

**FurnacePros**

DIVISION OF LOCHABER CORNWALL, INC.

# **CONTINUOUS BELT IR FURNACE**

*Model S-615X Furnace*

## **Owner's Manual**

08-003 Rev 0



**Installation and Operating Instructions,  
Specifications and Drawings**

**Read this guide before unpacking or operating this equipment.**  
After you finish reading this guide, store it in a safe place for future reference.

# Continuous Belt IR Furnace

## Owner's Manual

Rev. 0

Part No. 08-003 - 675-120615-01 CD

Part No. 08-003 - 675-120615-02 Loose Leaf

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## WHAT IS IN THIS MANUAL

This Owner's Manual contains your product information as well as installation, startup, operating instructions specific to the equipment purchased. The Owner's Manual is to be used in conjunction with the Continuous Belt IR Furnace Reference Manual and Dell Computer Product Information Guide to assure the equipment is installed and operated according to manufacturer's instructions.

*Note that throughout this Owner's Manual and the furnace Reference Manual the equipment is generally referred to as a furnace. A dryer is a furnace with only the top lamp elements installed.*

## EQUIPMENT LIST

Verify that the following equipment was received.

Qty	Unit	Description	Part Number
(1)	ea	S-615X Furnace	08-003
(1)	ea	Monitor, Viewsonic E651 CRT Monitor	E651

In addition verify that you received the following, shipped separately.

Qty	Unit	Description	Part Number
(1)	ea	Manual, S-615X Owner's, 3-Ring Bound	08-003-675-121524-02
(1)	ea	Manual, Reference, Perfect Bound	675-110000-02
(1)	ea	CD Media, Reinstallation, ProControl™ Furnace software, including <ul style="list-style-type: none"><li>- Owner's Manual, P/N 08-002-675-121524-01</li><li>- Reference Manual, P/N 675-110000-01</li></ul>	08-003-675-131524-01
(1)	ea	CD Media, Owner's Manual, including <ul style="list-style-type: none"><li>- Reference Manual, P/N 675-110000-01</li></ul>	08-003-675-121524-01

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## 1.1 Unpacking the Equipment

### 1.1.1 Machine Placement

Remove the banding from the shipping container and carefully disassemble. Refer to the Equipment List in this manual and verify the model of your furnace system and good receipt of all options, accessories, and special configurations, which were ordered according to the original purchase order or specification. If any item listed is unaccounted for, immediately notify the carrier and FurnacePros Technical Support.

## 1.2 Installation Requirements

### 1.2.1 Machine Placement

The machine should be located on an unyielding floor in the final installation position so that the access panels along the length of the furnace can be removed for the upgrade work, service and maintenance. If lifting is required, lift the machine at the approximate locations shown on the original installation drawing. Do not attempt to lift the machine at one point or at points other than recommended; failure to follow these instructions invites frame damage.

**NOTE:** The lifting device must extend under the machine and support both sides of the frame structure.

**Level the furnace.** Remove the base covers and adjust the leveling screws to level the frame within 0.06 inch overall. Each of the leveling screws should support an equal amount of weight.

**Level the Chambers.** After the frame is level. Adjust the chamber leveling screws to 0.06 inch overall.



Figure 1.2.1 Leveling Feet



Figure 1.2.2 Leveling Chamber Supports

### 1.2.2 Machine Inspection

Whenever the furnace has been moved, remove the upper and lower side covers from both sides of the machine and inspect all lamp connections for soundness and for loose hardware that may have become dislodged during the move or shipment. Inspect the lower electrical compartment for shipping damage, loose connections, or components. Finally, inspect the furnace interior, checking for broken lamps, foreign

## 2.1 Power Controls and Indicators

### 2.1.1 Power Status Indicators

#### MAIN (Yellow Indicator)

This lamp burns continuously whenever power is available to the furnace and the main circuit breaker (optional) is turned on.

#### ON (Green Indicator)

This lamp burns continuously when the control circuits are energized, and indicates that power is available to actuate the control circuits.

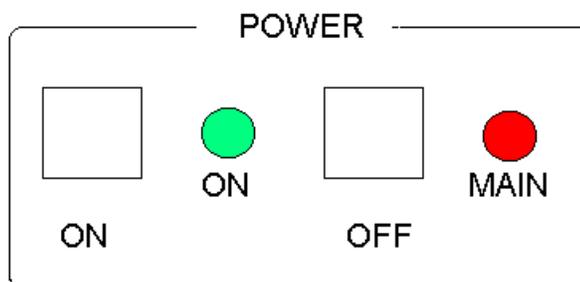


Figure 2.1.1 Control Panel showing POWER ON and OFF and Indicator Lights



Figure 2.1.2 Control Panel, Rear showing monitor power and data ports.

### 2.1.2 Controls



POWER CONTROLS and INDICATORS

Figure 2.1.3 Control Panel

Note: Always power down computer using Windows shutdown procedure before pressing POWER off.

