

**LIEBERT CRV
ENGINEERING SPECIFICATION SHEET
Water-Cooled Systems**

Project Name: MONUMENT VIEW - ARLINGTON, VA
Date: September 27, 2013
Reference No.: Q01981774
Submitted By: Liebert Capitol Office – Matt Caruthers

Configuration Number: CR035RW1A7SD1811PDF0PX213
Model Number: CR035RW1A7X213 **Quantity:** 5

ELECTRICAL SUPPLY REQUIREMENTS

Liebert CRV Room Unit: 460 Volts, 3 Phase, 60 Hertz, 31.7 Full Load Amps, 38.6 Wire Sizing Amps, 50.0 Over-Current Protection Device

NET COOLING CAPACITY DATA

- 75°F (23.9°C) DB – 62.5°F (16.9°C) WB
- 50% RH
- Total Capacity: 129,000 BTU/hr (37.8 kW)
- Sensible Capacity: 92,900 BTU/hr (27.2 kW)
- Entering Water Temperature: 85°F (29.4°C)
- Flow Rate: 25.0 GPM (1.6 l/s)
- Pressure Drop: 46.4 Feet of Water (138.7 kPa)

CABINET

- Adjustable Supply Air Baffle System
- Hot Air Rear Return with Front Cold Air Discharge
- Server Rack Style Rear Door
- Superior Service Access Panel
- Installation Casters with Leveling Feet
- Powder Coated Panels
- Unit Color: Z-7021 (Black Gray Matte)

EVAPORATOR FAN AND COIL

- Type: Variable speed EC plug fan
- Total Fan Motor: 1.4 HP (1.06 kW)
- Air Volume: 3,260 CFM (5,540 CMH)
- Number of Fans: 2
- Evaporator Coil: 5 Rows
- Evaporator Type: Tilted Slab, Copper Tubes – Aluminum Fins with Hydrophilic Coating
- 2-Way Valve, 230 PSI (1,586 kPa)

COMPRESSOR

- Digital Scroll Compressor with RotoLocks, Variable Capacity
- Refrigerant: 410A
- Crankcase Heater
- Low Sound Package (Compressor Sound Jacket and Additional Panel Insulation)

HUMIDIFIER

- Type: Steam Generating Humidifier
- Capacity: 5 lbs/hr (2.3 kg/hr) / 1.8 kW
- Copper Distribution Wand

REHEAT

- Type: Electric Reheat
- Capacity: 20,472 BTU/hr (6 kW)
- Number of Stages: 1

FILTER

- Rating: MERV 8 per ASHRAE 52.2 (30% efficient by ASHRAE 52.1)
- Type: Disposable
- Size: 31.5 x 17.5 inches (800 x 445 mm)
- Depth: 4 inches (102mm)
- Effective Surface Area: 16.4 ft² (1.52 m²)
- Filter Clog Detection with Alarm

CONTROL SYSTEM

- Type: Liebert iCOM Control System
- Interface: Large Graphic Display, Backlit 320 x 240 Dot Matrix
- Display Language: English
- Three 2T Sensors to Measure Server Rack Temperatures
- IntelliSlot Card Slots: 2

ADDITIONAL EQUIPMENT

- Dual Float Condensate Pump
- Locking Disconnect Switch
- Top and Bottom Electrical and Piping Connections
- One Remote Shutdown Terminals
- One Alarm Contacts
- IntelliSlot IS-IPBML Card (IS-IPBML) provides Modbus IP communications to Building Management Systems, Quantity: 1 (One) Per Unit
- External 24VAC Transformer (40VA), Quantity: 4 (Four) Per Order
- LT410, Point Leak Sensor, Quantity: 4 (Four) Per Order
- Compressor lockout on loss of fluid flow with a unit alarm indication. CRV W/G Unit with wiring for a field installed Flow Switch. (Flow switch ships loose or is field supplied); Quantity: 1 (One) Per Unit



Liebert Rating System

Liebert.

