City of Portland, Maine - Bui	ilding or Use	Permit Applicatio	n Permi	it No:	Issue Date:	CBL:
389 Congress Street, 04101 Tel:	(207) 874-8703	, Fax: (207) 874-87	16	07-1050		032 L002001
Location of Construction:	Owner Name:		Owner A	ddress:		Phone:
1 CITY CTR	ONE CITY C	ENTER ASSOCIATE	ONE CITY CENTER			
Business Name:	Contractor Name	2: 2:	Contract	or Address:		Phone
Johnson Cont		ols	477 co	ngress St. 6	Flr Portland	2075233417
Lessee/Buyer's Name	Phone:		Permit T HVAC	<b>`уре:</b> С		Zone:
Past Use: Proposed Use:			Permit F	Fee:	Cost of Work:	CEO District:
Commercial	Commercial -	Install a new Liebert		\$510.00	\$49,000.00 <b>ت</b>	
CRAC unit on		Roof	FIRE DEPTOR J Approved INSPECTION: Denied Use Group:			PECTION: Group: Type:
Proposed Project Description:	· · · · · · · · · · · · · · · ·		י <i>י</i> יך		142	ect !!
Install a new Liebert CRAC unit on	Koot		Signature PEDEST Action:	RIAN ACTIV	d Approved	hature: Γ (P.A.D.) I w/Conditions Denied
		· · · · · · · · · · · · · · · · · · ·	Signature	e:		Date:
Permit Taken By:Date AIdobson08/2	Applied For: 28/2007			Zoning .	Approval	
1. This permit application does no	t preclude the	Special Zone or Reviews		Zoning	g Appeal	Historic Preservation
Applicant(s) from meeting appli Federal Rules.	icable State and	Shoreland		Variance		VNot in District or Landma
2. Building permits do not include septic or electrical work.	plumbing,	Wetland		Miscellan	eous	Does Not Require Review
3. Building permits are void if wor within six (6) months of the date	rk is not started e of issuance.	Flood Zone		Condition	al Use	Requires Review
False information may invalidat permit and stop all work.	e a building	Subdivision		Interpreta	tion	Approved
		Site Plan		Approved		Approved w/Conditions
PERMIT ISSU SEP - C	JED	Maj Minor My Date: 8/29		Denied		Denie Date:

## CERTIFICATION

I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the application is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

SIGNATURE OF APPLICANT	ADDRESS	DATE	PHONE
RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE		DATE	PHONE

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The undersigned hereby applies for a permit to install the following heating, cooking or power equipment in accordance with the Laws of Maine, the Building Code of the City of Portland, and the following specifications:

Location / CBL <u>City Center</u> , Portland Name and address of owner of appliance <u>Verizon B</u> <u>Suite 305 B</u> Buffalo, NY Installer's name and address <u>Johnson Controls</u> Portland, Me 04/03	Me Use of Building Office/Mixed Date 8/16/07 USINESS 325 Delaware Ave 14202 477 Congress Street, 6th Floor Telephone 207-523-3412
Location of appliance:	Type of Chimney:
Basement X Floor	Masonry Lined
Attic     Koof	Factory built
Type of Fuel:	D Metal
Gas Oil Solid	Eactory Built III Listing #
Appliance Name: <u>Liebert CRAC</u> U.L. Approved X Yes D No	Direct Vent Type UL#
installation instructions? Yes D No	Type of Fuel Tank
IF NO Explain:	
	Size of Tank
The Type of License of Installer:	Number of Tanks
Master Plumber #	
Solid Fuel #	Distance from Tank to Center of Flame feet.
• Oil #	49 00 -
Gas #	
• Other	Permit Fee: \$\$ 00
Approved Fire:	Approved with Conditions See attached letter or requirement
Ele.:	
Bldg.:	

Da

Date Approved

White - Inspection

Ken/në

Signature of Installer

Yellow - File

Pink - Applicant's

Gold - Assessor's Copy

Inspector's Signature

City of Portland, Maine - Buil	ding or Use Permit		Permit No:	Date Applied For:	CBL:
389 Congress Street, 04101 Tel: (1	207) 874-8703, Fax: (207) 874-	8716	07-1050	08/28/2007	032 L002001
Location of Construction:	Owner Name:	0	wner Address:	<u></u>	Phone:
1 CITY CTR	ONE CITY CENTER ASSOCIA	TE C	ONE CITY CENT	ER	
Business Name:	Contractor Name:	C	ontractor Address:		Phone
	Johnson Controls	4	77 congress St. 6	Flr Portland	(207) 523-3417
Lessee/Buyer's Name	Phone:	Pe	ermit Type:		
		]	HVAC		
Proposed Use:	Pi	roposed	Project Description:		
Commercial - Install a new Liebert Cl	RAC unit on Roof I:	nstall a	new Liebert CRA	C unit on Roof	
Dept: Zoning Status: A	pproved Revie	ewer:	Marge Schmucka	l Approval Da	te: 08/29/2007
Note:					Ok to Issue: 🗹
Dept: Building Status: A	pproved with Conditions Revie	ewer:	Tammy Munson	Approval Da	te: 09/06/2007
Note:				(	Ok to Issue: 🗹
<ol> <li>All penetrations between units and required rating.</li> </ol>	l common areas shall be protected	with ap	proved firestop m	aterials and shall not	reduce the
Dept: Fire Status: N	ot Applicable Revie	ewer:	Capt Greg Cass	Approval Da	te: 08/29/2007
Note:	~ ~				Ok to Issue:

August 22, 2007

Mr. Ken Chartrand Johnson Controls, Inc. Controls Group 39 Salem Street Lynnfield, MA 01940-0840 Consulting Structural Engineering 241 Tolend Road Dover, NH 03820

Phone: 603-749-4177 Fax: 603-740-4177 Email: ngcstructural@comcast.net

Re: One City Center – Portland, ME Structural Investigation for Installation of New Rooftop Equipment NGC Project No. 07-752

Dear Ken,

It was a pleasure to meet with you on August 22, 2007 to view and discuss your proposed installation of new rooftop and floor supported equipment for your customer on the southwest corner of the 4<sup>th</sup> floor at One City Center in Portland, Maine. Our review of the building structural drawings prepared by William Dorsky Architects in 1984 indicates that the roof is constructed with 7.5 inch thick reinforced concrete slab supported by reinforced concrete beams. The third floor roof and adjacent fourth floor are constructed identically – the roof is designed for snow plus 35 psf live load and the floor is designed for a live loading of 75 psf.