## Section 2

### MAIN FURNACE POWER

MODE	COMPUTER UNSWITCHED	COMPUTER SWITCHED
POWER ON	Power to furnace and controller. Pressing this switch causes the furnace to go through its power up sequence, providing the MAIN lamp is lit and the EPO's (Emergency Power Off switches) and interlocks located in the doors are released. The ON indicator will illuminate.	Power to furnace, computer, controller and computer monitor. Pressing this switch causes the furnace to go through its power up sequence, providing the MAIN lamp is lit and the EPO's (Emergency Power Off switches) and interlocks located in the doors are released. The ON indicator will illuminate.
POWER OFF	Cuts power to furnace and controller. Before pressing POWER OFF, the furnace must be in COOL DOWN mode. COOL DOWN causes the furnace to begin a timed power shutdown sequence. The heaters are shut down immediately, and after a cool-down (to 100°C) period, the fans, transport belt, and other functions are shut down.	Cuts power to furnace, computer, controller and computer monitor. Before pressing POWER OFF, the furnace must be in COOL DOWN mode. COOL DOWN causes the furnace to begin a timed power shutdown sequence. The heaters are shut down immediately, and after a cool-down (to 100°C) period, the fans, transport belt, computer and other functions are shut down.
LOWER CABINET EXHAUST BLOWER CONTROL	Knob on Control Panel increases power to the SCR controlling the lower cabinet exhaust blower. Turn clockwise to increase blower speed.	Knob on Control Panel increases power to the SCR controlling the lower cabinet exhaust blower. Turn clockwise to increase blower speed.
EPO PANEL SWITCHES 	If a lower panel is removed, emergency power interlocks will automatically cut power to furnace and controller.	If an lower panel is removed, emergency power interlocks will automatically cut power to furnace, computer, controller and computer monitor.
EMO SWITCHES  Entrance EMO  Exit EMO	Operator activated Emergency Power Off switch located at furnace entrance and exit immediately cuts power to furnace and controller. Rotate knob to reset. Press POWER ON button to re-introduce power.	Operator activated Emergency Power Off switch located at furnace entrance and exit immediately cuts power to furnace, computer, controller and computer monitor. Rotate knob to reset. Press POWER ON button to re-introduce power.
POWER FAILURE	Cuts power to furnace, controller and computer monitor.	Cuts power to furnace, computer, controller and computer monitor..

## SERVICE & TROUBLESHOOTING

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### 3.1 Routine Maintenance

#### 3.1.1 General

Generally external cleaning is all that is required. The chambers are not to be touched or removed. If chamber cleaning is required, contact FurnacePros.

**WARNING. DO NOT ATTEMPT TO OPEN OR MANUALLY CLEAN THE CHAMBERS OR THE FURNACE MAY BE INOPERABLE DUE TO DAMAGE TO THE INSULATION. Contact the manufacturer if cleaning is required.**

### 3.2 Service and Maintenance Access

Observe extreme caution when the furnace power is engaged while the access panels are removed. Dangerous levels of AC and DC voltages will be present on motor speed control board.

**LOWER PANELS.** Gain access to the lower sections of the furnace by turning the keylock and opening the door. When opening compartment doors on the back side of the furnace, make sure the EPO switches on lower panels are pulled out if the furnace is to be energized while these lower panels are off.

**UPPER PANELS.** You can gain access to the upper sections by turning the fasteners clockwise and removing them. The upper panels can be lifted and removed. When replacing the upper panels carefully lower the top of the panel into the slot provided and press the bottom of the panel over the threaded opening so the machine screw fasteners can be reinserted.

**COMPUTER ENCLOSURE PANELS.** Access to the computer power on button and cd-rom is by opening the lower compartment below the control console. This compartment is not interlocked. Access to the rear ports of the computer is via the lower panel on the opposite side of the furnace, nearest the entrance. This panel is interlocked.

**DRIVE ENLOSURE.** Remove Panels at entrance and exit of the furnace to adjust the belt tracking.

**HEATING ELEMENTS.** Remove upper side panels to access lamp plenums and lamp elements.

**4.1 Furnace Specifications**

**4.2 Computer**



## FURNACE SPECIFICATIONS

DOC NBR: 08-003 802-101400-01 R 0	
MODEL NBR: S-615X	APVL
SERIAL NBR: 140615201	JCLARK
DATE: 30-Sep-08	SHT 1 of 1

### EQUIPMENT SPECIFICATIONS

FURNACE LENGTH	171.375 INCHES	4353 mm
FURNACE WIDTH	42 INCHES	1067 mm
FURNACE HEIGHT	72 INCHES	1828.8 mm

NUMBER OF LAMPS	56	
FURNACE HEATING CHAMBER LENGTH	60 INCHES	1524 mm
FURNACE NOMINAL WIDTH (LAMP LENGTH)	14 INCHES	356 mm
PRODUCT CLEARANCE (MAX)	4 INCHES	101.6 mm
PRODUCT CLEARANCE (BAFFLE CLEARANCE)	1 7/8 INCHES	47.6 mm
ENTRANCE INTERFACE ROLLER	NONE	NONE
EXIT INTERFACE ROLLER	NONE	NONE
EDGE HEAT	LEFT & RIGHT	
LINE VOLTAGE	208 VAC, 60 Hz, 3 Ph	
APPROX NET WEIGHT	2300 LB	1043 kg

EQUIPMENT RATING	MAX	NORMAL
TEMPERATURE	1000 °C	925 °C
BELT SPEED	24-240 IPM	160 IPM
POWER (PEAK & OPERATING)	79 kW	38 kW
CURRENT (UNBALANCED)	218 A	104 A

PROCESS GAS: CLEAN DRY AIR (CDA)		MAX	NORMAL
TOTAL HYDROCARBONS, MAXIMUM		20 PPM	NA
MOISTURE, MAXIMUM		100 PPM	NA
PURGE RATE	GAS PURGE/MIN	7.1	2.0
GAS SUPPLY	FLOWRATE	42 SCFM	12 SCFM
	PRESSURE	90 PSIG	70 PSIG
PROCESS EXHAUST	FLOWRATE	42 SCFM	12 SCFM
	TEMPERATURE	260 °C	180 °C