Project Name: **My Project**

Customer Name:

MATT CARUTHERS

**Liebert Products &
Services, Capitol Sales
Office**

(703) 726-4100

CRV Model CR035RW~No Drycooler; WaterGlycolCooled

Unit Power Supply: **460/3/60**
Refrigerant: **R410A**
Internal Filter Class: **Merv 8 Std. - 4 inch (102 mm)**
Unit Airflow (std. motor): **3260 ACFM**
ESP: **0 InH2O**

Width: **23.6 in**
Depth: **43.3 in**
Height: **78.74 in**
Weight: **856 lb**
Altitude: **0 ft**

Hide/Show

Condenser(s)

Manufacturer: **SWEP**
Model: **B80Hx42**
Condenser Type: **Brazed Plate**
Design Ambient: **NA**

Compressor(s)

Manufacturer: **Copeland**
Model: **ZPD120KCE-TFD-60Hz**
Compressor Type: **Digital**
Power Supply: **TFD**

Evaporator(s)

Fin Type: **WavyCorrugated**
Number of Rows: **5**
Fin Density: **14 1/in**
Face Area: **7.2 ft²**

Hide/Show

Miscellaneous

Drycooler: **None**

Cooling Fan(s)

Quantity of Fans: **2**
Type: **EC Plug Fan In the Unit**
Power Supply: **460/3/60**
Total Motor HP: **3 HP**
Quantity of Motors: **2**

System: [Digital Loading: 100%, SC: 10 °F, SH: 10 °F, Fluid: Water 100%]

Ent DB (°F)	Ent WB (°F)	Ent RH (%)	Unit Air Vol (ACFM)	Air Face Vel (ft/min)	Amb DB (°F)	TCC (kBtu/hr)	SCC (kBtu/hr)	THR (kBtu/hr)	Ent Fluid Temp (°F)	Lvg Fluid Temp (°F)	Fluid Flow Rate (gpm)	Fluid DP (ftH2O)	Lvg DB (°F)	Lvg WB (°F)	Tot Comp Pwr (kW)	Sys Power Input (kW)	Sys SCOP (kW/kW)	Fan kW (kW)
75	61.1	45	3260	452	95	122.5	95.7	153.1	85	107	14	15.3	48.9	47.5	9	10.17	2.645	1.16



1. Unit Watt Input and SCOP include: Compressor, Blower Motor.
2. Coil airflow has not been reduced by a bypass.
3. Test method as defined by ASHRAE 127-2007.
4. Capacity Tolerance is 5%.

Project List

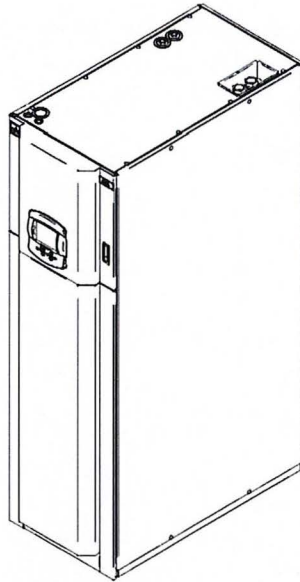
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LIEBERT CRV WATER-COOLED MODELS



STANDARD FEATURES (Refer to specification sheet for accessories supplied)

DX COOLING COIL The evaporator coil has 7.25 ft² (0.674 m²) face area, 4 or 5 rows deep. It is constructed of copper tubes and hydrophilic coated aluminium fins. The hydrophilic coating provides superior water carryover resistance. Two stainless steel condensate drain pans are provided.

REFRIGERATION SYSTEM Single refrigeration circuit includes a liquid line filter drier, an adjustable externally equalized expansion valve, and a liquid line solenoid valve.

COMPRESSOR The compressor is an R-410A scroll-type with variable capacity operation from 20-100%; commonly known as a Digital Scroll. Compressor solenoid valve unloads the compressor to provide variable capacity operation. The compressor has a suction gas cooled motor, vibration isolators, internal thermal overloads, manual reset high pressure switch, RotoLock service valves, low pressure and high pressure transducer, crankcase heater, internal centrifugal oil pump, and an operating speed of 3500 RPM @ 60Hz (2900RPM @ 50Hz).

FAN The unit is equipped with two plug fans: direct driven centrifugal fans with backward curved blades and Electronically Commutated DC motors; commonly referred to as EC plug fans. The fan speed is variable and automatically regulated by the iCOM control through all modes of operation. Each fan has a dedicated motor and speed controller which provides a level of redundancy. The fans push air through the coil and are located on the rear panel of the unit.

WATER / GLYCOL CONDENSER Is an efficient stainless steel brazed-plate condenser. Waterside threaded connections are provided for convenience. Proper filtration must be field supplied when used on open-loop water systems (cooling towers, etc). When operating on a closed-loop, to avoid undesired ice formation in the wintertime, it is advisable to use a water/glycol mixture.