The rooftop unit is a Liebert Model No. BCSL-083Z Ambient Lee-Temp Control Condenser with an operating weight of 295 pounds. The unit is about 3 feet high, and the base of the unit measures approximately 4 ft X 4 ft and is bolted to a timber curb supported by the roof. Our calculations indicate that this unit has an adequate factor of safety with respect to wind and seismic overturning forces. The roof design live load of 35 psf is greater that the 20 psf loading exerted by the new unit.

The interior floor supported unit is a Liebert Model No. BU067A-AAEI Challenger 3000 Computer Room Air Conditioner with an operating weight of 640 pounds. The unit is about 6 feet high and the base of the unit measures approximately 3 ft X 3 ft and is mounted on the control room floor which is supported by the concrete floor. The unit has a low center of gravity and has an adequate factor of safety against overturning due to seismic forces. The gravity loading over the unit footprint does not exceed the design live loading of 75 psf for the floor system.

In my opinion, both units addressed herein may be installed upon or within this existing building area (column grids A to C and 1 to 3) without any restriction in exact placement, and this installation will have no adverse impact on the structural integrity of the existing construction.

Please feel free to contact our office if you have any questions.

Respectfully yours,

NGC STRUCTURAL, LLC

Normand G. Cote, PE, SECB



# LIEBERT AIR COOLED MODELS



## STANDARD FEATURES

- COMPRESSOR Scroll with a suction gas cooled motor, internal centrifugal oil pump, vibration isolating mountings, internal thermal overloads, manual reset high pressure switch, and operates at 3500 RPM @ 60 HZ and 2900 RPM @ 50 HZ.
- **REFRIGERATION SYSTEM** Single refrigeration circuit, includes a liquid line filter drier, refrigerant sight glass with moisture indicator, adjustable externally equalized expansion valve, and liquid line solenoid valve.
- COOLING COIL A-frame/V-frame coil design is constructed of copper tubes and aluminum fins. A stainless steel drain pan is provided.
- FAN Centrifugal type, double width, double inlet, with lifetime lubricating self aligning ball bearings rated at a minimum life of 100,000 hours. The motor operates at 1750 RPM for 60 HZ and 1450 RPM for 50 HZ. The drive package is variable speed, sized for 200% of the fan motor horsepower (the motor is on an adjustable base). The fan draws air over the coil. The fan assembly is located on an isolated fan deck.
- FILTER Deep pleated with a minimum efficiency rating of 20% (based on ASHRAE standard 52.1) located within the cabinet, and accessible from the front of the unit.
- **CABINET AND FRAME** Custom powder painted steel panels with 1" (25.4mm), 1 1/2 lbs. (.68kg) insulation. A hinged control access panel opens to a second front panel which is a protection enclosure for high voltage components. The frame corner posts are constructed of 14 gauge MIG welded steel. The frame is painted with a powder coat finish to protect against corrosion. The unit is totally front accessible including any component removal.
- HUMIDIFIER High intensity infrared quartz lamps over a stainless steel humidifier pan. An automatic water supply system maintains water level in the pan and a timed flush system greatly reduces mineral precipitation, and is field adjustable to change the cycle time.
- ELECTRIC REHEAT Electric low watt density 304 stainless steel fin tubular electric reheat elements provide two stages of reheat to control room dry bulb temperature.
- HOT GAS BYPASS Factory piped hot gas solenoid valve and externally equalized regulating valve in the refrigerant circuit.
- ADVANCED MICROPROCESSOR CONTROL (A) The advanced control system includes the following control, monitor and alarm features: Backlit 4x20 LCD, selectable control logic (proportional, PID, intelligent\*), programmable analog inputs, component run hour data, selectable humidity control, automatic reheat sequencing, sequential load activation, sequential auto restart, programmed humidifier water cycle, compressor short cycle control, sensor calibration, manual cooling override switches, programmable common alarm, alarm history log, programmable coil flush cycle, unit and control diagnostics, battery backup of unit parameters.

\*The Intelligent control approximates the actions that a human operator would take to maintain precise, stable control. The control logic uses Artificial Intelligence Techniques including "Fuzzy Logic" and "Expert Systems" methods.

