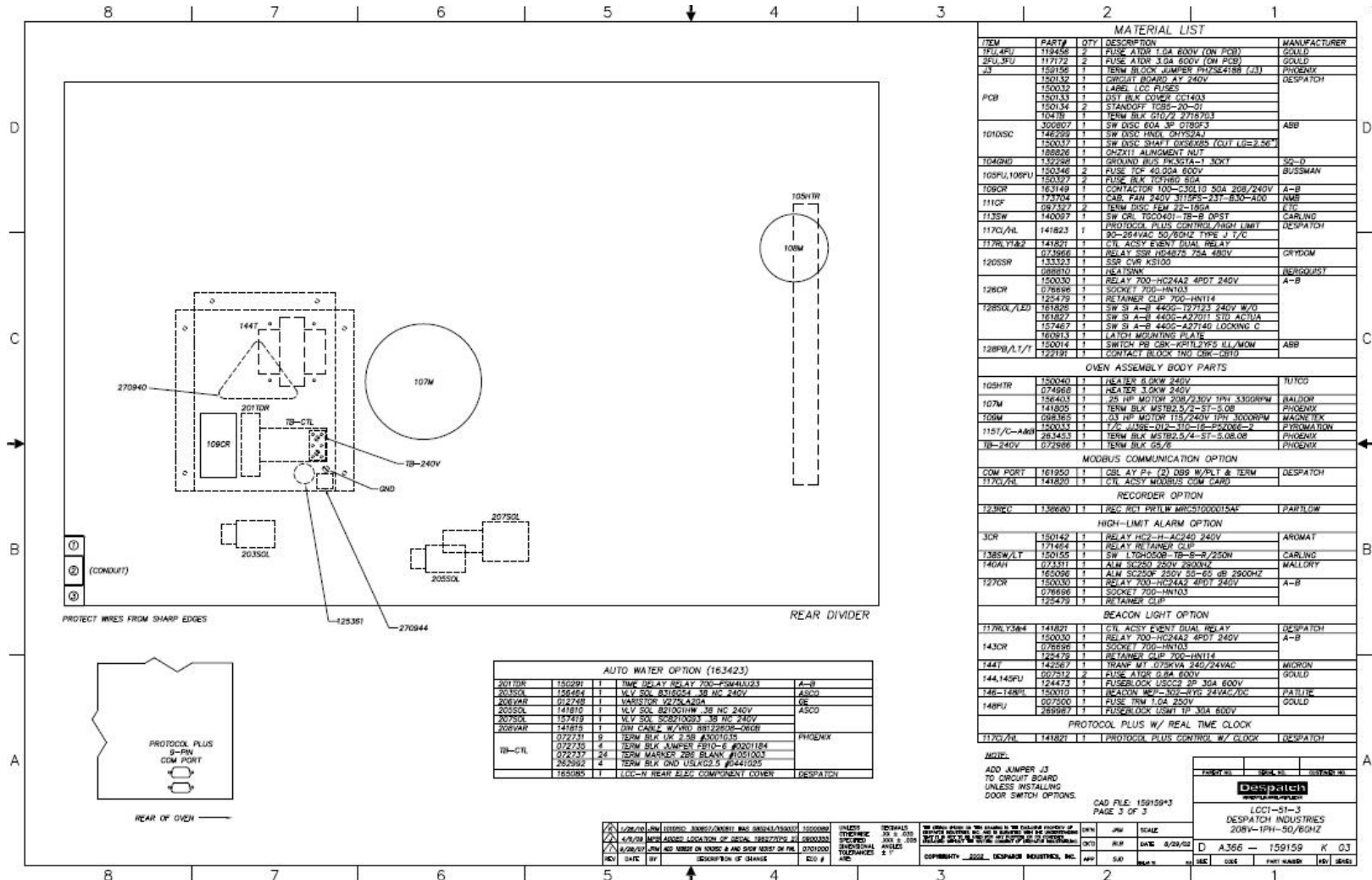


Figure 32. LCC1-51-3 (Drawing 159159-03).