FORCED AIR CABINET EXH 5 TOP MOUNTED BLOWERS	FLOWRATE	2750 ACFM	
	TEMPERATURE	59 °F > AMBIENT	15 °C > AMBIENT
CABINET EXHAUST LOWER BLOWER	FLOWRATE	1265 ACFM	500 ACFM
	TEMPERATURE	59 °F > AMBIENT	15 °C > AMBIENT
TURBULENT AIR COOLING 15 FAN ARRAY ABOVE BELT	FLOWRATE	1590 ACFM	

STANDARD CONDITIONS	PRESSURE	14.7 PSIA	101.3 kPa
	TEMPERATURE	294 K	146 °C

- 5.1 SCR Power and Current**
- 5.2 Flowmeters, 2 exchanges/min**
- 5.3 Channel Assignments**

PROJECT GBT/Moreco Tech EQUIPMENT S-615X	<b>IR FURNACE SYSTEM</b> <b>SCR Lamp Power &amp; Current</b>	DOC NBR: 08-003 DATE: 7/28/2008	802-101600-01 Sht 1 of 1
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INPUT TABLE		Entry OK?
3-phase Line Voltage (208/240/380/400/415/480/500)	208 VAC	TRUE
Lamps wired to Neutral? (Y/N)	N	TRUE
Line Frequency (50/60)	60 Hz	TRUE
Lamp Length (9/14/24/36)	14 inches	TRUE
Typical Operating %	45 %	TRUE

SUMMARY OF RESULTS	
<b>Max Power</b>	<b>78.4 kW</b>
<b>Max Current</b>	<b>217.7 A</b>
<b>Typical Power</b>	<b>37.5 kW</b>
<b>Typical Current</b>	<b>104.1 A</b>

HARDWARE	
<b>Lamps</b>	<b>56</b>
<b>SCRs</b>	<b>15</b>
<b>EMs</b>	<b>15</b>

	Phase 1		Phase 2		Phase 3		Totals
	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	
Length (7.5/10/15/20/30) in inches	15	15	7.5	7.5	7.5	7.5	60 in.
Length Entry OK?	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	
Furnace(f) or Dryer(d)?	F	F	F	F	F	F	
Furnace/Dryer Entry OK?	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	
No. Lamps in Series/String	1	1	1	1	1	1	
Rated Lamp Voltage	225	225	225	225	225	225	
Max. Lamp Wired Voltage	208	208	208	208	208	208	
Rated Lamp Power (W)	1500	1500	1500	1500	1500	1500	
Max. Lamp Wired Power (W)	1329	1329	1329	1329	1329	1329	
No. Strings per SCR	6	6	4	4	4	4	
Max. Current per String (A)	6.4	6.4	6.4	6.4	6.4	6.4	38.3
No. Lamps in Zone	12	12	8	8	8	8	56
No. Lamp SCRs in Zone	2	2	2	2	2	2	12
No. Strings in Furnace Zones	12	12	8	8	8	8	56
No. Furnace Element Monitors							14
Power Required/SCR (kW)	8.0	8.0	5.3	5.3	5.3	5.3	
Total Power/Zone (kW)	15.9	15.9	10.6	10.6	10.6	10.6	74.4
Current Required/SCR (A)	38.3	38.3	25.6	25.6	25.6	25.6	
Color Temp (K) (target:2300-2700)	2428	2428	2428	2428	2428	2428	
Peak Wavelength (µm) (target:<2)	1.19	1.19	1.19	1.19	1.19	1.19	
Estimated Lamp Life (hrs)	15216 hr						
Light Output vs. Rated (%)	78	78	78	78	78	78	

Furnace Total	Number of Item?	Voltage	Current	Max Power 78.4 kW	Max Current 217.7 A	Typical Power 37.5 kW	Typical Current 104.1 A
Lamps	56	208 VAC		74.4 kW		33.5 kW	
Motor, Belt	1	24 VDC	8.0 A	0.2 kW		0.2 kW	
Computer	1	115 VAC	3.0 A	0.3 kW		0.3 kW	
Edge Heaters	2	208 VAC	6.0 A	2.5 kW		2.5 kW	
UCD		115 VAC	8.4 A	0.0 kW		0.0 kW	
UCD Recirc Pump		115 VAC	12.0 A	0.0 kW		0.0 kW	
Other: Fans	1	115 VAC	2.4 A	0.3 kW		0.3 kW	
Cabinet Blower	1	230 VAC	3 A	0.7 kW		0.7 kW	
			A	0.0 kW		0.0 kW	

PHASE	PHASE BALANCING			TOTAL
	1	2	3	ALL
LAMP PWR, kW	27	27	21	74.4
EH/OTHER	0.5	0.3	3.2	4.0
TOTAL	27.1	26.9	24.5	78.4

PROJECT	GBT/Moreco Tech	IR FURNACE	DOC NBR:	08-003	802-101400-01
EQUIPMENT	S-615X	FLOWMETER SCALE CORRECTION, PURGE AIR AND EXHAUST	DATE:	9/28/2008	Sht 1 of 1

<b>STANDARED CONDITIONS</b>					
Ts	Standard Temperature, F	Gage	70 F	Absolute	530 R Dwyer flowmeter std
Ps	Standard Pressure, psig		0.0 psig		14.7 psia Dwyer flowmeter std
<b>COMPRESSED AIR SUPPLY</b>					
T1	Actual Temperature, F		100 F		560 R max normal temperature at flowmeter exit
P1	Pressure after Furnace Regulator, psig		60 psig		74.7 psia furnace pressure regulator setting
<b>REPLENISH RATE</b>					
	Number of Replenishes/minute		2 rep/min		120 rep/H furnace replenishes per hour
	Time it takes to evacuate Furnace				30 sec time 'to refresh gas in furnace