~~**3-WAY MODULATING VALVE** A 3 way modulating valve controls the water/glycol flow passing through the brazed plate condenser. The iCOM control manages the valve actuator movement in order to maintain the desired condensing temperature for various entering water temperatures. The maximum differential pressure across the closed valve is 43.5 PSI (300 kPa). Maximum system pressure is 230 PSI (1586 kPa).~~

LIEBERT CRV

WATER-COOLED MODELS

SUPPLY AIR BAFFLE A field adjustable, modular supply air baffle is located in the discharge air stream. It can be quickly and easily reconfigured to redirect airflow. The angles of the vanes have been optimized to effectively distribute air to heat generating equipment in a wide variety of applications.

iCOM CONTROL SYSTEM The Liebert CRV is controlled by the iCOM Control System. The standard user interface is the Large Graphical Display (320x240 pixels, backlit) which presents system information and allows all parameters to be viewed and adjusted. It features push-button navigation, operational status LEDs, and a 3-level password protection system. Unit-to-Unit communication with other Liebert CRVs and two IntelliSlot communication card housings are included as standard.

✓ **2T RACK TEMPERATURE SENSORS** Consist of a vented case with two temperature probes. Three (3) 2T rack sensors are standard with each Liebert CRV. Up to ten (10) 2T housings (20 temperature probes) can be connected to a Liebert CRV. One (1) 2T housing and both sensor probes are to be attached to a rack the cooling unit is conditioning. The sensors provide real-time, direct feedback to the cooling unit to optimize the amount of cooling and airflow required; increasing energy efficiency and ensuring proper rack inlet air temperatures. The sensor data can also be reported to remote BMS and monitoring systems. The sensor network consists of one CAN wire leaving the cooling unit and connecting to a 2T sensor. Each remaining 2T sensor is connected to the previous sensor; often referred to as a daisy-chain configuration.

REMOTE SHUTDOWN TERMINAL Provides the customer with a location to remotely shut down the unit.

COMMON ALARM CONTACT Provides the customer with a set of normally open (n/o) contacts for remote indication of unit alarms.

CABINET The exterior steel panels are custom powder coated to protect against corrosion. The double wall constructed side panels separate the ½ inch, 2.0 lb/ft³ insulation from the airstream. The unit is mounted on casters for quick installation and provided with levelling feet. The perforated inlet and outlet panels have 81% open area, and the rear door utilizes a Knürr rack style handle and hinges.

SERVICE ACCESS All service and maintenance is performed through the front and rear of the unit; including any component removal. No side access is required. All electrical and piping connections are made through the top and/or bottom of the unit. All units are provided with a Superior Service Access Panel to provide additional access.

✓ **FILTER** The unit is equipped with two deep pleated 4 inch filters rated MERV8 following ASHRAE 52.2 (30% by ASHRAE 52.1), located within the cabinet, and accessible from the rear of the unit. A filter clog alarm is included.

LOCKING DISCONNECT SWITCH A moulded case circuit interrupter disrupts the flow of power to the unit. The electric panel high voltage compartment can only be accessed with the switch in the 'off' position. Conveniently located behind the iCOM display door for quick access.

5,000 AMP SHORT CIRCUIT CURRENT RATING (SCCR) The electrical panel provides a 5k amp SCCR.

LIEBERT CRV

WATER-COOLED MODELS

ADDITIONAL FEATURES (Refer to specification sheet for accessories supplied)

DUAL-FLOAT CONDENSATE PUMP It has a capacity of 6 GPM (22.7 l/min) at 30ft (9 m) head. Pump is complete with integral primary and secondary float switches, pump, motor assembly and reservoir. The secondary float shall send a signal to the local alarm and shut down the unit upon high water condition.

HUMIDIFIER A steam generating canister humidifier is factory-installed in the cooling unit and is operated by the iCOM control system. It is complete with disposable cylinder, all supply and drain valves, steam distributor and electronic controls. The need to change the canister is indicated on the iCOM display. The humidifier is designed to operate with water conductivity from 125-500 (50Hz) or 330-670 (60Hz) microS/cm. System automatically fills and drains as well as maintains the required water level based on conductivity. An air-gap within the humidifier assembly shall prevent backflow of the humidifier supply water. The humidifier is removable from the rear of the cabinet.

ELECTRIC REHEAT The electric reheat coils are low watt density, 304 stainless steel fin-tubular construction, protected by thermal safety switches and controlled in one stage.

