Section 5

# ENGINEERING

| FurnacePros DIVISION OF LOCHABER CORNWALL, INC. | DATA SHEET | DOC NBR: 10-004 | 802-101500 | R 1 |
|---|---|---|---|---|
| | IR FURNACE SYSTEM POWER & CURRENT | MODEL: LA-309 | APVL SLB | 9/2/09 |
| | | SERIAL NBR: 1303091001 | PRNT Wed, Oct 06, 2010 | |
| Customer: OMS RATTO | | DATE: 05/18/10 | SHT 1 of 1 | |

| INPUT TABLE | Entry OK? | VALID | | |
|---|---|---|---|---|
| Enter Power Line Tap Voltage: (208, 220, 240, 277, 380, 415, 440, 480) | 380 | Vac | TRUE | |
| Limit Lamps to Max Rating? (Y/N) | N | | TRUE | |
| Line Frequency (50/60) | 50 | Hz | TRUE | |
| Lamp Length (6, 9, 15, 24, 36) | 9 | inches | TRUE | |
| Typical Operating % | 35 | % | TRUE | |

| SUMMARY OF RESULTS | |
|---|---|
| Max Power: | 23.6 kW |
| Max Current: | 35.8 A |
| Typical Power: | 8.6 kW |
| Typical Current: | 13.1 A |

| HARDWARE | | | |
|---|---|---|---|
| Lamps: 28 | | SCRs: 8 | |
| EMs: 4 | | TCs: 3 | |
| Nbr Lamps in 10" zone: | 6 | AOV-25: 4 | |
| | | AITM: 2 | |

Lamp Balance (kW)
Phase 1: 5.9
Phase 2: 8.9
Phase 3: 5.9

| SCR PHASE | Zone Entry OK? | VALID | VALID | VALID |
|---|---|---|---|---|
| Top Lamp Phase (1/2/3): | | 1 | 2 | 3 |
| Bottom Lamp Phase (1/2/3): | | 1 | 2 | 3 |

| SCR POWER | Zone 1 | Zone 2 | Zone 3 | Zone 4 | Zone 5 | Zone 6 | Zone 7 | Zone 8 | Zone 9 | Zone 10 | Zone 11 | Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Length (7.5/10/15/20/30) in inches | 7.5 | 15 | 7.5 | | | | | | | | | 30 in. |
| Length Entry OK? | TRUE | TRUE | TRUE | | | | | | | | | |
| (F)urn., Furn. (1) SCR-Zn, (D)ryer | F | F | F | | | | | | | | | 3 |
| Zone Type OK? | TRUE | TRUE | TRUE | | | | | | | | | |
| No. Lamps in Series/String (1-5) | 2 | 2 | 2 | | | | | | | | | Plenum: |
| Lamps/String OK? | TRUE | TRUE | TRUE | | | | | | | | | 120 |
| Rated Lamp Voltage | 216 | 216 | 216 | | | | | | | | | |
| Max. Lamp Wired Voltage | 190 | 190 | 190 | | | | | | | | | |
| 50% Power SCR Cal Span Setting | **268** | **268** | **268** | | | | | | | | | <-- Vrms |
| Max. Lamp Wired Power (W) | 739 | 739 | 739 | | | | | | | | | |
| No. Strings per SCR | 2 | 3 | 2 | | | | | | | | | |
| Max. Current per String (A) | 3.9 | 3.9 | 3.9 | | | | | | | | | |
| No. Lamps in Zone | 8 | 12 | 8 | | | | | | | | | 28 |
| No. Lamp SCRs in Zone | 2 | 2 | 2 | | | | | | | | | 6 |
| No. Strings in Furnace Zones | 4 | 6 | 4 | | | | | | | | | 14 |
| | | | | | | | | | No. Furnace Element Monitors | | | 4 |
| Top Lamp Power (kW) | 3.0 | 4.4 | 3.0 | | | | | | | | | |
| Bottom Lamp Power (kW) | 3.0 | 4.4 | 3.0 | | | | | | | | | |
| Total Power/Zone (kW) | 5.9 | 8.9 | 5.9 | | | | | | | | | 20.7 |
| Current Required Top SCR (A) | 7.8 | 11.7 | 7.8 | | | | | | | | | |
| Current Required Bottom SCR (A) | 7.8 | 11.7 | 7.8 | | | | | | | | | |
| Color Temp (K) (nominal: 2500K) | 2384 | 2384 | 2384 | | | | | | | | | |
| Peak Wavelength (µm) | 1.22 | 1.22 | 1.22 | | | | | | | | | |
| Estimated Lamp Life (hrs) | Long | Long | Long | | | | | | | | | |
| Lumen Output vs. Rated (%) | 66 | 66 | 66 | | | | | | | | | |