**CALCULATE INTERNAL VOLUME OF THE FURNACE**

	137.5 INCHES														
	Interface Roller Assy	Load Station	Entrance Baffle	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6		Plenum	Exit Baffle	Cooling Section	Unload Interface Station Roller Assy	
Length, inches	8.0	13.2	15	15	15	7.5	7.5	7.5	7.5		240	15	47	13.2	3.3
Width, inches			15	15	15	15	15	15	15		1.75	15	15		
Height, inches			6	12	12	12	12	12	12		3	6	6		
Temperature, °C			150	250	400	600	800	950	900		300	100	100		
Pressure, in H2O			2	2	2	2	2	2	2		1524	2	2		
Volume, CF			0.8	1.6	1.6	0.8	0.8	0.8	0.8		0.7	0.8	2.4		
Std Volume, SCF			0.5	0.9	0.7	0.3	0.2	0.2	0.2		1.8	0.6	1.9		

171.375 inches total length  
chamber internal width  
chamber internal height  
lowest normal chamber op temp  
highest normal chamber static press  
11.0 CF internal volume  
7.3 SCF GAS @70F,14.7 PSIA

**REPLENISH GAS FLOW**

Q1	BALANCING GAS FLOW, ACTUAL CUBIC FEET PER HOUR	11.0 x 120 =	1319 ACFH
Q1	BALANCING GAS FLOW, STANDARD CUBIC FEET PER HOUR	7.3 x 120 =	878 SCFH

**ESTABLISH FURNACE FLOW BY ZONE**

**CALCULATE FLOW TO EDUCTORS**

Eductor multiplier 10

TOTAL EXHAUST 709.9 SCFH

	Entrance Eductor											Exit Eductor	
	X											X	
Temperature, deg F	130											130	
Pressure, in H2O	5											5	
Flowmeter setting	34											34	
Flow, Max (size)	100											100	
	Entrance Baffle	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6		Plenum	Exit Baffle			
Calc Reqd Flow, SCFH	65.5	106.0	82.4	31.8	25.8	22.7	23.6		213.2	74.3		645.4	
Temperature, °F	110	110	110	110	110	110	110		110	110			
Pressure, PSIG	0	55	55	55	55	55	55		55	0			
Flowmeter setting	67.9	50.5	39.2	15.1	12.3	10.8	11.3		101.5	77.0		386	
Flow, Max (size)	200	400				400			200	200		1400	

355 SCFH =>      <=355 SCFH

Include?==> 32 SCFH      32 SCFH

Total 64.5 Total  
max temp at flowmeter exit  
min press at flowmeter exit  
68 Flowmeter Grad SCFH  
200 Flowmeter Grad SCFH

645.4 SCFH std flow @ flowmeter exit  
386 Flowmeter reading, SCF Grad @ flowmeter exit  
1400 Flowmeter reading, SCF Grad

**SUMMARY, TOTAL FLOW**

	Normal	Max (all flowmeters open)
Required standard flow	710 Total SCFH reqd	
Observed flow, flowmeter settings	453 Flowmeter Grad SCFH	1600 Flowmeter Grad SCFH

**PROCESS EXHAUST**

	Normal	per Stack	Max (all flowmeters open)
Qs	Standard Flow to plant exhaust	710 SCFH	355 SCFH 2505 SCFH SCFH @ 70F, 14.7 psia
T3	Temperature at exhaust	350 F	350 F 500 F 810 R
P3	Pressure at exhaust	5 in H2O	5 in H2O 10 in H2O 14.9 psia
Q3	Actual total exhaust flow	18 ACFM	9 ACFM 63 ACFM Boyles Law
	Velocity in each stack	1.6 fps	1.6 fps 5.6 fps feet/sec in 1.5" dia stack

**REQUIRED COMPRESSED AIR OR NITROGEN**

	Normal	Max (all flowmeters open)	
Qs	Actual Flow to Plant Exhaust Syst	11.8 SCFM	41.8 SCFM convert to ACFM
	Air compressor size	15 SCFM	54 SCFM SF=1.3
	Air Compressor pressure rating	60 psig	60 psig
	Air compressor size, ACFM	3.0 ACFM	10.7 ACFM continuous
	Air Compressor pressure rating	90 psig	90 psig
	Air compressor size, ACFM	2.2 ACFM	7.6 ACFM continuous

**Section 6**  
**DRAWINGS & SCHEMATICS**

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<b>Job/Master</b>	<b>Drawing Nbr.</b>	<b>Title</b>
08-003	803-091734	GENERAL ARRANGEMENT
08-003	802-101701-1524	PLC CONFIGURATION
08-003	802-101770-01	POWER CONTROL SCHEMATIC
STD	802-101771	SCHEM, FRAME WIRING
STD	802-101772	SCH SIGNAL CONTROL WIRING
STD	802-101775	LIGHT TOWER SCHEMATIC
08-003	802-101852	CABINET EXHAUST
08-003	802-101889-01	ELEMENT WIRING, 6-ZONE

**EQUIPMENT SPECIFICATIONS**

FURNACE LENGTH	171.375 INCHES	4353 mm
FURNACE WIDTH	42 INCHES	1067 mm
FURNACE HEIGHT	72 INCHES	1828.8 mm

NUMBER OF LAMPS	56	
FURNACE HEATING CHAMBER LENGTH	60 INCHES	1524 mm
FURNACE NOMINAL WIDTH (LAMP LENGTH)	14 INCHES	356 mm
PRODUCT CLEARANCE (MAX)	4 INCHES	101.6 mm
PRODUCT CLEARANCE (BAFFLE CLEARANCE)	1 7/8 INCHES	47.6 mm
ENTRANCE INTERFACE ROLLER	NONE	NONE
EXIT INTERFACE ROLLER	NONE	NONE
EDGE HEAT	LEFT & RIGHT	
LINE VOLTAGE	208 VAC, 60 Hz, 3 Ph	
APPROX NET WEIGHT	2300 LB	1043 kg