LOW NOISE PACKAGE The Low Noise Package reduces the level of sound emitted from the compressor. The package consists of a 3/8 inch closed cell polymeric 4.5 – 8.5 lbs/ft³ density compressor sound jacket that encloses the compressor. Additional 1/2 inch closed cell polymeric 3 - 8 lbs/ft³ density sound deadening material is affixed to the underside of the Superior Service Access Panel located above the compressor and attached to the inner side of the compressor compartment panels that face the hot and cold aisles. All sound deadening material is non-shedding and located outside of the airstream.

2-WAY MODULATING VALVE A 2-way modulating valve controls the water/glycol flow passing through the brazed-plate condenser. The iCOM control manages the valve actuator movement in order to maintain the desired condensing temperature for various entering water flow rates and temperatures. The maximum differential pressure across the closed valve is 43.5 PSI (300 kPa). Maximum system pressure is 230 PSI (1586 kPa).

~~**INTELLISLOT WEB CARD (IS-WEBL)** Provides ground fault isolated 10/100 baseT Ethernet connectivity for unit monitoring and management. The supported management interfaces include: SNMP for Network Management Systems, HTTP for web page viewing, SMTP for email and SMS for Mobile messaging.~~

~~**INTELLISLOT 485 CARD (IS-485L)** Provides ground fault isolated RS 485 Modbus network connectivity to Building Management Systems for unit monitoring and management.~~

INTELLISLOT BUILDING MANAGEMENT CARD (IS-IPBML) Provides ground fault isolated Modbus IP network connectivity to Building Management Systems for unit monitoring and management.

~~**INTELLISLOT SITELINK-E CARD (IS-485EXI)** Provides ground fault isolated connection to a Liebert SiteLink-E for monitoring and management. Compatible with Liebert SiteScan Web 4.0 or newer version.~~

~~**FILTER** The optional filters are two deep pleated 4 inch rated MERV11 following ASHRAE 52.2 (60-65% by ASHRAE 52.1), located within the cabinet and accessible from the rear of the unit. A filter clog alarm is included.~~

~~**REHEAT / HUMIDIFIER LOCKOUT** Includes the necessary relays to disable the reheat and humidifier from an external 24 volt signal.~~

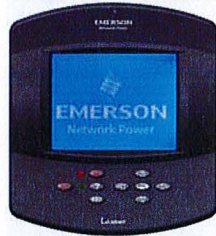
LIEBERT CRV

WATER-COOLED MODELS

~~ONE (1) EXTRA COMMON ALARM CONTACT~~ Provides the customer with a total of two sets of normally open (n/o) contacts for remote indication of unit alarms.

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.

Liebert iCOM® Control System for the Liebert CRV
Intelligent Communications & Monitoring
Large Graphic Display
(Unit-mounted)



Large Graphic Display

The Liebert iCOM® Large Graphic Display for the Liebert CRV is microprocessor based with a 320x240 dot matrix graphic monitor with control keys for user inputs mounted in an ergonomic, aesthetically pleasing housing. The display and housing is viewable while the unit panels are open or closed. All parameter changes are password protected.

~~Wall Mounted Large Graphic Displays for the Liebert CRV are provided with a power supply. Wall mounted displays can be added to a Liebert CRV Unit-to-Unit network and remotely located from the cooling unit(s) to provide convenient monitoring and control capabilities.~~

Temperature Control – Precision temperature control is maintained while maximizing efficiency based on a user entered setpoint and tolerance.

Humidity Control – The dewpoint level of the room is monitored and controlled based on a user specified Relative Humidity setpoint and tolerance.

Operating Modes – 6 selectable fan and compressor operating modes allow the compressor/cooling valve and fans to modulate together or independently. The components can be set to operate based on the return air, supply air, or rack temperature sensors.

Various Control Types – Proportional, PI (proportional-integral), PID (proportional-integral-derivative), or Intelligent control types can be selected for supply or return temperature. These control types have been developed to maximize component life and maintain precise environmental control.

Unit Alarms – All unit alarms are annunciated, displayed on the screen, automatically recorded in the event log, communicated to available IntelliSlot monitoring cards, and a red light flashes on the display.

Event Log – The last 400 unit and system (U2U communication required) events (messages, warnings, and alarms) are automatically stored.

Temperature and Humidity Graphs – A graphical view of historical room conditions, selectable from 8 minutes to 16 days is provided.

Automatic Component Sequencing – Runtimes of multiple components within a unit are automatically balanced to extend component life.

Wellness / Maintenance – System components are monitored to warn of potential issues in advance (helps avoid unplanned downtime) and prolongs component life.

Auto Restart – The unit will return to its previous operating status after loss of power. Units can be stagger started to minimize system current draw.

IntelliSlot Cards – IntelliSlot cards allow for external unit communication and control.