| Furnace Total | Number of Item? | Voltage (Vac) | Current (Amps) | Power (kW) Max | Power (kW) Typical | Phase Assigned | | Other Items |
|---|---|---|---|---|---|---|---|---|
| Lamps | 28 | 380 | as above | 20.7 | 7.2 | as above | | 10" Cabinet or CACT Fans, 117 Vac, 0.30/0.29 A for 50/60 Hz |
| PC, Monitor | 1 | 117 | 1.3 | 0.2 | 0.2 | 1 | | 4" Box (Muffin) Fans, product cooling, 117 Vac, 0.16 A |
| Belt, Opto22, EM | 1 | 117 | 2.1 | 0.2 | 0.2 | 1 | | Cross-flow Fans, product cooling, 230 Vac, 1.27 A max |
| UC (Pump & Gen) | | 117 | 10.0 | | | | | Lower Cabinet Blowers (Impellers), 230 Vac, 0.72 A max |
| UC (Tank Heater) | | 117 | 8.4 | | | | | |
| UCD (Blower) | | 117 | 2.0 | | | | | No more than 8 SCRs/phase per TRx xfmr 24 Vac secondary |
| UCD (Heater) | | 380 | 12.7 | | | | | TR1: 4 TR2: 2 TR3: 2 |
| Edg Htr 1 **Length** | 30 | 380 | 6.2 | 2.3 | 0.8 | 1 | OK | Max Curr/EH1 SCR: 3 A |
| Edg Htr 2 **Length** | | | | | | | | Max Curr/EH2 SCR: |
| Edg Htr 3 **Length** | | | | | | | | Max Curr/EH3 SCR: |
| Cabinet Fans 10" | 2 | 117 | 0.3 | 0.1 | 0.1 | 1 | OK | Cabinet/CACT Fans: 1.2 A |
| CACT Fans 10" | 2 | 117 | 0.3 | 0.1 | 0.1 | 1 | OK | |
| Cooling Fans 4" | | 117 | 0.16 | | | | | |
| Cross-flow Fans | | 230 | 1.27 | | | | | |
| Cabinet Blowers | | 230 | 0.72 | | | | | |
| | | | Furnace Totals: | **23.6** | **8.6** | | | |

| | PHASE BALANCING | | | TOTAL |
|---|---|---|---|---|
| PHASE | 1 | 2 | 3 | ALL |
| LAMP PWR, kW | 5.9 | 8.9 | 5.9 | 20.7 |
| EH/OTHER | 1.4 | 0.0 | 0.0 | 1.4 |
| TOTAL | 7.3 | 8.9 | 5.9 | 22.0 |

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| FurnacePros DIVISION OF LOCHABER CORNWALL, INC. | DATA SHEET | DOC NBR: 10-004 | 802-101520 | R 1 |
|---|---|---|---|---|
| | IR FURNACE SYSTEM FUSE LIST | MODEL: LA-309 | APVL SBARBER | 7/12/09 |
| | | S/N: 1303091001 | PRNT Wed, Oct 06, 2010 | |
| | | DATE: 07/01/10 | SHT 1 of 1 | |

**Safety Enclosure (TR0, basic control)**

| Fuse Label | Size (A) | Comments |
|---|---|---|
| FA | 2 | 24 Vac control, AGC |
| FB | 4 | Switched/Unswitched 117 Vac, AGC |
| F1 | 3 | To TR0, KTK |
| F2 | 3 | To TR0, KTK |
| F3 | 20 | To K3 Contactor, KTK |
| F4 | 20 | To K3 Contactor, KTK |
| F5 | 20 | To K3 Contactor, KTK |

**Belt Motor Controller**

| Fuse Label | Size (A) | |
|---|---|---|
| Iso Xfrmr | 2 | AGC |
| Control Bd | 1.5 or 2 | Varies w/ motor HP, AGC |
| Iso I/F Bd | 2 x .062 | Special size |