EQUIPMENT RATING	MAX	NORMAL
TEMPERATURE	1000 °C	925 °C
BELT SPEED	24-240 IPM	160 IPM
POWER (PEAK & OPERATING)	79 kW	38 kW
CURRENT (UNBALANCED)	218 A	104 A

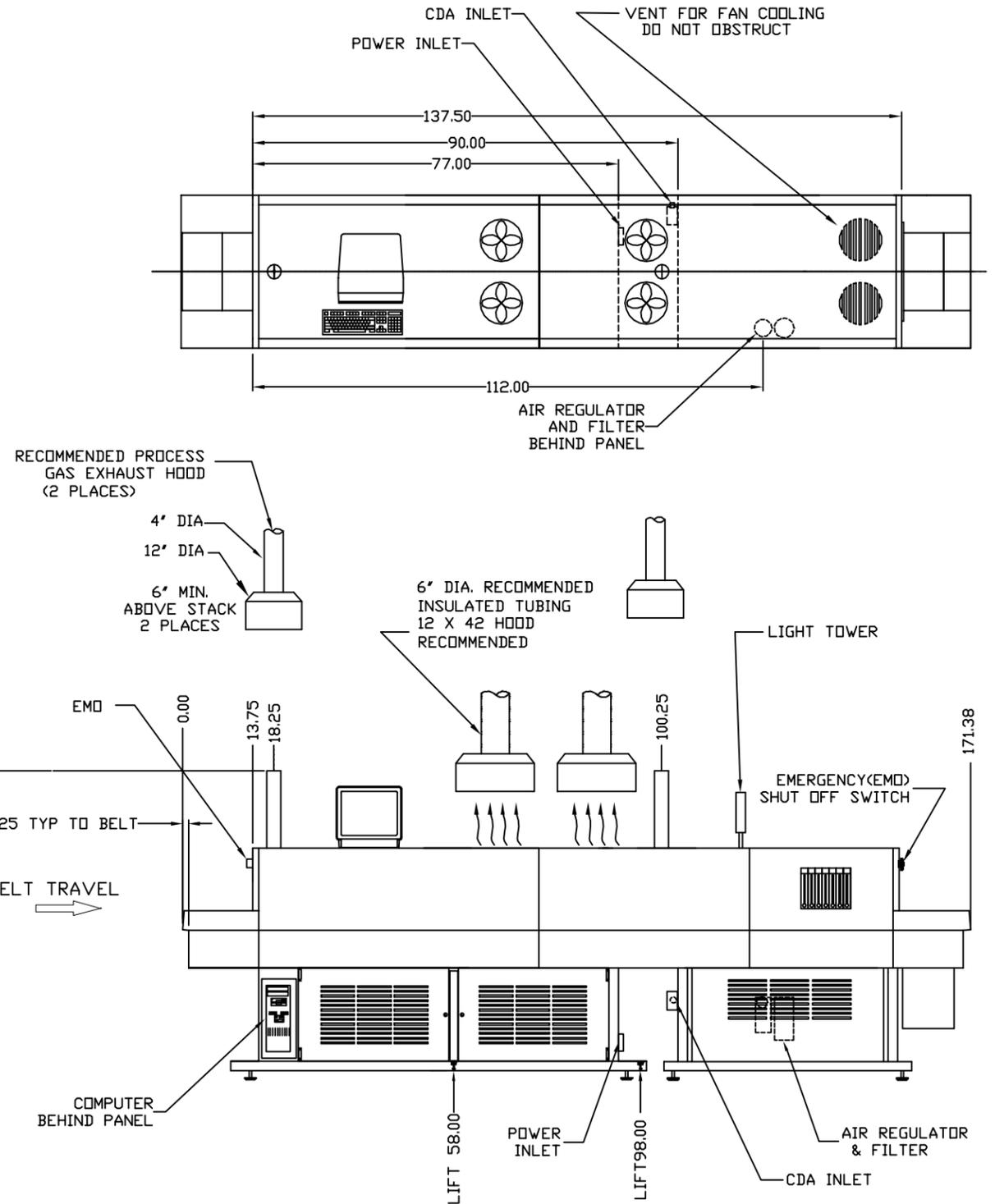
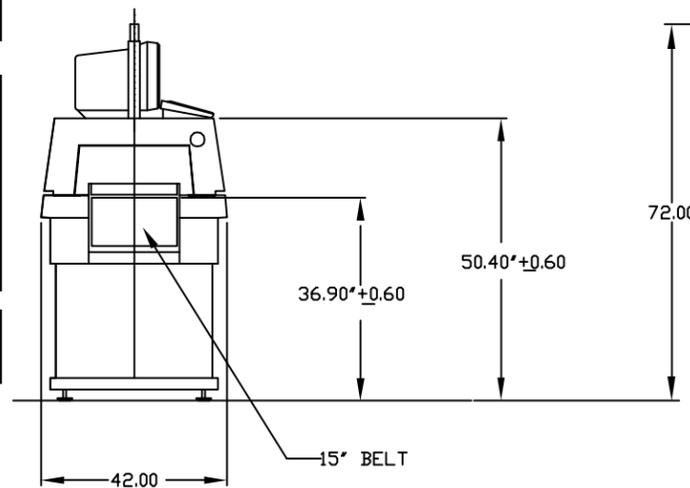
PROCESS GAS: CLEAN DRY AIR (CDA)		MAX	NORMAL
TOTAL HYDROCARBONS, MAXIMUM		20 PPM	NA
MOISTURE, MAXIMUM		100 PPM	NA
PURGE RATE	GAS PURGE/MIN	7.1	2.0
GAS SUPPLY	FLOWRATE	42 SCFM	12 SCFM
	PRESSURE	90 PSIG	70 PSIG
PROCESS EXHAUST	FLOWRATE	42 SCFM	12 SCFM
	TEMPERATURE	260 °C	180 °C