# LIEBERT AIR COOLED MODELS

### **OPTIONAL FEATURES** (Refer to specification sheet for options supplied)

- CONDENSATE PUMP Has a minimum capacity of 100 GPH (379 l/h) at 20 ft. head (58 kPa). (Consult factory for 200V or 230V, 50Hz applications). Pump is complete with integral float switch, pump, motor assembly, and reservoir. (Shipped loose for field installation on Downflow (BF) Units). A dual float switch is also available.
- **UNIT DISCONNECT SWITCH** Two types of switches are available. The "Non-Locking Type" consists of a non-automatic molded case circuit interrupter operational from the outside of the unit. Access to the high voltage electric panel compartment can be obtained with the switch in either the "on" or "off" position. The "Locking Type" is identical except access to the high voltage electric panel compartment can be obtained only with the switch in the "off" position.
- FIRESTAT Is mounted in the unit with the sensing element in the return air flow. Upon activation the high temperature stat will immediately shut down the entire unit.
- **SMOKE DETECTOR** The smoke detector senses the return air, shuts down the unit upon detection, and sends visual and audible alarm. Dry contacts are available for a remote customer alarm. This smoke detector is not intended to function as or replace any room smoke detection system that may be required by local or national codes.
- FILTERS Four optional filters are available. A 2" 20% prefilter, and 4" 20%, 30%, 40%-45% or 60%-65% main filter may be specified (efficiency based on ASHRAE 52.1).
- LIQUI-TECT SENSOR Is a solid state water sensor that has no moving parts and is hermetically sealed to keep out dust and dirt. When the sensor detects the presence of moisture the alarm system is activated.
- **REMOTE TEMPERATURE AND HUMIDITY SENSORS** Are provided in a vented case for mounting in the room to be conditioned. Includes 30 ft. (9m), 60 ft. (18m), 90 ft. (27m), 120 ft. (36m), or 150 ft. (45m) of cable supplied for connecting sensors to unit.
- **FLOORSTAND** Is constructed of MIG welded tubular steel and available in heights from 9" to 24" (229mm to 610mm) with vibration isolation pads provided on the adjustable legs. An optional factory supplied **turning vane** is available for field installation if desired.
- PLENUM(S) 4 plenums are available for upflow units: 2 way, 3 way, or 4 way discharge and top duct connection. Each plenum is 18" (457mm) high and constructed of steel with 1" (25.4mm), 1 1/2 lb. (.68kg) insulation and is custom painted in unit matching colors.
- STEAM GENERATING CANISTER HUMIDIFIER This system is housed in a steel enclosure and includes a replaceable canister with integral fill cup, fill and drain valves, and high water indicator. System automatically fills and drains as well as maintains the required water level based on conductivity.
- HEAVY GAUGE INDUSTRIAL PANELS Are 16 ga. outside panels and heavy duty gaskets which replace the standard 20 ga. panels and gaskets.
- HOT WATER REHEAT System is factory piped with a two-way solenoid valve and cleanable Y-strainer. Reheat coil is constructed of copper tubes and aluminum fins.
- REHEAT/HUMIDIFIER LOCKOUT Includes the necessary relays to disable the reheat and humidifier from an external 24 volt signal.
- SEQUENTIAL AUTO RESTART For units with Standard Microprocessor control, provides an adjustable time delay for unit start-up after a loss of power.
- SCR ELECTRIC REHEAT Is controlled by the unit microprocessor (only Advanced or Advanced with Graphics) by pulsing the reheat elements for tight temperature control. Not available in 575 volts.
- HIGH EXTERNAL STATIC BLOWERS This blower/motor package is available only on upflow models where external static pressures are up to 2.0 inches/500 Pa (60Hz) or 1.5 inches/370 Pa (50Hz). These blowers are rigidly mounted for ducting directly to the blower housing. Heavy gauge panels are recommended with this option.
- TWO (2) ADDITIONAL REMOTE SHUTDOWN TERMINALS Provides the customer with a total of three locations to remotely shut down the unit.
- TWO (2) EXTRA COMMON ALARM CONTACTS Provides the customer with a total of three sets of n/o contacts for remote indication of unit alarms.
- MAIN FAN AUXILIARY SWITCH Provides the unit with one n/o set of contacts to indicate that the motor/unit is on.
- **REMOTE HUMIDIFIER CONTACTS** allow the unit's humidity controller to control a humidifier outside the unit. Power to operate the remote humidifier <u>does not</u> come from the Challenger unit.
- ADVANCED MICROPROCESSOR CONTROL W/ GRAPHICS (G) Includes all the features of the Advanced Microprocessor Control, except the 4x20 LCD is replaced with a backlit 240x128 dot matrix graphics display. In addition, the Advanced Microprocessor Control with Graphics includes a larger alarm history file, graphical plots of temperature, humidity, and the analog inputs, bar graph plots of component run history, and a graphical floor plan layout for an optional water detection cable system.
- INTELLISLOT WEB/485 CARD W/ADAPTER Provides 10/100 baseT Ethernet and RS-485 Modbus network connectivity for unit monitoring and management. The supported management interfaces include: SNMP for Network Management Systems (exp. HP OpenView), web pages, and RS-485 Modbus for Building Management Systems.
- **INTELLISLOT 485 CARD W/ADAPTER** Provides RS-485 Modbus network connectivity to Building Management Systems for unit monitoring and management.

DPN000348

ENVIRONMENTAL DISCRETE OUTPUTS CARD (ENV-DO) Provides 16 discrete outputs, corresponding to status and major alarm conditions of the unit.

DPN000348

# **TYPICAL GENERAL ARRANGEMENT DIAGRAM**

AIR COOLED MODELS



\*Components are not supplied by Liebert but are recommended for proper circuit operation and maintenance.