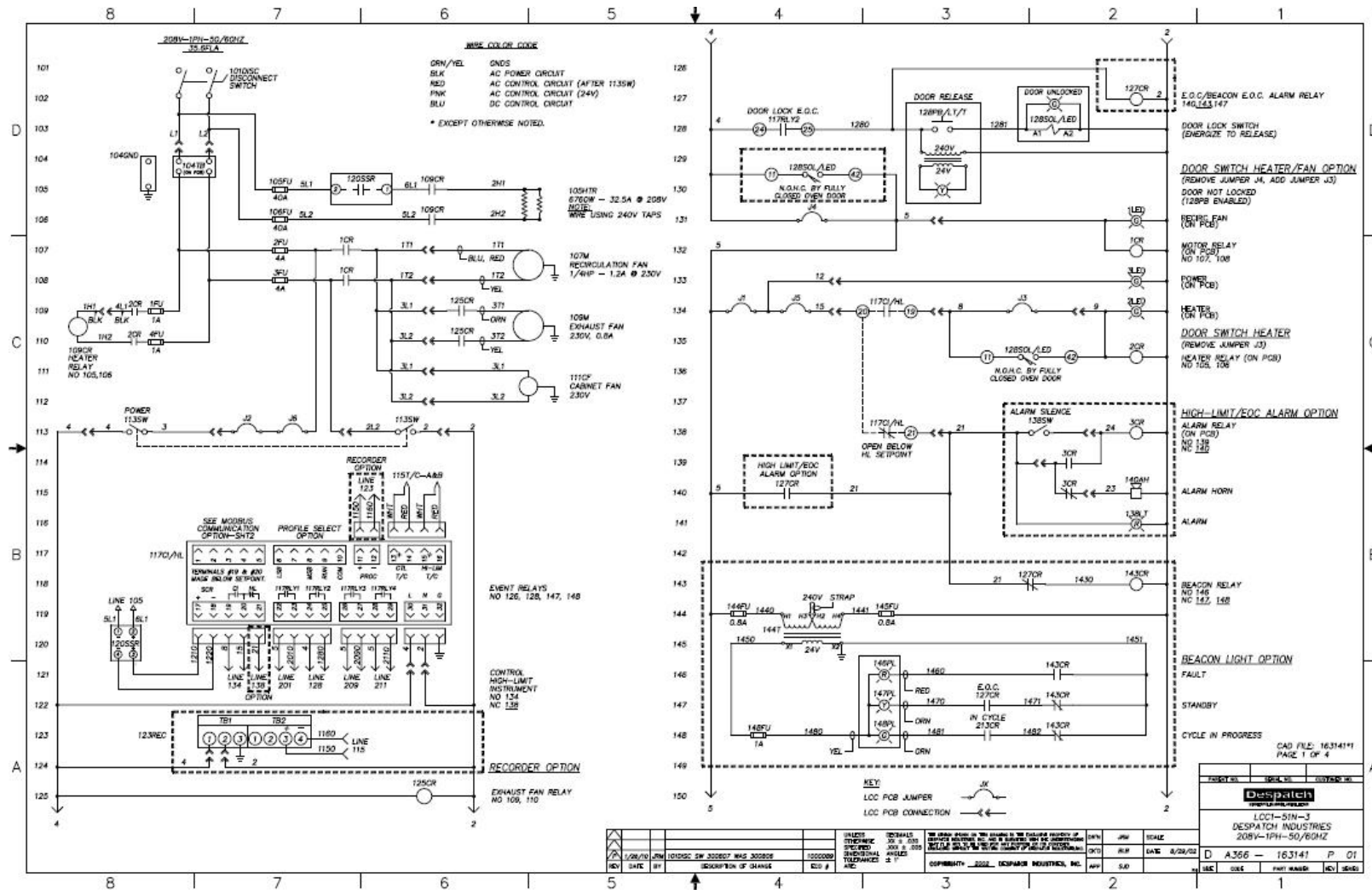


Figure 33. LCC1-51N-3 (Drawing 163141-01).