**Power Distribution Panel (TR1-TR3 power supplies to TB2 and TB3)**

| Fuse Label | Size (A) | Comments |
|---|---|---|
| FC | 4 | Phase 1, 117 Vac switched, AGC |
| FD | 4 | Phase 2, 117 Vac switched, AGC |
| FE | 4 | Phase 3, 117 Vac switched, AGC |
| FF | 1 | Phase 1, 24 Vac switched, AGC |
| FG | 1 | Phase 2, 24 Vac switched, AGC |
| FH | 1 | Phase 3, 24 Vac switched, AGC |
| F6 | 3 | TR1, L1 leg, KTK |
| F7 | 3 | TR1, L2 leg, KTK |
| F8 | 3 | TR2, L2 leg, KTK |
| F9 | 3 | TR2, L3 leg, KTK |
| F10 | 3 | TR3, L3 leg, KTK |
| F11 | 3 | TR3, L1 leg, KTK |

**Heating Lamp/Edge Heat SCR Fuses (all KTK)**

| Fuse Label | Size (A) | Comments | Fuse Label | Size (A) | Comments |
|---|---|---|---|---|---|
| F30 | 10 | Zone 1 Top | | | None |
| F31 | 10 | | | | |
| F32 | 10 | Zone 1 Bottom | | | None |
| F33 | 10 | | | | |
| F34 | 15 | Zone 2 Top | | | None |
| F35 | 15 | | | | |
| F36 | 15 | Zone 2 Bottom | | | None |
| F37 | 15 | | | | |
| F38 | 10 | Zone 3 Top | | | None |
| F39 | 10 | | | | |
| F40 | 10 | Zone 3 Bottom | | | None |
| F41 | 10 | | | | |
| F42 | 4 | EH1L | | | None |
| F43 | 4 | | | | |
| F44 | 4 | EH1R | | | None |
| F45 | 4 | | | | |

| FurnacePros DIVISION OF LOCHABER CORNWALL, INC. | DATA SHEET | DOC NBR: 10-004 | 802-101522 R1 |
|---|---|---|---|
| | IR FURNACE SYSTEM TB1 OVERVIEW | MODEL: LA-309 | APVL SLB 3/15/10 |
| | | SERIAL NBR: 1303091001 | PRNT 06Oct10 |
| Customer: OMS RATTO | | DATE: 05/18/10 | SHT 1 of 1 |

| From | Wire | TB1 Conn | Wire | To |
|---|---|---|---|---|
| **Zone 1 Top Load** | **101** | **1** | **101** | **-> to Lamps E2R** |
| E1R -> | 102 | 2 | 102 | EM0-1 |
| E4R -> | 103 | 3 | 103 | EM0-2 |
| **Zone 1 Bot Load** | **126** | **4** | **126** | **-> to Lamps E2R** |
| E1R -> | 127 | 5 | 127 | EM0-3 |
| E4R -> | 128 | 6 | 128 | EM0-4 |
| **Zone 2 Top Load** | **151** | **7** | **151** | **-> to Lamps E2R, E5R** |
| E1R -> | 152 | 8 | 152 | EM1-1 |
| E4R -> | 153 | 9 | 153 | EM1-2 |
| E6R -> | 154 | 10 | 154 | EM1-3 |
| **Zone 2 Bot Load** | **176** | **11** | **176** | **-> to Lamps E2R, E5R** |
| E1R -> | 177 | 12 | 177 | EM1-4 |
| E4R -> | 178 | 13 | 178 | EM2-1 |
| E6R -> | 179 | 14 | 179 | EM2-2 |
| **Zone 3 Top Load** | **201** | **15** | **201** | **-> to Lamps E2R** |
| E1R -> | 202 | 16 | 202 | EM2-3 |
| E4R -> | 203 | 17 | 203 | EM2-4 |
| **Zone 3 Bot Load** | **226** | **18** | **226** | **-> to Lamps E2R** |
| E1R -> | 227 | 19 | 227 | EM3-1 |
| E4R -> | 228 | 20 | 228 | EM3-2 |
| **EH1L Load** | **251** | **21** | **251** | **-> to EH1L** |
| EH1L -> | 252 | 22 | 252 | EM3-3 |
| **EH1R Load** | **276** | **23** | **276** | **-> to EH1R** |
| EH1R -> | 277 | 24 | 277 | EM3-4 |