Service Contact Information – Local service or sales contact information can be conveniently stored in the control.

Full Text Descriptions – The large screen size eliminates the need for abbreviated text, simplifying user operation.

Upgradeable – Multiple units connected through a Unit-to-Unit network can be upgraded simultaneously or in series.

Rack Temperature Sensors – Remote temperature sensors can be attached to the IT equipment racks to help ensure enough air at the correct temperature is being supplied by the cooling unit(s). Up to 10 racks can be equipped with a 2T temperature sensor; each 2T sensor provides two temperature readings. The control can be set to average or take the maximum of the two sensor readings per rack. Sensors are connected in a daisy-chain (one sensor plugs into another) fashion via CAN cables. These sensors help to improve energy efficiency of the unit, minimize operating noise, and provide enhanced monitoring capabilities.

Unit-to-Unit (U2U) Communication for Liebert CRVs – Communication via private Ethernet network allows for advanced control functionality (Teamwork modes, sharing sensor data, Standby Rotation, Lead-Lag, and Cascade operation).

Cascade – Standby units on a U2U network are automatically activated if active unit(s) cannot maintain control of the environment.

Lead-Lag – A standby unit on a U2U network is automatically activated if an alarm occurs in an active unit.

Standby Rotation – Standby units are rotated through a U2U network to balance system run hours. Units can be set to automatically rotate daily, weekly, or monthly.

Teamwork modes:

- **Mode No** – Units share data but operate independently using local sensor readings.
- **Mode 1** – All units perform the same operation with the *same* capacity based on sensor readings from the entire network; typically for rooms with balanced heat loads.
- **Mode 2** – All units perform the same operation with *varying* capacity based on sensor readings from the entire network; typically for rooms with un-balanced heat loads.

Spare Parts List - A list of key spare parts, their quantity and respective parts numbers is displayed.

Unit Diary - A free-field area where a technician may store notes for reference.

View Network – A summarized view of all the cooling units connected on a U2U network is displayed.

Centralized Operation – Any cooling unit on a U2U network can be displayed or configured from a Large Graphic Display.

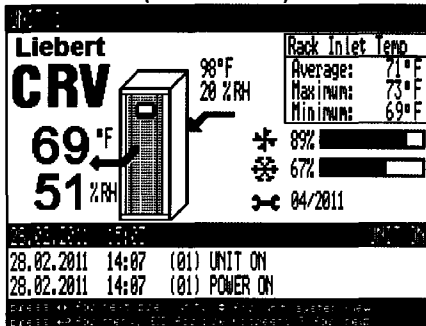
System View – The average of all operations being performed on the U2U network can be displayed.

Active Alarms on Status Screen – Last two unit/system events are displayed at the bottom of the Status Screen for rapid identification of critical events without having to enter submenus.

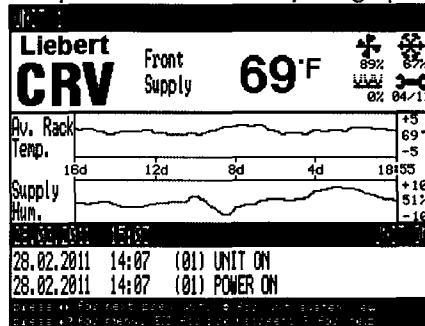
Rack Map – Within the control, a map of the racks that a Liebert CRV is influencing can be created. If Rack Temperature Sensors are attached, the sensor readings will be displayed along with customizable rack labels. This allows for easy interpretation of environmental conditions and rapid identification of alarms (high/low temperatures per rack, etc).

Screenshots – Additional status screens are field selectable including the Simple and Graphic views found on a Liebert DS and Liebert Challenger.

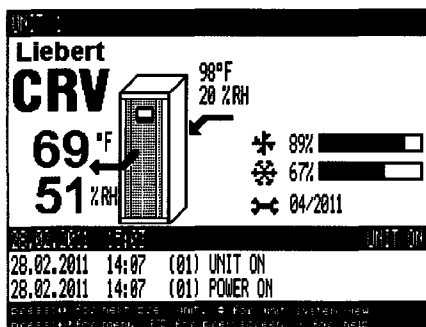
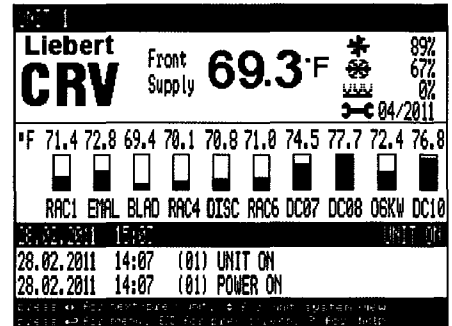
Status Screen with 2T Rack Sensors
(default view)