## **PIPING: AIR COOLED MODELS**

UPFLOW (BU) MODELS



# **ELECTRICAL FIELD CONNECTIONS**



- 1) Electric conduit knockouts on top and bottom of electric box. Knockout size 1 3/4" (44.5mm).
- 2) Three phase connection. Electric service connection terminals when factory disconnect is NOT supplied.
- 3) Three phase connection. Electric service connection terminals when factory disconnect switch is supplied.
- 4) Factory installed disconnect switch. (Optional).
- 5) Three phase electric service not by liebert.
- 6) Earth ground connection (50/60HZ). Connection terminal for field supplied earth grounding wire.
- 7) Earth ground bar (50HZ only). Connection terminals with factory ground from each high voltage component for field supplied earth grounding wire.
- 8) Control and monitoring section of electric box.
- 9) Remote unit shutdown. Replace existing jumper between terminals 37 + 38 with normally closed switch having a minimum 75VA, 24VAC rating. Use field supplied Class 1 wiring. Two additional contact pairs available as an option (labeled as 37B & 38B, 37C & 38C). Replace existing jumper for appropriate pair as done for 37 & 38.
- 10) Special alarm connections. Field supplied 24V. Class 1 wiring for special alarm. Connection made by adding normally open contacts between terminals 24 + 50. Optional additional connections available with Advanced or Advanced with Graphics controls and appropriate optional accessories (connections 51, 55, and 56).
- 11) SiteScan connection. Terminals 77 (-) and 78 (+) are for connection of a 2 wire, twisted pair, communication cable (available from Liebert or others) to optional SiteScan.
- 12) Remote condensing unit connection. Field supplied 24V Class 1 wiring to remote condensing unit terminals 1, 2, 3, & 4 from (R2) relay (split system only.)
- 13) Smoke detector alarm connections. Field supplied 24V. Class 1 wiring to remote alarm circuits. Factory wired contacts from optional smoke detector are #91-comm., #92-NO, and #93-NC.
- 14) **Common alarm connection**. Field supplied 24V. Class 1 wiring to common alarm terminals 75 + 76 (and optional 94 + 95, and 96 + 97), which are factory connected to common alarm relay (R3).
- 15) Heat rejection connection. Field supplied 24V Class 1 wiring to interlock heat rejection from pigtails 70 + 71 which are factory connected to compressor side switch (self contained units only and to Glycool relay (R5), Glycool units only).
- 16) Reheat and Humidifier Lockout. Optional emergency power lockout of reheat and/or humidifier: connections provided for remote 24V AC source.
- 17) Main Fan Auxiliary Switch. Optional main fan auxiliary side switch. Terminals located in field wiring compartment for remote indication that the evaporator fan motor/unit is on. Field to connect 24V maximum.
- 18) **Optional Condensate Alarm (Dual Float Condensate Pump only).** Relay terminals located in field wiring compartment for remote indication.

\*Located inside unit on top for Upflow and on base for Downflow.

NOTE: Refer to specification sheet for full load amp. and wire size amp. ratings.

DPN000354

## **MONITORING PANEL AND UNIT ALARMS**

ADVANCED MICROPROCESSOR CONTROL (A) MONITORING



## GENERAL

DISPLAY A 4 x 20 backlit LCD which displays all monitoring, control, alarm and diagnostic information.

**KEYPAD** 5 membrane keys for easy movement through the menu-driven control.

## STANDARD ALARMS

**TEMPERATURE** The high and low temperature thresholds are programmable between 35°F and 90°F (1.6°C and 32.2°C). The alarm indicates excessive high or low return air temperature.

HUMIDITY The high and low humidity thresholds are programmable between 15% and 85% R.H. The alarm indicates excessive high or low return air humidity.

HUMIDIFIER PROBLEM Indicates excessive high water levels in the humidifier pan or full canister.

HIGH HEAD Indicates a head pressure above a factory preset point. Unit is equipped with a factory preset compressor safety cutout switch. (Provided on DX units only.)

CHANGE FILTERS Indicates the pressure drop across the filters has exceeded the customer-set level.

LOSS OF AIR Indicates a loss of air flow in the unit based on mechanical sensing switches.

LOW SUCTION PRESSURE Indicates a suction pressure below the preset cutout point (DX units only).

SHORT CYCLE ALARM Indicates the compressor has turned off-on-off at least 10 times in a one hour period.

LOSS OF POWER Indicates that a power interruption has occurred.

## **OPTIONAL ALARMS**

The following alarms are available when the appropriate options are included with the unit.

Main Fan Overload

Compressor Overload

(4) Local Alarms from below
 Standby Glycol Pump On
 Water Under Floor
 Smoke Detected
 Loss of Water Flow
 Stand-by Unit On

Special Message 1 Special Message 2

## FEATURES OF THE MONITOR

**MONITOR** Room conditions, user analog sensors, run hours, alarm history, unit operating status. **SET-UP** Password protected programming of various time delays and unit configurations.

SETPOINT Password protected programming of operational setpoints/alarms.

### DPN000355







# LIQUI-TECT<sup>®</sup> 410 **Point Leak Detection Sensor**

## Description

The Liqui-tect 410 (LT410) provides a single-point detection of leaks. The point detection sensor has two gold-plated sensing probes to prevent corrosion resistance and to provide accurate readings. The LT410 constantly monitors points for leaks,



internal faults and power failures and warns of any abnormal conditions. Mounting brackets allow for sensor height adjustment and leveling.

The LT410 is the ideal solution for sensing leaks under a raised computer floor or air conditioning drip pans. Two independent outputs provide added flexibility with the capacity to signal both a local alarm panel and a remote building management system or external equipment, such as motorized water shut-off valves.