| FurnacePros DIVISION OF LOCHABER CORNWALL, INC. | DATA SHEET | DOC NBR: 10-004 | 802-101524 | R1 |
|---|---|---|---|---|
| | IR FURNACE SYSTEM<br>TB3 OVERVIEW | MODEL: LA-309<br>SERIAL NBR: 1303091001 | APVL SLB | 8/12/10 |
| | | | PRNT 06Oct10 | |
| Customer: OMS RATTO | | DATE: 05/18/10 | SHT 1 | of 1 |

| Phase | Signal TB3 Conn | Color | SCR Term 4 | Neutral TB3 Conn | Color | SCR Term 5 |
|---|---|---|---|---|---|---|
| 1 | 0 | 0 | Z1 Top<br>Z1 Bot<br>EH1L<br>EH1R | 0 | 0 | Z1 Top<br>Z1 Bot<br>EH1L<br>EH1R |
| 2 | 0 | 0 | Z2 Top<br>Z2 Bot | 0 | 0 | Z2 Top<br>Z2 Bot |
| 3 | 0 | 0 | Z3 Top<br>Z3 Bot | 0 | 0 | Z3 Top<br>Z3 Bot |

| FurnacePros DIVISION OF LOCHABER CORNWALL, INC. | DATA SHEET | DOC NBR: 10-004 | 802-101523 | R1 |
|---|---|---|---|---|
| | IR FURNACE SYSTEM TB2 OVERVIEW | MODEL: LA-309 | APVL SLB | 3/15/10 |
| | | SERIAL NBR: 1303091001 | PRNT 06Oct10 | |
| Customer: OMS RATTO | | DATE: 05/18/10 | SHT 1 | of 1 |

| Leg | TB2 Conn | Wire | Fuse |
|---|---|---|---|
| L1 | TB2-01A | 100 | F30 |
| L1 | TB2-01B | 125 | F32 |
| L1 | TB2-01C | 214 | F39 |
| L1 | TB2-01D | 239 | F41 |
| L1 | TB2-02A | 250 | F42 |
| L1 | TB2-02B | 275 | F44 |
| | TB2-02C | | |
| | TB2-02D | | |
| L2 | TB2-03A | 114 | F31 |
| L2 | TB2-03B | 139 | F33 |
| L2 | TB2-03C | 150 | F34 |
| L2 | TB2-03D | 175 | F36 |
| L2 | TB2-04A | 263 | F43 |
| L2 | TB2-04B | 288 | F45 |
| | TB2-04C | | |
| | TB2-04D | | |
| L3 | TB2-05A | 165 | F35 |
| L3 | TB2-05B | 190 | F37 |
| L3 | TB2-05C | 200 | F38 |
| L3 | TB2-05D | 225 | F40 |