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

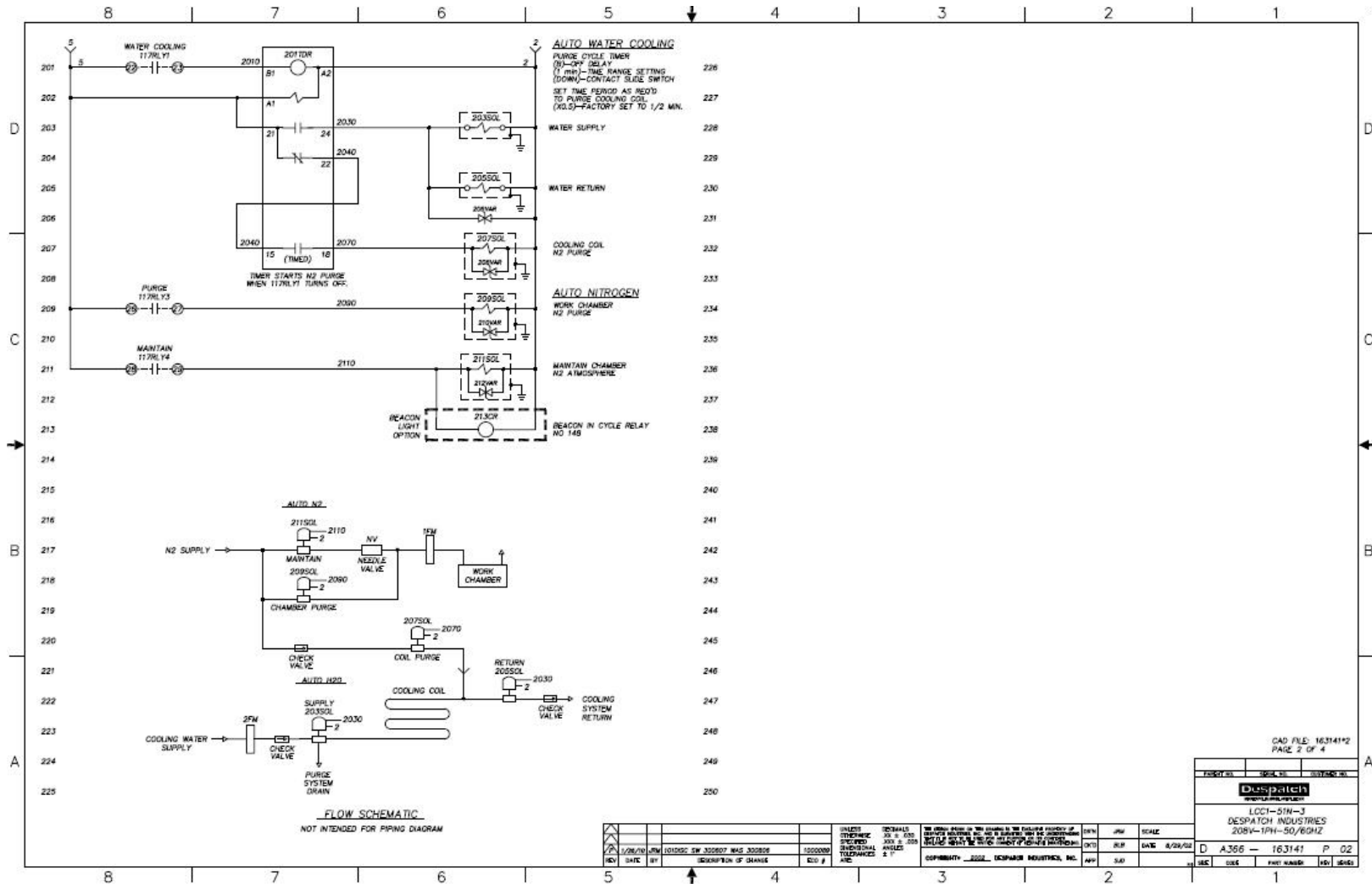


Figure 34. LCC1-51N-3 (Drawing 163141-02).