The LT410 is also ideally suited for the following:

### Applications

### Locations

- · Glycol, Chilled Water Cooling Humidification
- · Large-Scale Network Control Centers
- · Data Centers
- · Server Rooms Closets
- Feed Water Piping Condensate Pumps Unattended Remote Shelters and Drains
  - Mechanical Equipment Rooms
- Unit and Ceiling Auxiliary Drip Pans
- Overhead Piping
- Troughs
- · Sensitive Areas With **Overhead** Piping Industrial Process Control Rooms
- Placement on Subfloor **Under Cooling Support Equipment**



## **Specifications**

Liqui-tect 410 Sensor					
Power requirements	24 VAC 100 mA, 50/60 Hz, 3 VA (max.)				
Dimensions W x D x H	6.35" x 2.25" x 4.46" (161.2 mm x 57.2 mm x 113.2 mm)				
Weight (assembled)	2.0 lbs (0.9 kg)				
Metal enclosure	NEMA 1, IP 30				
Environmental Conditions					
Operating temperature	50°F to 104°F (10°C to 40°C)				
Operating humidity	10% to 95% relative humidity (non-condensing)				
Operating altitude	0 to 10,000 ft (0 to 3,048 m)				
Output Relays					
Contact rating	2 Form-C; 3 A rating at 24 VAC				
Agency Listings					
UL	UL916				
C-UL	C22.2, No. 205-M1983				
CE	Yes				
FCC Compliance	47 CFR, Part 15				

## Dimensions-Top, Front & Side Views



## Wiring Interconnections

#### **Red Wires Orange Wires Yellow Wires** 24 V, AC/DC Alarm Contact Rating Alarm Contact Rating @0.10A, 50-60Hz, DC 24 VAC @ 3A 24 VAC @ 3A



## **Ordering Information**

Product Number	Quantity	Description
LT410		Point Leak Detection Sensor

## **Power Wiring**

The LT410 is rated for 24 VAC, 50/60 Hz and 0.10 amp.





Figure 2 24V from transformer to LT410



## Wiring to Auxiliary Alarm Panels

The LT410 has two Form-C dry contact alarm output contacts: orange wires (1) and yellow wires (2). Each contact is rated for 24 VAC at 3 amp.

### Figure 3 LT410 to Liebert environmental units









## Challenger Unit Sound Level Comparison Sound Power Data 07/14/03

Unit Type	Downflow Unit w/ Open Return (4)					
Sound Path	Supply Air Sound					
Model	3T	3Т	5T	5T		
Blower Model	12x9T	12x9T	12x9T	12x9T		
CFM	1800	2300	2800	3000		
Octave Lw (dB)						
63	84	91	95	96		
125	78	85	89	90		
250	74	80	84	86		
500	74	80	83	84		
1000	72	79	85	86		
2000	70	77	81	83		
4000	69	76	80	81		
8000	65	71	76	77		
Total LwA (dBA)	78	84	89	90		

Unit Type	Downflow Unit w/Open Return					
Sound Path	Cabinet+Return Air Sound					
Model Blower Model CFM	3T 12x9T 1800	3T 12x9T 2300	5T 12x9T 2800	5T 12×9T 3000		
Octave Lw (dB)						
63	75	82	86	87		
125	69	76	80	81		
250	59	65	70	71		
500	53	60	62	63		
1000	49	55	61	63		
2000	43	49	54	55		
4000	40	47	51	52		
8000	37	43	47	49		
Total LwA (dBA)	58	64	69	70		

Linear octave sound power (dB) Total Sound Power A-weighted (dBA) No compressor sound included

## Challenger Unit Sound Level Comparison Sound Power Data 07/14/03

Unit Type Sound Path	Upflow Ducted Unit w/ Return Grille ① Supply Air Sound			
Model	3Т	3Т	5T	5T
Blower Model	12x9T	12x9T	12x9T	12x9T
CFM	1800	2300	2800	3000
Octave Lw (dB)				
63	84	90	94	96
125	78	84	88	90
250	73	80	84	85
500	74	80	82	84
1000	72	79	85	86
2000	70	77	81	82
4000	69	75	79	81
8000	65	71	75	77
Total LwA (dBA)	78	84	89	90

Unit Type	Upflow Ducted Unit w/Return Grille 2							
Sound Path	C	Cabinet+Return Air Sound						
Model	3T	3T	5T	5T				
Blower Model	12x9T	12x9T	12x9T	12x9T				
CFM	1800	2300	2800	3000				
Octave Lw (dB)								
63	73	80	84	85				
125	69	76	80	81				
250	61	67	71	73				
500	52	58	60	62				
1000	45	52	58	59				
2000	44	50	54	56				
4000	40	47	51	52				
8000	31	38	42	43				
Total LwA (dBA)	58	64	68	70				

Linear octave sound power (dB) Total Sound Power A-weighted (dBA) No compressor sound included

## Challenger Unit Sound Level Comparison Sound Power Data 07/14/03

Unit Type	Upflow Plenum Unit w/ Return Grille							
Sound Path		Total Unit Sound						
Model	3Т	3T	5T	5T				
Blower Model	12x9T	12x9T	12x9T	12x9T				
CFM	1800	2300	2800	3000				
Octave Lw (dB)								
63	74	81	85	86				
125	75	82	86	87				
250	70	77	81	82				
500	70	77	79	80				
1000	67	74	80	81				
2000	66	73	77	78				
4000	65	72	76	77				
8000	60	67	71	72				
Total LwA (dBA)	74	80	85	86				

Linear octave sound power (dB) Total Sound Power A-weighted (dBA) No compressor sound included