| Leg | TB2 Conn | Wire | Fuse |
|---|---|---|---|

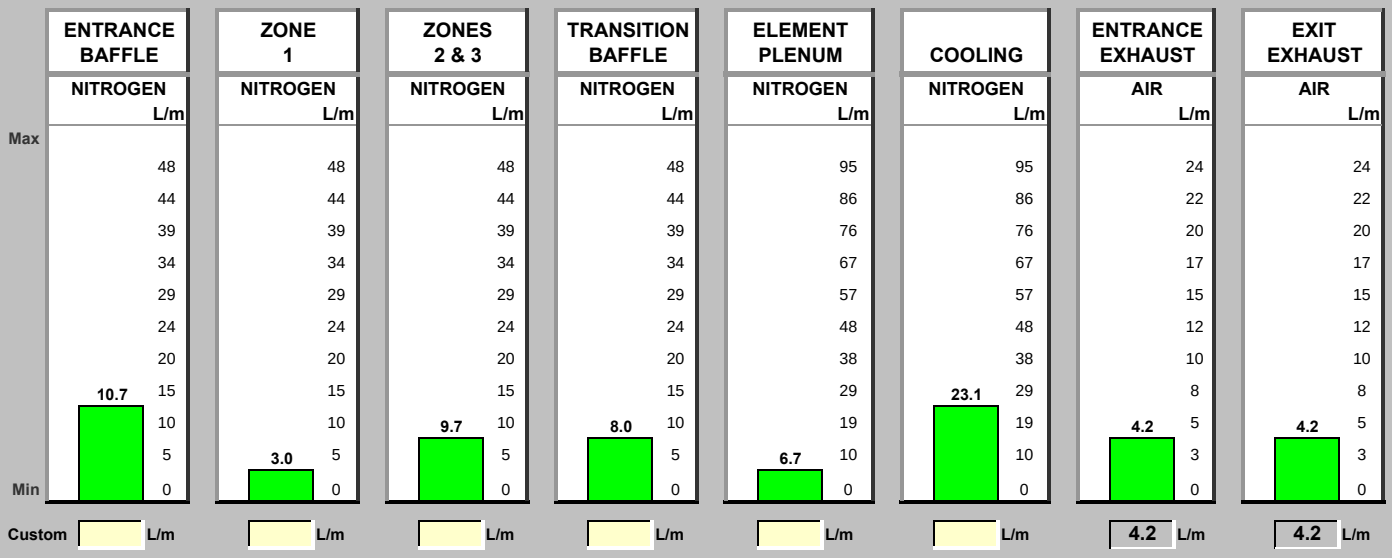
| Leg | 2 Co | Wire | Fuse |
|---|---|---|---|

# IR FURNACE PROCESS GAS FLOW BALANCER

**OMS RATTO 10-004**

| | | | | |
|---|---|---|---|---|
| 5.0 | bar | Pressure after Furnace Regulator | bar | Select Pressure Units |
| 1.0 | rep/min | Times Gas is Replaced in Furnace/minute | L/m | Select Flowmeter Units |

| | Zone 1 | Zone 2 | Zone 3 | Pct Exh | Pct Exh |
|---|---|---|---|---|---|
| Temp | 390 °C | 300 °C | 430 °C | 50% | 50% |




| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Custom | L/m | L/m | L/m | L/m | L/m | L/m | 4.2 L/m | 4.2 L/m |

**THEORETICAL PROCESS GAS FLOW SETTINGS TO BALANCE FURNACE AS A FUNCTION OF PROCESS GAS PRESSURE AND REPLENISH RATE**

1. Input process gas pressure setting, ideal replenish rate and zone temperatures. Input preferred exhaust percent.
2. Modify using Custom flows to determine balanced flow exhaust settings for your process. Delete custom values to reset.
   Note: For a positive pressure furnace, set actual flowmeter exhaust values slightly lower than shown.

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DIVISION OF LOCHABER CORNWALL, INC.

Customer: OMS RATTO

# DATA SHEET

## IR FURNACE SYSTEM
## GAS FLOW

DOC NBR: 10-004 802-101560-01 R 3
MODEL: LA-309 DATE: 07/13/10
SERIAL NBR: 1303091001 APVL JCLARK 19Apr10
PRINT: 10Dec10 SHT 1 OF 1

### IR FURNACE FLOWMETER SCALE CORRECTION, PURGE AIR AND EXHAUST

| Gage | | | Absolute | | |
|---|---|---|---|---|---|
| | | **STANDARD CONDITIONS** | | | |
| 70 | F | Standard Temperature, F | Ts | 530 R | *Dwyer flowmeter std* |
| 0.0 | psig | Standard Pressure, psig | Ps | 14.7 psia | *Dwyer flowmeter std* |
| | | **COMPRESSED GAS SUPPLY** | | | |
| 100 | F | Actual Temperature, F | $T_1$ | 560 R | *max normal temperature at flowmeter exit* |
| 58 | psig | Pressure after Furnace Regulator, psig | $P_1$ | 72.5 psia | *furnace pressure regulator setting* |
| | | **REPLENISH RATE** | | | |
| 1.0 | rep/min | Number of Replenishes/minute | RepRate | 60 rep/H | *furnace replinishes per hour* |
| | | Time it takes to evacuate Furnace | | 60 sec | *time 'to refresh gas in furnace* |
| 4 in | Special | **Product Height** | | | |
| 10 | Standard | Eductor multiplier | | | |