FORCED AIR CABINET EXH 5 TOP MOUNTED BLOWERS	FLOWRATE	2750 ACFM	
	TEMPERATURE	59 °F > AMBIENT	15 °C > AMBIENT
CABINET EXHAUST LOWER BLOWER	FLOWRATE	1265 ACFM	500 ACFM
	TEMPERATURE	59 °F > AMBIENT	15 °C > AMBIENT
TURBULENT AIR COOLING 15 FAN ARRAY ABOVE BELT	FLOWRATE	1590 ACFM	

STANDARD CONDITIONS			
	PRESSURE	14.7 PSIA	101.3 kPa
	TEMPERATURE	294 K	146 °C

**NOTES:**

- FOR COMPLETE INSTALLATION INSTRUCTIONS CONSULT FURNACE OPERATING MANUAL.
- INTERFACE BEARING COVER CAN BE REMOVED IF DESIRED. SEE 803-091734-1 FOR DETAIL
- INPUT LINES ARE SIZED FOR FEED LENGTHS OF 20 FEET OR LESS WITH 90 PSI MINIMUM AT SUPPLY MANIFOLD. AN AIR REGULATOR IS REQUIRED AT THE FURNACE. SIZE SUPPLY LINE AS FOLLOWS.  
 - LESS THAN 35 SCFM: 1/2" SCH 40 OR SCH 80 PIPE  
 - 35-90 SCFM: 3/4" SCH 40 OR SCH 80 PIPE



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: DECIMALS ANGLES FRACTIONS .XX ± .03 .XX ± .5 X/X ± 1/32 .XXX ± .010 .XX ± .2		CONTACT NO. 08-003		 DIVISION OF LOCHABER CORNWALL, INC.	
MATERIAL		APPROVALS	DATE		
FINISH		DRAWN	9/30/08	GENERAL ARRANGEMENT	
DO NOT SCALE DRAWING		CHECKED	9/30/08	S-615X	
		ISSUED	9/30/08	SIZE B	
				DWG. NO. 803-091734	
				REV. 1	
				SHEET 1 OF 1	

		DIGITAL ADDRESS: 1															
Module		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Channel		CH0	CH1	CH2	CH3	CH4	CH5	CH6	CH7								
Function	G4PS245A POWER SUPPLY	MAIN_POWER_LATCH	LAMP_POWER_CTRL	TRANSPORT_MOTION_FAULT	SPEED_FEEDBACK	ALARM_HORN	RED_LAMP	YEL_LAMP	GRN_LAMP								
Type	PROCESSOR	DO	DO	DI	DI	DO	DO	DO	DO								
Range	ADDRESS: 0-3	12-120 VAC	2.5-28 VDC	5-60 VDC		12-120 VAC											
Part Nbr	322-094410-01	322-092200-01	322-092202-01	322-092227-01		322-092200-01											
Opto PN	B3000	G4 OAC5MA	G4 IDC5D	G4 ODC5MA		G4 OAC5MA											

PART NUMBER 322-094409-16 16 CHANNEL RACK

		ANALOG ADDRESS: 2															
Module		1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
Channel		CH0	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	CH9	CH10	CH11	CH12	CH13	CH14	CH15
Function		T/C TEMPERATURE_ZONE_1	T/C TEMPERATURE_ZONE_2	T/C TEMPERATURE_ZONE_3	T/C TEMPERATURE_ZONE_4	T/C TEMPERATURE_ZONE_5	T/C TEMPERATURE_ZONE_6	ZONE_1_TOP	ZONE_1_BOT	ZONE_2_TOP	ZONE_2_BOT	ZONE_3_TOP	ZONE_3_BOT	ZONE_4_TOP	ZONE_4_BOT	ZONE_5_TOP	ZONE_5_BOT
Type	PROCESSOR	AI	AI	AI	AI	AI	AI	AO	AO								
Range	ADDRESS: 4-7	Thermocouple Input		Thermocouple Input		Thermocouple Input		0-5 VDC	0-5 VDC								
Part Nbr		322-092204-01		322-092204-01		322-092204-01		322-092201-01		322-092201-01		322-092201-01		322-092201-01		322-092201-01	
Opto PN		G4-AD8	G4-AD8	G4-AD8	G4-AD8	G4-AD8	G4-AD8	G4-DA4	G4-DA4								
Opto PN																	