# LIEBERT AIR COOLED LEE-TEMP CONTROL CONDENSERS



### STANDARD FEATURES

- **COIL Liebert manufactured** coil is constructed of copper tubes in a staggered tube pattern. Tubes are expanded into continuous, rippled or enhanced aluminum type fins. The fins have full depth fin collars completely covering the copper tubes which are connected to heavy wall type L headers. Inlet coil connector tubes pass through relieved holes in the tube sheet for maximum resistance to piping strain and vibration. Coils are **factory leak tested** at a minimum of 300 PSIG, dehydrated, then filled with a nitrogen and refrigerant holding charge and sealed.
- **FAN(S)** Blades are constructed of zinc plated steel or aluminum with a maximum diameter of 30 inches and secured to the fan shaft by a heavy duty hub with set screw. Fan guards are heavy gauge, close meshed, steel wire with corrosion resistant finish. Fans are **factory balanced and tested** before shipment.
- FAN MOTOR(S) Are provided with rain slingers, permanently lubricated bearings, and individual built-in overload protection. Motors are rigidly mounted on die-formed galvanized steel supports.
- **HEAD PRESSURE CONTROL** A Liebert Lee-Temp control system is furnished for each circuit and consists of an insulated, heated receiver tank with sight glasses, pressure relief valve, roto lock valve, and head pressure operated 3-way valve for field connection to air cooled condenser. This system allows operation at ambient conditions as low as -30 °F (-34 °C).
- **HOUSING** The condenser housing is constructed of bright **aluminum sheet** and divided into individual fan sections by full width baffles. Structural support members, including coil support frame, motor, and drive support, are **galvanized steel** for strength and corrosion resistance. Aluminum legs are provided with rigging holes for hoisting the unit into position.

## **OPTIONAL FEATURES**

UNIT DISCONNECT SWITCH A locking disconnect factory installed and wired in enclosed condenser control section.



# **CABINET & ANCHOR DIMENSIONAL DATA**

LEE TEMP CONTROL CONDENSERS



	LIEBERT MODEL NO.	NO.	A	В	С	D	NET WEIGHT	
	Note 1	FANS	INMM.	IN. MM.	IN. MM.	IN. MM	LBS. KG.	
C	CSC/CSL/CDL-083	1	51 1/2 1308	44 1118	42 1067	-	295 134	K
_	CSC/CSL/CDL-104	1	51 1/2 1308	44 1118	42 1067		315 143	
	CSC/CSL/CDL-165	2	91 1/2 2324	84 2134	82 2083		425 193	
	CSC/CSL/CDL-205	2	91 1/2 2324	84 2134	82 2083		495 225	
	CSC/CSL/CDL-251	3	131 1/2 3340	124 3150	122 3099		500 227	
	CSC/CSL/CDL-308	3	131 1/2 3340	124 3150	122 3099		670 305	
	CSC/CSL/CDL-415	4	171 1/2 4356	164 4166	82 2083	80 2032	815 370	
	CSC/CSL/CDL-510	4	171 1/2 4356	164 4166	82 2083	80 2032	1188 540	

CSL model prefix indicates single refrigeratiocircuit condensers.CSC model prefix indicates single refrigeration circuit condensers (without controle) use with Series 3000 units. CDL and CDC prefix indicates dual refrigeration circuit condensers.
 All condenser fan motos are 3/4 H.P.

2. An contrasted managed as a set of the differential.

## PIPING: LEE-TEMP CONTROL CONDENSERS



7/8	(22.2)	CSC/CSL-104	1-1/8	5/8	W-4	1-1/8	7/8	5/8	7/
7/8	(22.2)	CDL-104	7/8	1/2	(2) W-4	1-1/8	7/8	5/8	
7/8	(22.2)	CSC/CSL-165	1-1/8	7/8	W-5	1-3/8	7/8	7/8	1-1
7/8	(22.2)	CDL-165	7/8	5/8	(2)W-4	1-1/8	7/8	5/8	
1 1/8	(28.6)	CSC/CSL-205	1-1/8	7/8	W-5	1-3/8	7/8	7/8	1-1
5/8	(15.9)	CDL-205	1-1/8	7/8	(2) W-4	1-1/8	7/8	5/8	
5/8	(15.9)	CSC/CSL-251	1-1/8	7/8	W-5	1-3/8	7/8	7/8	1-1
5/8	(15.9)	CDL-251	1-1/8	7/8	(2) W-4	1-1/8	7/8	5/8	
5/8	(15.9)	CSC/CSL-308	1-5/8	1-1/8	W-6	1-3/8	7/8	7/8	1-1
7/8	(22.2)	CDL-308	1-3/8	1-1/8	(2) W-5	1-3/8	7/8	7/8	
7/8	(22.2)	CSC/CSL-415	1-5/8	1-1/8	W-41	1-3/8	1-1/8	7/8	1-1
7/8	(22.2)	CDL-415	1-3/8	1-1/8	(2) W-5	1-3/8	7/8	7/8	
7/8	(22.2)	CST-510	2-1/8	1-5/8	W-120	1-3/8	1-1/8	7/8	1-1
1/2	(12.7)	CDL-510	1-5/8	1-1/8	(2) W-41	1-3/8	1-1/8	7/8	_
5/8	(15.9)	** PROVIDED V		ENSER IS	ORDERED	FORUSE	WITH CSI	13000 CHI	
5/8	(15.9)								
5/8	(15.9)	NOTE: WHEN	JNIT IS OPE	RATING B	ELOW 30% (	OF FULL (	CAPACITY	DOUBLE	
3/6	(15.9)	DISCHA	RGE RISER	IS ARE RE	QUIRED. CC	DNSULT F	ACTORY	FOR PRO	PER

WHEN UNIT IS OPERATING BELOW 30% OF FULL CAPACITY, DOUBLE DISCHARGE RISERS ARE REQUIRED. CONSULT FACTORY FOR PROPER SELECTION (CSU 3000 UNITS ONLY)

NOTE: FOR RUNS LONGER THAN 150 FT. (45.7m) EQUIV. LENGTH CONSULT FACTORY FOR PROPER LINE SIZING.