### INTERNAL VOLUME OF THE FURNACE AND FURNACE GAS INFLOWS

Select UoM for Distance: cm
Select UoM for Flowmeters: L/m

Gas 1: CDA
Gas 2: N2

| | | | | | Length | Width | Height | Length | Width | Height | | | 1 | 2 | 3 | 4 | 7 | 8 | 9 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | Min Std Flow | Typ Std Flow | Meter Operating Settings | | Max Setting | Max Std Flow | | |
| Include? | Select Gas Enter 1or2 | | Section | Location | inch | inch | inch | cm | cm | cm | Proc Gas | Temp °C | RepRate=1 Min Flow scfh | RepRate=1 Typical flow scfh | Calc FMtr Sizing Flow scfh grad | Adj Units for Flowmeter to sL/m grad | Manually selectd metr sL/m grad | Max Flow sL/m | Max Flow scfh | |
| O | | IR-E | Interface Roller Assembly, Entrance, Small Dia | Entrance interface | 2.5 | 10.5 | | 6.4 | 26.7 | 0 | | | | | | | | | | Interface Roller Assembly, Entra |
| Y | | LOAD | Load Station, 15 Inch | Entrance load area | 15.0 | 10.5 | | 38.1 | 26.7 | 0 | | | | | | | | | | Load Station, 15 Inch |
| Y | | EED-E | Exhaust Eductor, Entrance | Entrance | | | | 0.0 | 0.0 | 0 | none | | | | | | | | | Exhaust Eductor, Entrance |
| Y | Gas 2 | BE | Entrance Baffle W/ Eductor | Entrance barrier | 15.0 | 10.5 | 6 | 38.1 | 26.7 | 15.2 | N2 | 156 | 22.6 | 22.6 | 22.2 | 10.5 | **48.0** | 49 | 103 | Entrance Baffle W/ Eductor |
| Y | Gas 2 | Z1 | Zone 1 | Heating chamber | 7.5 | 10.5 | 11 | 19.1 | 26.7 | 27.9 | N2 | 390 | 13.4 | 13.4 | 6.2 | 2.9 | **48.0** | 104 | 220 | Zone 1 |
| Y | Gas 2 | Z2 | Zone 2 | Heating chamber | 15.0 | 10.5 | 11 | 38.1 | 26.7 | 27.9 | N2 | 300 | 31.0 | 31.0 | 14.3 | 6.8 | **48.0** | 104 | 220 | Zone 2 |
| Y | Gas 2 | Z3 | Zone 3 | Heating chamber | 7.5 | 10.5 | 11 | 19.1 | 26.7 | 27.9 | N2 | 430 | 12.6 | 12.6 | 5.8 | 2.8 | **0.0** | | | Zone 3 |
| Y | Gas 2 | TT | Transition Tunnel, Single Eductor | Furnace exit | 15.0 | 10.5 | 6 | 38.1 | 26.7 | 15.2 | N2 | 301 | 16.9 | 16.9 | 16.6 | 7.8 | **48.0** | 49 | 103 | Transition Tunnel, Single Eductc |
| Y | | EED-T | Exhaust Eductor, Transition | Furnace Exit | | | | 0 | 0.0 | 0 | none | | | | | | | | | Exhaust Eductor, Transition |
| Y | Gas 2 | CACT | Controlled Atmosphere Cooling Tunnel, 30 In | Exit cooling | 30.0 | 10.5 | 6.4 | 76.2 | 26.7 | 16.3 | N2 | 151 | 48.7 | 48.7 | 48.0 | 22.7 | **95.0** | 96 | 204 | Controlled Atmosphere Cooling |
| Y | Gas 2 | PLENUM | Plenums, Hermetic Chamber | Left & right furnace sides | 120.0 | 1 | 2 | 304.8 | 2.5 | 5.1 | N2 | 80 | 30.6 | 30.6 | 14.7 | 6.9 | **95.0** | 197 | 418 | Plenums, Hermetic Chamber |
| Y | | UNLOAD | Unload Station, 15 Inch | Exit | 15.0 | 10.5 | | 38.1 | 26.7 | 0 | | | | | | | | | | Unload Station, 15 Inch |
| O | | IR-X | Interface Roller Assembly, Exit, Small Dia | Exit interface | 2.5 | 10.5 | | 6.4 | 26.7 | 0 | | | | | | | | | | Interface Roller Assembly, Exit, |
| Y | | | Frame Adjustment | Internal | 3.0 | 10.5 | | 7.6 | 26.7 | 0 | | | | | | | | | | Frame Adjustment |
| | | Total Furnace Length with optional items | | | 248.00 | | | 629.9 | | | | | 175.7 | 175.7 | 127.9 | 60.4 | 382.0 | 599 | 1269 | |
| | | Optional Items | | | 5.00 | | | 12.7 | | | | | | | | | | | | |
| | | Total Furnace Length without optional items | | | 243.00 | | | 617.2 | | | | | | | | | | | | |
| **EDUCTOR IN-FLOWS** | | | | | | | | | | | | | | | | | | | | |
| Y | Gas 1 | EED-E | Exhaust Eductor, Entrance | Stack | | | | | | | CDA | 80 | 8.8 | 8.8 | 9.0 | 4.3 | **24.0** | 23.3 | 49.4 | |
| Y | Gas 1 | EED-T | Exhaust Eductor, Transition | Stack | | | | | | | CDA | 80 | 8.8 | 8.8 | 8.8 | 4.2 | **24.0** | 24.0 | 50.7 | |
| | | | | | | | | | | | | Total Eductor Inflows | 17.6 | 17.6 | 17.9 | 8.4 | 48.0 | 47.3 | 100.1 | |