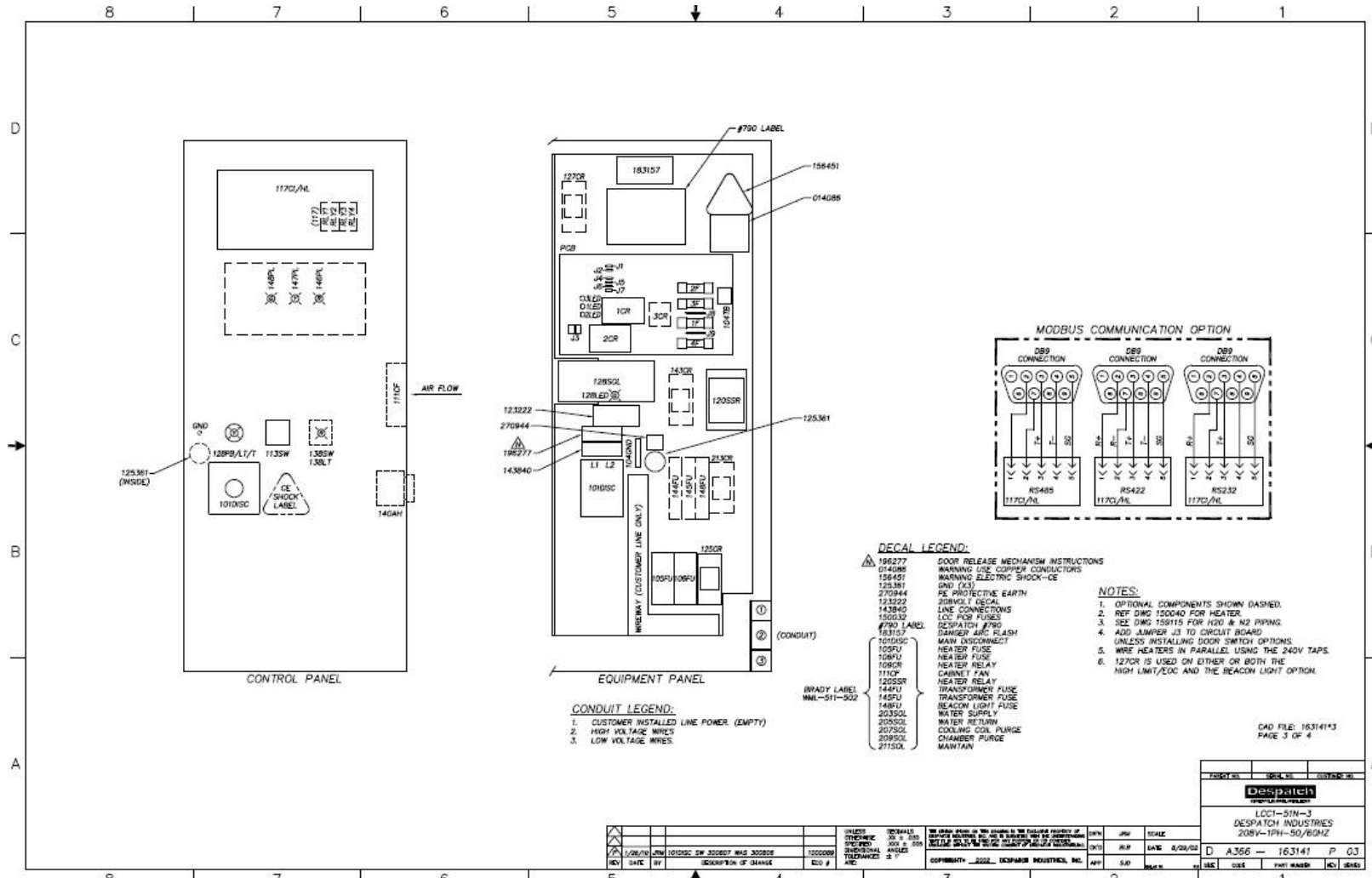


Figure 35. LCC1-51N-3 (Drawing 163141-03).