DPN000667

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MODEL

STEP

0/2

DH/VH-380A

CS-91A/109A

CD-182A/218A

CT-327A

CS-135A

CD-270A

CS-181A

CD-362A

CT-534A

DS-065A

DD-130A

CS-91A

CD-182A

CS-109A

CD-218A

CT-327A

CS-135A

CD-270A

CS-181A

CD-362A

CT-543A

100 (30.5) 150 (45.7)

50 (15.2) 100 (30.5) 150 (45.7)

50 (15.2)

100 (30.5)

150 (45.7)

50 (15.2) 100 (30.5)

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50 (15.2) 100 (30.5) 150 (45.7)

50 (15.2) 100 (30.5) 150 (45.7)

1 3/8 (34.9)

1 3/8 (34.9

7/8 (22.2)

1 1/8 (28.6) 1 1/8 (28.6)

1 1/8 (28.6)

1 1/8 (28.6) 1 1/8 (28.6)

1 1/8 (28.6) 1 3/8 (34.9) 1 3/8 (34.9)

3/4 (19.1) 3/4 (19.1)

3/4 (19.1)

7/8 (22.2)

(22.2)

(22.2)

(22.2)

(28.6)

3/4 7/8

7/8 (22.2)

7/8 7/8

7/8

7/8 (22.2)

1 1/8 1 1/8 (28.6)

1 1/8 (28.6)

1 3/8 (34.9)

1 3/8 (34.9) (15.9) (15.9)

(15.9)

(22.2)

(22.2

5/8 (15.9) 7/8 (22.2) 7/8 (22.2)

5/8 5/8

5/8

7/8 7/8 7/8 (22.2) 1-1/8

1-1/8

1-1/8

1-1/8

1-1/8





RECOMMENDED REFRIGERANT LINE SIZES CU.OD.									
LIEBERT DS	S - STANDARD SC	ROLL MODELS (N	ON-DIGITAL)						
UNIT	TOTAL EQUIV.	HOT GAS	LIQUID						
MODEL	LENGTH	LINE	LINE						
NUMBER	FT. (m)	IN. (mm)	IN. (mm)						
	50 (15.2)	7/8 (22.2)	1/2 (12.7)						
DS028	100 (30.5)	7/8 (22.2)	5/8 (15.9)						
	150 (45.7)	7/8 (22.2)	5/8 (15.9)						
	50 (15.2)	7/8 (22.2)	1/2 (12.7)						
DS035	100 (30.5)	7/8 (22.2)	5/8 (15.9)						
	150 (45.7)	7/8 (22.2)	5/8 (15.9)						
	50 (15.2)	7/8 (22.2)	1/2 (12.7)						
DS042	100 (30.5)	7/8 (22.2)	5/8 (15.9)						
	150 (45.7)	7/8 (22.2)	5/8 (15.9)						
	50 (15.2)	7/8 (22.2)	5/8 (15.9)						
DS053	100 (30.5)	1-1/8 (28.6)	7/8 (22.2)						
	150 (45.7)	1-1/8 (28.6)	7/8 (22.2)						
	50 (15.2)	1-1/8 (28.6)	7/8 (22.2)						
DS070	100 (30.5)	1-1/8 (28.6)	7/8 (22.2)						
	150 (45.7)	1-1/8 (28.6)	7/8 (22.2)						
	50 (15.2)	1-1/8 (28.6)	7/8 (22.2)						
DS077	100 (30.5)	1-1/8 (28.6)	7/8 (22.2)						
	150 (45.7)	1-1/8 (28.6)	7/8 (22.2)						
	50 (15.2)	1-1/8 (28.6)	7/8 (22.2)						
DS105	100 (30.5)	1-3/8 (34.9)	7/8 (22.2)						
	150 (45.7)	1-3/8 (34.9)	1-1/8 (28.6)						

RECOM	MENDED REFRIGI - STEP SEM ⊦HERN	ERANT LINE SIZES	CU.OD.
UNIT	TOTAL EQUIV.	HOT GAS	LIQUID
MODEL	LENGTH	LINE	LINE
NUMBER	FT. (m)	IN. (mm)	IN. (mm)
	50 (15.2)	3/4 (19.1)	1/2 (12.7)
DS028	100 (30.5)	3/4 (19.1)	5/8 (15.9)
	150 (45.7)	7/8 (22.2)	5/8 (15.9)
	50 (15.2)	3/4 (19.1)	1/2 (12.7)
DS035	100 (30.5)	7/8 (22.2)	5/8 (15.9)
	150 (45.7)	7/8 (22.2)	5/8 (15.9)
	50 (15.2)	7/8 (22.2)	5/8 (15.9)
DS042	100 (30.5)	7/8 (22.2)	5/8 (15.9)
	150 (45.7)	1-1/8 (28.6) *	5/8 (15.9)
	50 (15.2)	7/8 (22.2)	7/8 (22.2)
DS0 53	100 (30.5)	1-1/8 (28.6)*	7/8 (22.2)
	150 (45.7)	1-1/8 (28.6)	7/8 (22.2)
	50 (15.2)	1-1/8 (28.6) *	7/8 (22.2)
DS070	100 (30.5)	1-1/8 (28.6)	7/8 (22.2)
	150 <u>(4</u> 5.7)	1-1/8 (28.6)	7/8 (22.2)
	50 (15.2)	11/8 (28.6)	7/8 (22.2)
DS077	100 (30.5)	1-1/8 (28.6)	7/8 (22.2)
	150 (45.7)	1-1/8 (28.6)	7/8 (22.2)
	50 (15.2)	1-3/8 (34.9)	7/8 (22.2)
DS105	100 (30.5)	1-3/8 (34.9)	7/8 (22.2)
	150 (45.7)	1-3/8 (34.9)	1-1/8 (28.6)

\* DOWNSIZE VERTICAL RISER ONE TRADE SIZE (1-1/8" to 7/8")



Note: The following materials are supplied by Liebert for each circuit (shipped loose with condenser) for field installation: insulated Lee-Temp storage tank, head pressure control valve, check valve, roto-lock valve, two sight glasses and pressure relief valve. All other piping to be supplied and installed by others.