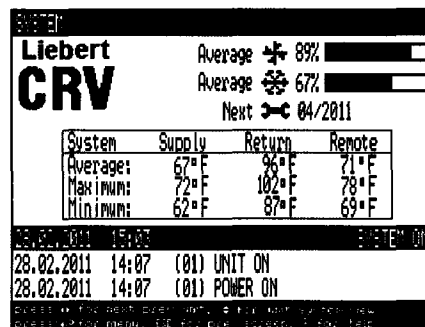
Status Screen providing historical temperature and humidity line graphs



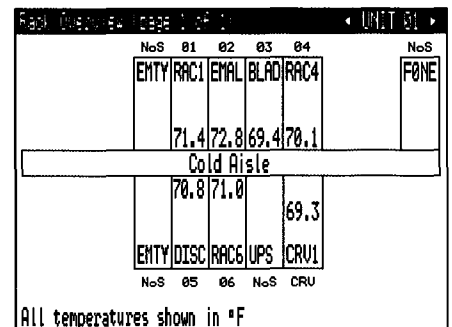
Status Screen providing bar graphs of the maximum temperature on each rack with a 2T sensor



Status Screen without 2T Rack Sensors



Provides the status of all the Liebert CRVs connected in a Unit-to-Unit network



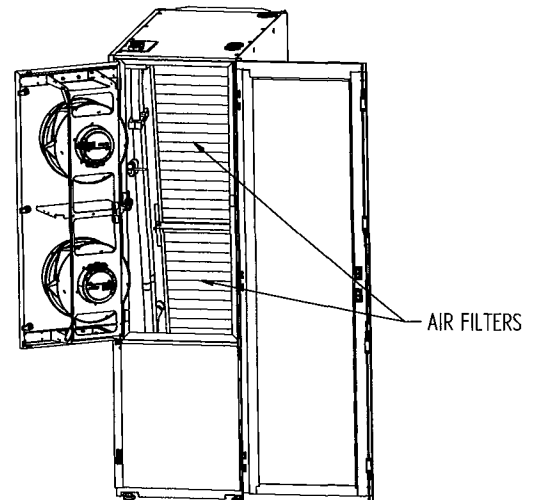
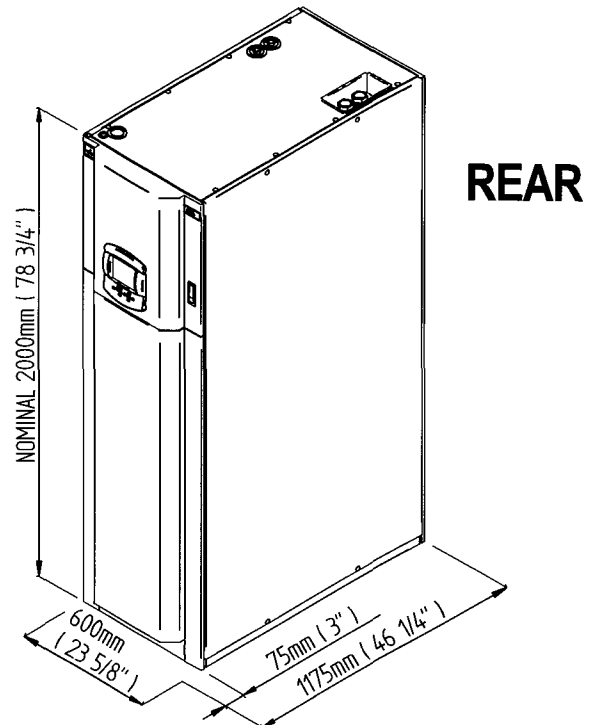
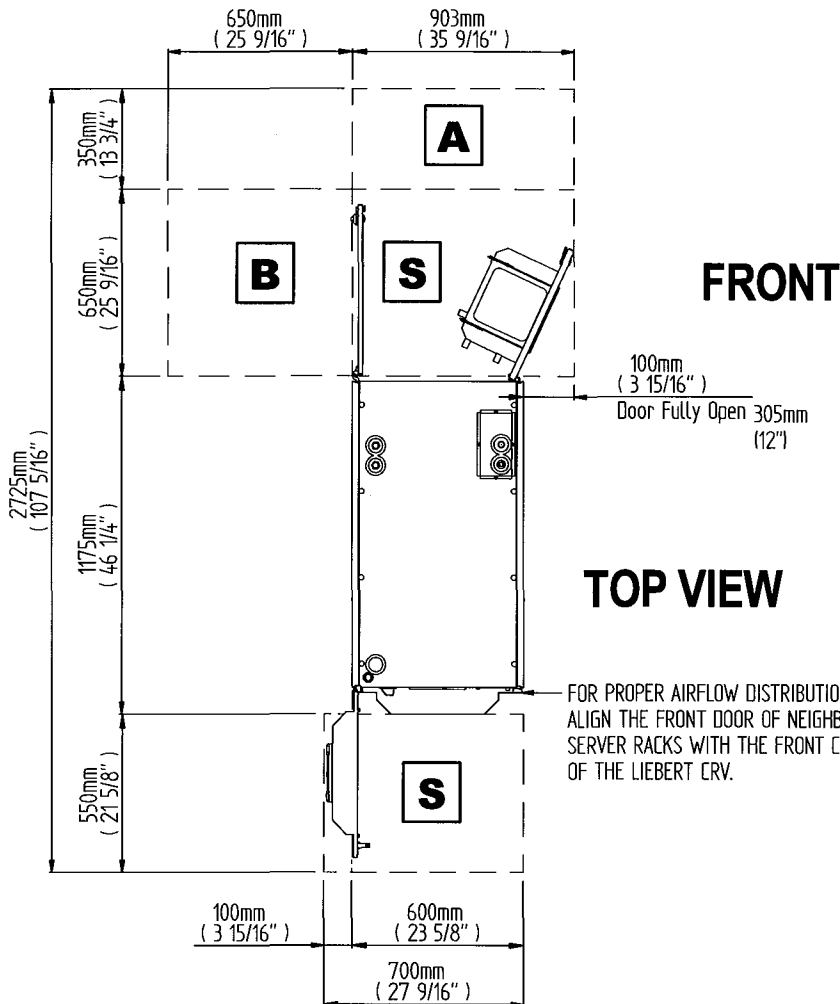
Top view of the IT equipment with 2T racks sensors attached surrounding the Liebert CRV