| | | | Temp °C | Min Flow RepRate=1 scfh | Typical Flow RepRate=1 scfh | Max Flow sL/m | Max Flow scfh |
|---|---|---|---|---|---|---|---|
| **GAS INFLOW** | | | | | | | |
| Gas 1 | CDA | | 80 | 17.6 | 17.6 | 47 | 100 |
| Gas 2 | N2 | | 80 | 175.7 | 175.7 | 599 | 1,269 |
| | | | | 193.3 | 193.3 | 646 | 1,369 |
| **GAS EXHAUST** | | | | | | | |
| Gas 1 | CDA | | 300 | 193.3 | 193.3 | 520 | 1,102 |
| Gas 2 | N2 | | 300 | 0.0 | 0.0 | 0 | 0 |
| | Mix | | 300 | 193.3 | 193.3 | 520 | 1,102 |
| **NET GAS FLOW IN (OUT)** | | | | | | | |
| Gas 1 | CDA | | 200 | (176) | (176) | (473) | (1,001) |
| Gas 2 | N2 | | 200 | 176 | 176 | 599 | 1,269 |

**CDA SUPPLY**

| 1.3 | Compressor Safety Factor | | Temp °C | Typical scfh | Max Compressor sL/m | Max Compressor scfh |
|---|---|---|---|---|---|---|
| Gas 1 | | CDA | 30 | 23 | 47 | 100 |

**N2 SUPPPLY**

| 1.0 | Compressor Safety Factor | | Temp °C | Typical scfh | Max Compressor sL/m | Max Compressor scfh |
|---|---|---|---|---|---|---|
| Gas 2 | | N2 | 30 | 176 | 599 | 1,269 |

FurnacePros
DIVISION OF LOCHABER CORNWALL, INC.

# CHANNEL ASSIGNMENTS

| | | | |
|---|---|---|---|
| DOC NBR: | 10-004 | 802-101570 | R 4 |
| MODEL: | LA-309 | DWN JCLARK | 7/1/10 |
| S/N: | 1303091001 | APVL SBARBER | 7/1/10 |
| CUSTOMER | OSM RATTO | SIZE: A / PRNT 12/10/10 | SHT 1 OF 1 |

**Electrical** Power: 380 Vac
Phase: 3
Freq: 50 Hz

**Orig FO**

| | Controller Module | Part Number |
|---|---|---|
| | 5 Vdc 4 A Power Supply | 322-094408-01 |
| | PLC Controller | 322-092246-03 |
| | Ethernet Card | 322-092246-04 |
| BASE 0 | Rack Controller | 322-094410-02 |
| | 16 Module Rack | 322-094409-16 |