C	ONDENS	SER PI	PING CO	NNECTIC	ON SIZE	S	
CONDENS	SER CONNE	CTIONS		LEE-TEMP CONNECTIONS-(ODS-INCHES)			
UDS-INCHES			LEE-TEMP SIZE	HOT GAS	LIQ TO	RECEIVER	
NO.	HOT GAS	LIQUID	0.22	TEE	L-T VALVE	OUT	
CSL083	7/8	5/8	W-4	1-1/8	7/8	5/8	
CDL083	1/2	1/2	(2) W-4	1-1/8	7/8	5/8	
CSL104	1-1/8	5/8	W-4	1-1/8	7/8	5/8	
CDL104	7/8	1/2	(2) W-4	1-1/8	7/8	5/8	
CSL165	1-1/8	7/8	W-5	1-3/8	7/8	7/8	
CDL165	7/8	5/8	(2)W-4	1-1/8	7/8	5/8	
CSL205	1-1/8	7/8	W-5	1-3/8	7/8	7/8	
CDL205	1-1/8	7/8	(2) W-4	1-1/8	7/8	5/8	
CSL251	1-1/8	7/8	W-5	1-3/8	7/8	7/8	
CDL251	1-1/8	7/8	(2) W-4	1-1/8	7/8	5/8	
CSL308	1-5/8	1-1/8	W-6	1-3/8	7/8	7/8	
CDL308	1-3/8	1-1/8	(2) W-5	1-3/8	7/8	7/8	
CSL415	1-5/8	1-1/8	W-41	1-3/ <u>8</u>	1-1/8	7/8	
CDL415	1-3/8	1-1/8	(2) W-5	1-3/8	7/8	7/8	
CST510	2-1/8	1-5/8	W-120	1-3/8	1-1/8	7/8	
CDL510	1-5/8	1-1/8	(2) W-41	1-3/8	1-1/8	7/8	

NOTE: FOR RUNS LONGER THAN 150 FT. (45.7m) EQUIV. LENGTH CONSULT FACTORY FOR PROPER LINE SIZING.

# Liebert

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# Liebert Heat Rejection Equipment

Job Name	 	
Model		
Quantity	 	
Date	 	-
Invoice #	 	
Purchaser	 _	
P.O.#	 	
Tag #	 	
Submitted By		



ladobbins@lordonassoc.com 08/16/2007 01:52 PM To Kenneth.E.Chartrand@JCl.com cc bcc Subject DCSL083Z

Hi Ken,

The first line is your unit. The columns are shifted to the right one space.....So the total is 56.6 at 5' away.

Lorrie

From: Matthew.Caruthers@Emersonnetworkpower.com [mailto:Matthew.Caruthers@Emersonnetworkpower.com] Sent: Thursday, August 16, 2007 1:47 PM To: ladobbins@lordonassoc.com Subject:

39.416375 70.031

## 4/89 BASED ON DELAWARE LAB TEST ON 1FAN, 5ROW, 10FPI COIL WITH EMERSON

1/4 HP MOTOR & STD FAN LIEBERT CORP. "QUIET-LINE" HEAT TRANSFER SOUND LEVELS (dB)

							DIST	ANCE	N	0. F	REQU	ENCY
FΤ	F	ANS	63	125	250	5	00	1000	2000	4000	8000	) "A"
		5	1	61	57.5	58	55	5 51	48.:	5 39	30	56.5
		2	64.	0 60.	5 61	.0	58.0	54.0	51.5	42.0	33.0	59.5
		3	65.	8 62.	3 62	.8	59.8	55.8	53.3	43.8	34.8	61.3
		4	67.	0 63.	5 64	0.	61.0	57.0	54.5	45.0	36.0	62.5
		6	68.	8 65.	3 65	.8	62.8	58.8	56.3	46.8	37.8	64.3
		8	70.	0 66.	5 67	.0	64.0	60.0	57.5	48.0	39.0	65.5
		32	76.	1 72.	6 73	.1	70.1	66.1	63.6	54.1	45.1	71.6
	10	1	55.	0 51.	5 52	.0	49.0	45.0	42.5	33.0	24.0	50.5
		2	58.	0 54.	5 55	.0	52.0	48.0	45.5	36.0	27.0	53.5
		3	59.	8 56.	3 56	.8	53.8	49.8	47.3	37.8	28.8	55.3
		4	61.	0 57.	5 58	.0	55.0	51.0	48.5	39.0	30.0	56.5
		6	62.	8 59.	3 59	.8	56.8	52.8	50.3	40.8	31.8	58.3
		8	64.	0 60.	5 61	.0	58.0	54.0	51.5	42.0	33.0	59.5
		32	70.0	66.5	67.0	6	4.0	60.0	57.5	48.0	39.0	65.5

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CITY OF PORTLAND, MAINE Department of Building Inspections
S.28 2007
Received from Schulson Controls
Location of Work / City Ctr-
Permit Fee \$
Building (IZ) Plumbing (I5) Electrical (I2) Site Plan (U2)         OtherA C
CBL: $32 \perp 2$ Check # $1/2340444CC$ Total Collected \$ 510 m
THIS IS NOT A PERMIT
No work is to be started until PERMIT CARD is actually posted upon the premises. Acceptance of fee is no guarantee that permit will be granted. PRESERVE THIS RECEIPT. In case permit cannot be granted the amount of the fee will be refunded upon return of the receipt less \$10.00 or 10% whichever is greater.
WHITE - Applicant's Copy YELLOW - Office Copy PINK - Permit Copy