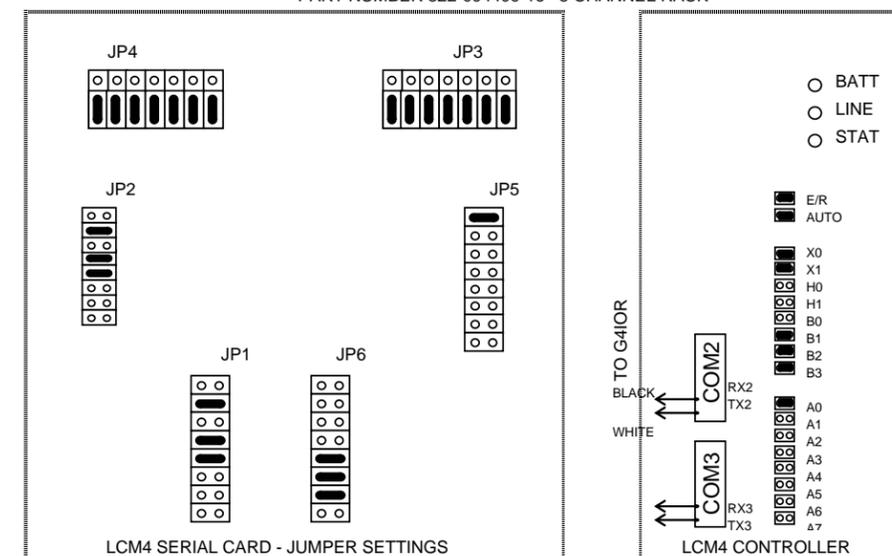
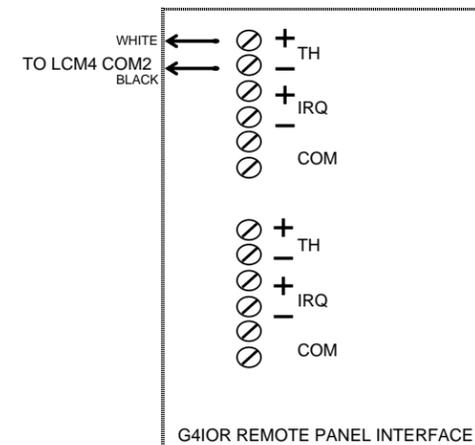
PART NUMBER 322-094409-16 8 CHANNEL RACK

PART NUMBER 322-094409-EXT 8 CHANNEL RACK EXTENSION

		ANALOG ADDRESS: 3							
Module		1	2	3	4	5	6	7	8
Channel		CH16	CH17	CH8	CH19	CH20			
Function		ZONE_6_TOP	ZONE_6_BOT	RIGHT_EDGE_HEAT1	LEFT_EDGE_HEAT1	BELT_SPEED_OUTPUT			
Type		AO	AO	AO	AO	AO			
Range		0-5 VDC	0-5 VDC	0-5 VDC	0-5 VDC	0-10 VDC			
Part Nbr		322-092201-01		322-092201-01		2-092203			
Opto PN		G4-DA4	G4-DA4	G4-DA4	G4-DA4	G4-DA5			
Opto PN									

PART NUMBER 322-094409-16 8 CHANNEL RACK

- MAIN\_POWER\_LATCH = POWER ON, K4
- LAMP\_POWER\_CTRL = CONTACTOR, K7, K1
- RED\_LAMP = LIGHT TOWER RED LAMP
- YEL\_LAMP = LIGHT TOWER YELLOW LAMP
- GRN\_LAMP = LIGHT TOWER GREEN LAMP
- ALARM\_HORN = AUDIBLE ALARM BUZZER
- TRANSPORT\_MOTION\_FAULT = BELT TRANSPORT MOTION SENSOR
- SPEED\_FEEDBACK = BELT SPEED FEEDBACK
- PRESSURE\_SW\_CDA = LOW AIR PRESSURE ALARM SWITCH
- F/S = WATER COOLING FLOW SWITCH
- TEMPERATURE\_ZONE\_X = THERMOCOUPLE INPUT, TYPE K, FROM ZONE X
- CABINET\_TEMP = FURNACE CABINET TEMPERATURE THERMOCOUPLE
- ZONE\_X\_TOP = ZONE X SCR OUTPUT FOR TOP IR HEATING ELEMENT
- BELT\_SPEED\_OUTPUT = OUTPUT SIGNAL TO BELT MOTOR CONTROLLER
- UCD\_RUN = ULTRASONIC BELT CLEANER DRAIN TIMER CYCLE
- UCD\_DRN = ULTRASONIC BELT CLEANER DRAIN TIMER CYCLE
- Spare = SPARE CHANNEL
- NA = NOT INSTALLED
- RIGHT\_EDGE\_HEATX = EDGE HEATER X, RIGHT SIDE SCR CONTROL
- LEFT\_EDGE\_HEATX = EDGE HEATER X, LEFT SIDE SCR CONTROL
- ◻ = JUMPER INSTALLED
- = JUMPER NOT INSTALLED
- LEFT\_EDGE\_HEATX = EDGE HEATER X, LEFT SIDE SCR CONTROL