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

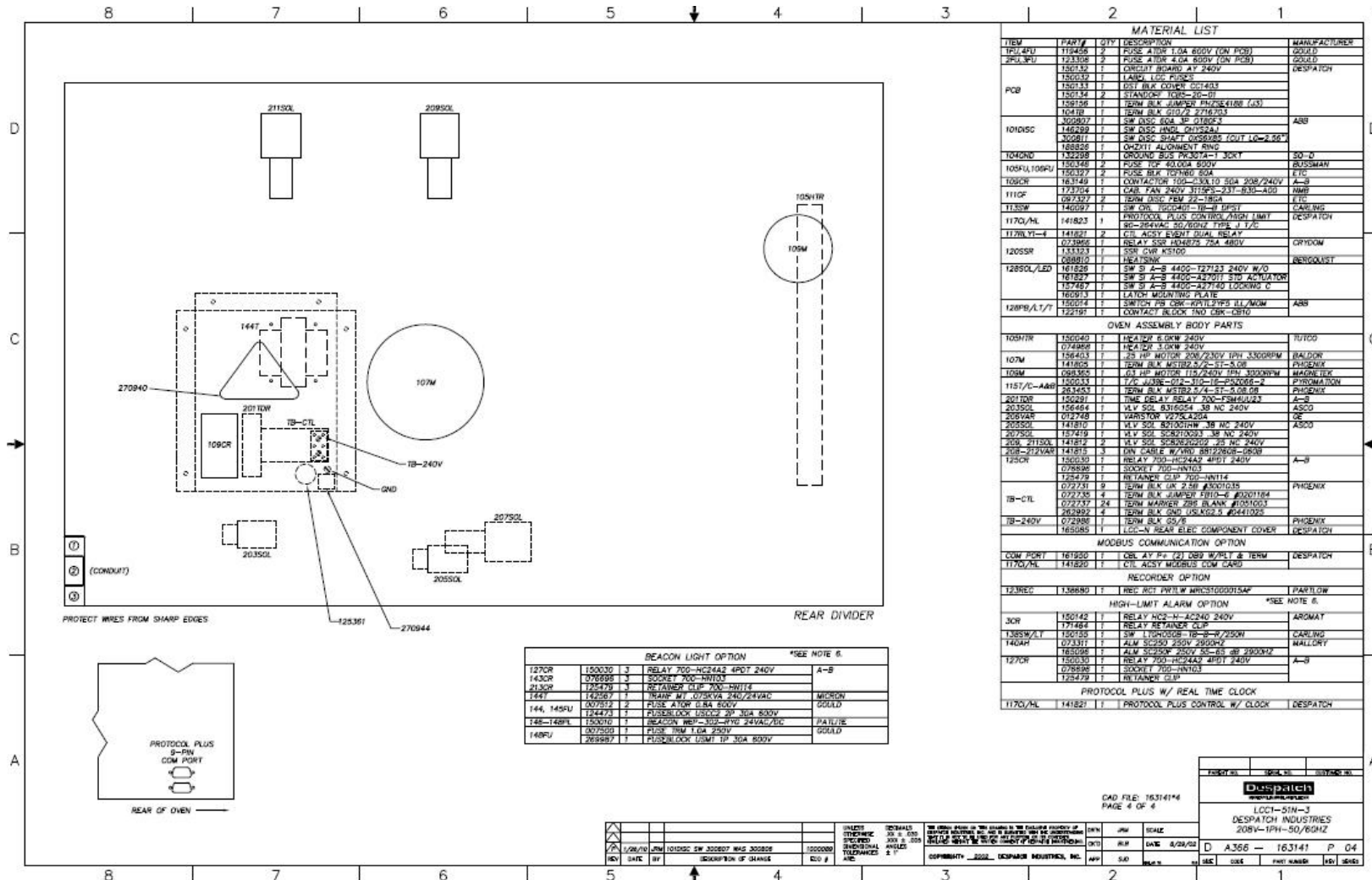


Figure 36. LCC1-51N-3 (Drawing 163141-04).

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.

Despatch

INDUSTRIES

GLOBAL HEADQUARTERS

Despatch Industries
8860 207th Street West
Minneapolis, MN 55044
USA

US toll free: 1-888-337-7282
international/main: 1-952-469-5424
fax: 1-952-469-4513

info@despatch.com
www.despatch.com

SERVICE AND TECHNICAL SUPPORT

service parts: 1-800-473-7373
international service/main: 1-952-469-8230
service fax: 1-952-469-8193

service@despatch.com

© 2010 Despatch Industries. All rights reserved.
Despatch is a registered trademark of Despatch
Industries in the U.S. and other countries.
Ransco is a product line of Despatch Industries.

Copyright © 2010 by Despatch Industries.

All rights reserved. No part of the contents of this manual may be reproduced, copied or transmitted in any form or by any means including graphic, electronic, or mechanical methods or photocopying, recording, or information storage and retrieval systems without the written permission of Despatch Industries, unless for purchaser's personal use.