**DIGITAL01** **Address: 0** 322-092246-09

| Channel | Signal | Type | RANGE | Location | Description | Ref | Part Number |
|---|---|---|---|---|---|---|---|
| 00 | MAIN_POWER_LATCH | DO | 4 ch DO 12-140 Vac sw | K4 | Delay Power OFF | 802-101770 | 322-094401-01 |
| 01 | LAMP_POWER_CTRL | DO | | K7 | Process Power On | 802-101770 | |
| 02 | O2_POWER | DO | | K24 | MA/O2 Power On/Off | 802-101773 | |
| 03 | GRN_LAMP | DO | | K17 | Light Tower Control | 802-101775 | |
| 04 | ALARM_HORN | DO | 4 ch DO 5-60 Vdc | K14 | Alarm Horn | 802-101772 | 322-094412-01 |
| 05 | Spare ch | | | | Spare channel | | |
| 06 | Spare ch | | | | Spare channel | | |
| 07 | Spare ch | | | | Spare channel | | |
| 08 | SPEED_FEEDBACK | DI | 4ch DI 2-16Vdc .025ms | K11 | Transport Motor Tach Feedback | 802-101771 | 322-094406-01 |
| 09 | spare | | | | | | |
| 10 | PRES_SW_N2_MANIFOLD | DI | | K52 | N2 Pressure Sensor SW1 | 802-101776 | |
| 11 | TRANSPORT_MOTION_FAULT | DI | | K8 | Transport Motion Sensor | 802-101771 | |
| 12 | O2_SRC | DO | 4 ch DO 12-140 Vac sw | K20 | MA/O2 Source Control | 802-101773 | 322-094401-01 |
| 13 | O2_SAMPLE_1 | DO | | K21 | MA/O2 Sample Control SV1 | 802-101773 | |
| 14 | O2_SAMPLE_2 | DO | | K22 | MA/O2 Sample Control SV2 | 802-101773 | |
| 15 | O2_SAMPLE_3 | DO | | K23 | MA/O2 Sample Control SV3 | 802-101773 | |

**ANALOG02** **Address: 3**

| Channel | Signal | Type | RANGE | Location | Description | Ref | Part Number |
|---|---|---|---|---|---|---|---|
| 00 | TEMPERATURE_ZONE_1_K | AI | 2 ch AI Type K -150 to 1372 | KA103 | Thermocouple Inputs TC1 | 802-101701 | 322-094405-01 |
| 01 | TEMPERATURE_ZONE_2_K | AI | | KA203 | Thermocouple Inputs TC2 | 802-101701 | |
| 02 | TEMPERATURE_ZONE_3_K | AI | 2 ch AI Type K -150 to 1372 | KA303 | Thermocouple Inputs TC3 | 802-101701 | 322-094405-01 |
| 03 | CABINET_TEMP | AI | | KA1703 | Cabinet Temperature input | 802-101701 | |
| 04 | ZONE_1_TOP | AO | 2 ch AO 0-10 Vdc | KA100 | Top SCR Signal Control | Element Wiring Sch | 322-094402-01 |
| 05 | ZONE_1_BOTTOM | AO | | KA101 | Bot SCR Signal Control | Element Wiring Sch | |
| 06 | ZONE_2_TOP | AO | 2 ch AO 0-10 Vdc | KA200 | Top SCR Signal Control | Element Wiring Sch | 322-094402-01 |
| 07 | ZONE_3_BOTTOM | AO | | KA301 | Bot SCR Signal Control | Element Wiring Sch | |
| 08 | ZONE_3_TOP | AO | 2 ch AO 0-10 Vdc | KA300 | Top SCR Signal Control | Element Wiring Sch | 322-094402-01 |
| 09 | ZONE_2_BOTTOM | AO | | KA201 | Bot SCR Signal Control | Element Wiring Sch | |
| 10 | LEFT_EDGE_HEAT1 | AO | 2 ch AO 0-10 Vdc | KA112 | Edge Heat 1 Right SCR Signal Control | Element Wiring Sch | 322-094402-01 |
| 11 | RIGHT_EDGE_HEAT1 | AO | | KA111 | Edge Heat 1 Left SCR Signal Control | Element Wiring Sch | |
| 12 | BELT_SPEED_OUTPUT | AO | 2 ch AO 0-10 Vdc | K2 | Motor Speed Control Signal | 802-101771 | 322-094402-01 |
| 13 | Spare ch | | | | Spare channel | | |
| 14 | O2_INPUT | AI | 2 ch AI -20+20mA | KA4 | 02 sensor reading | 802-101773 | 322-094400-01 |
| 15 | Spare ch | | | | Spare channel | | |