CABINET AND FLOOR PLANNING DIMENSIONAL DATA

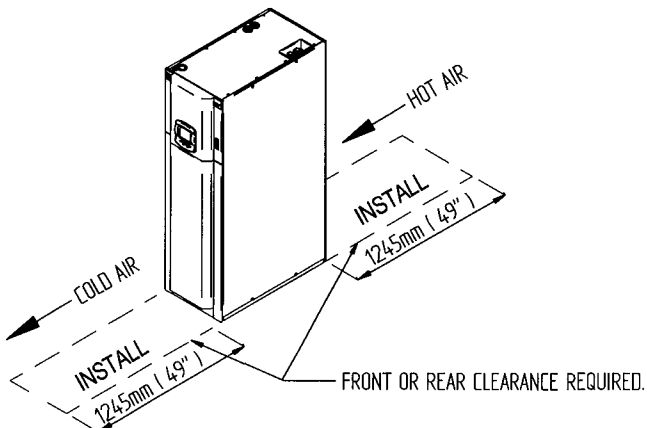
WATER-COOLED (W)

ACCESS REQUIRED TO SERVICE THE LIEBERT CRV UNIT WITHIN THE ROW

REAR SERVICE AREA IS S+B OR S+A WHEN B IS NOT AVAILABLE



ACCESS REQUIRED FOR INSTALLATION OF
THE LIEBERT CRV UNIT WITHIN THE ROW.