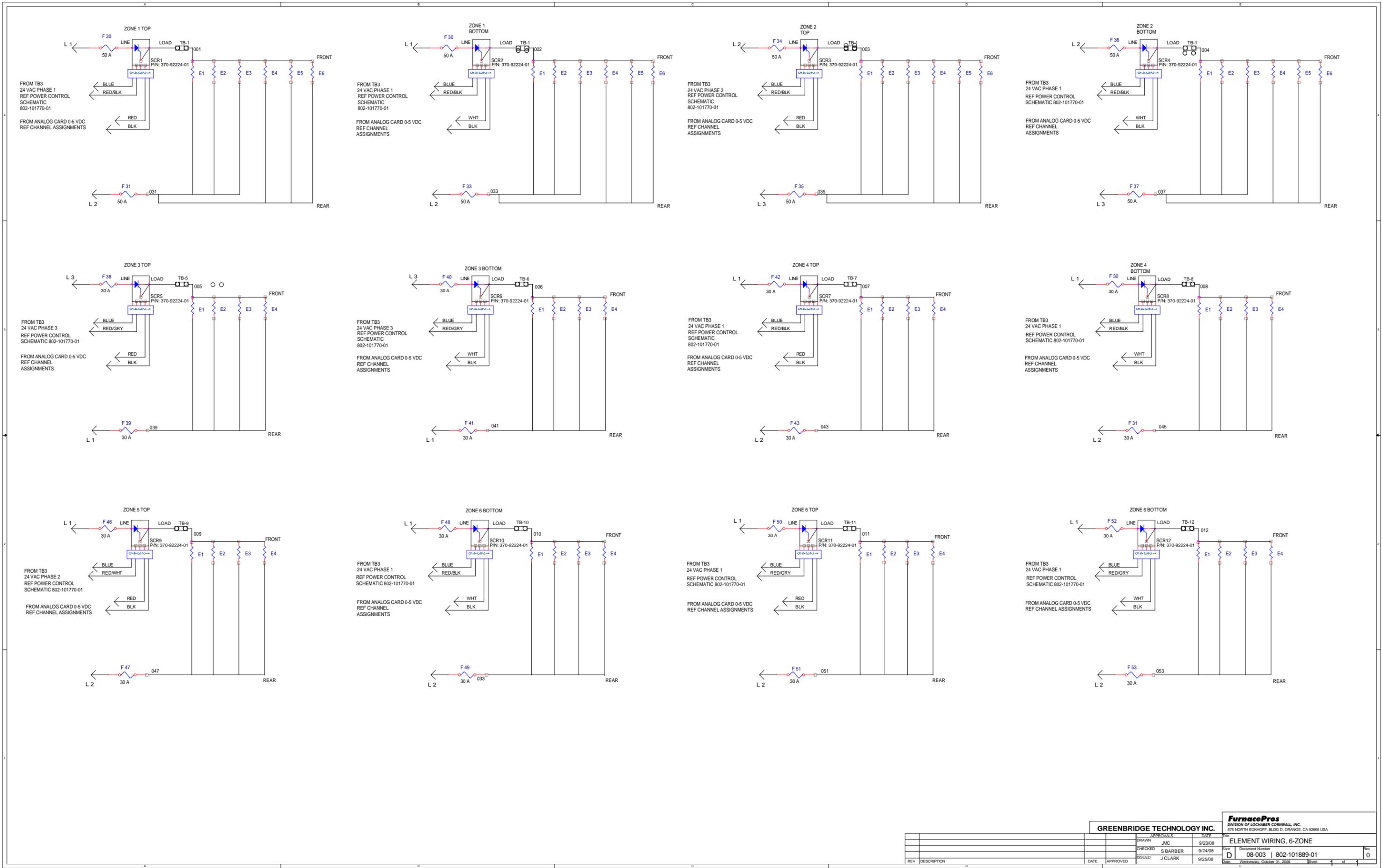
1. COM2 - COMMUNICATION TO MODULES OR RACKS

**NOTES:**

REV	DESCRIPTION	DATE	APPROVED

**FurnacePros**  
DIVISION OF LOCHABER CORNWALL, INC.  
675 N ECKHOFF STREET, BLDG D  
ORANGE, CALIFORNIA 92868 USA  
(714) 935-0302 www.furnacepros.com

APPROVALS	DATE	TITLE
DWN JMC	7/18/08	S-615X FURNACE PLC CONFIGURATION
CHKT SBARBER	7/21/08	
ENGR JMC	7/20/08	
PM SBARBER	7/24/08	
DATE: 10/1/08		REVISION: 08-003
SHEET 1 OF 1		DOCUMENT NUMBER: 802-101701-615



REV		DESCRIPTION	DATE	APPROVED

APPROVALS		DATE
DRAWN	JMC	9/23/08
CHECKED	S BARBER	9/24/08
ISSUED	J CLARK	9/25/08

File	ELEMENT WIRING, 6-ZONE
Doc#	08-003   802-101889-01
Date	Wednesday, October 01, 2008
Page	1 of 4

**GREENBRIDGE TECHNOLOGY INC.**  
 DIVISION OF LOCKHEED CORNWALL, INC.  
 675 NORTH ECHOLIFF, BLDG D, ORANGE, CA 92668 USA

**FurnacePros**  
 DIVISION OF LOCKHEED CORNWALL, INC.  
 675 NORTH ECHOLIFF, BLDG D, ORANGE, CA 92668 USA

## **7.1 MATERIAL DATA SAFETY SHEETS**

1. Fiberfrax Cements MSDS 042006
2. Fiberfrax Duraboard MSDS 042006
3. Fiberfrax Fibers MSDS 042006
4. Fiberfrax Papers MSDS 042006
5. Magnaform MSDS 050406
6. RTU Silicone Red Hi Temp 042006
7. Kaowool Insulation MSDS 050406

**8.1 CONTINUOUS BELT FURNACE DRIVE MOTOR & CONTROL**

Bodine Type ABL Filtered SCR Brushless DC Motor Control, V1.0

**8.2 77506X PRODUCT SPECIFICATION**

GBT Model 615X Specification, 77506X Rev A, May 2007

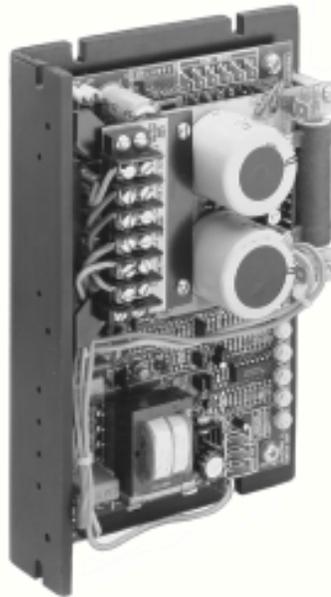


# **CONTINUOUS BELT FURNACE DRIVE MOTOR & CONTROL**

**BODINE TYPE ABL FILTERED SCR BRUSHLESS DC MOTOR CONTROL**

## *Operation and Troubleshooting*

*Version 1.0*



Model 3911C

### **Supplemental Reference to the IR Furnace Equipment Owner's Manual**

For comments and suggestions about this manual, please contact:

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