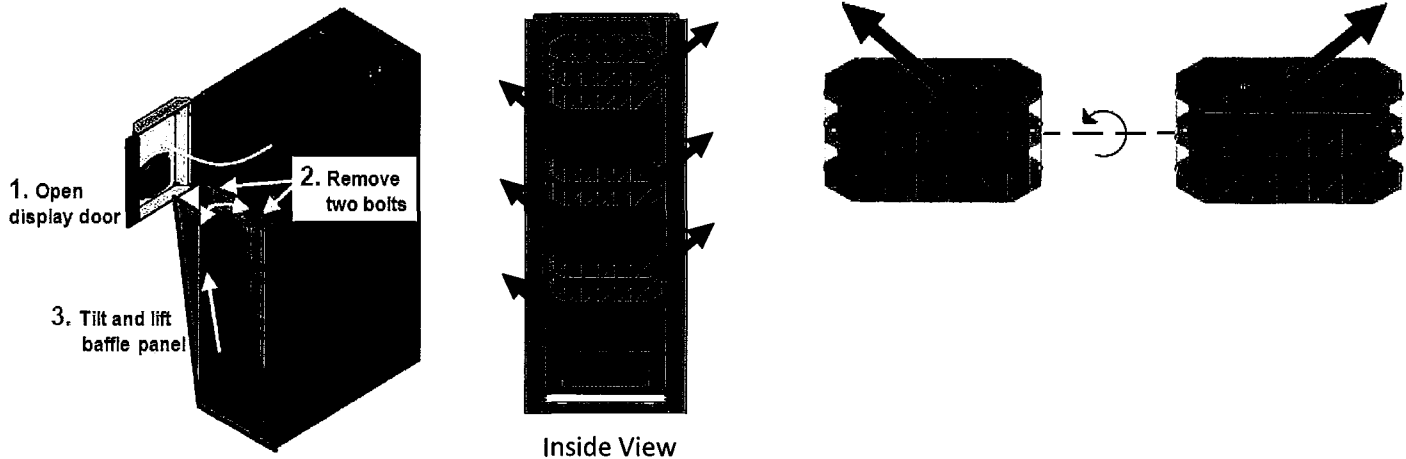


DRY WEIGHT $\pm 5\%$ (lb / kg)		
Model No.	AIR COOLED	WATER/GLYCOL
CR020R	739 / 335	772 / 350
CR035R	805 / 365	849 / 385
CHILLED WATER		
CR040R	728 / 330	

LIEBERT CRV

ADJUSTABLE SUPPLY AIR BAFFLES

The Liebert CRV has been equipped with an adjustable, modular supply air baffle system. The baffles should be adjusted at start-up to direct air to the racks the cooling unit is intended to condition. Ideally, these should be the same racks the cooling unit is pulling hot air from. The baffles can be readjusted at any time as cooling needs change. Make sure that the unit is shutdown, with input power removed, when performing any work on the unit.

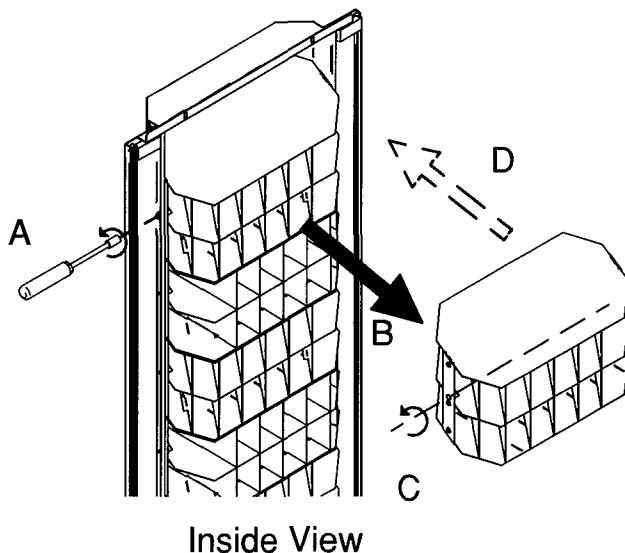


The Liebert CRV is shipped with the baffles in an alternating pattern as shown in the picture above.

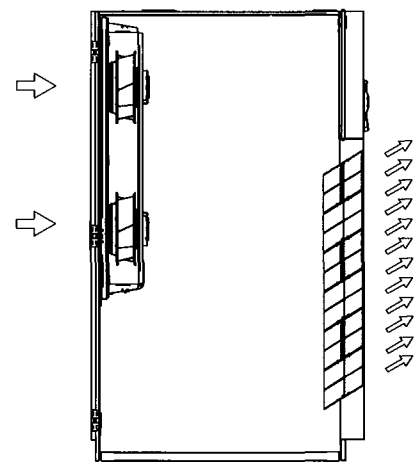
If a Liebert CRV is installed at the end of a row, all the baffles should blow air down the cold-aisle, toward the racks. If the cooling unit is installed in-between racks, the baffle segments can be alternated to distribute air both directions. The baffle segments at the top of the panel will direct more air than the segments at the bottom. The supply air will travel the furthest when all baffle segments are pointed in the same direction, left or right.

Instructions to adjust the baffle segments

- Remove the screws (1 on left and 1 on right side) of each baffle that must be changed ;
- Extract the baffle segment;
- Rotate baffle segment around the horizontal axis to adjust direction;
- Reassemble and tighten the screws.



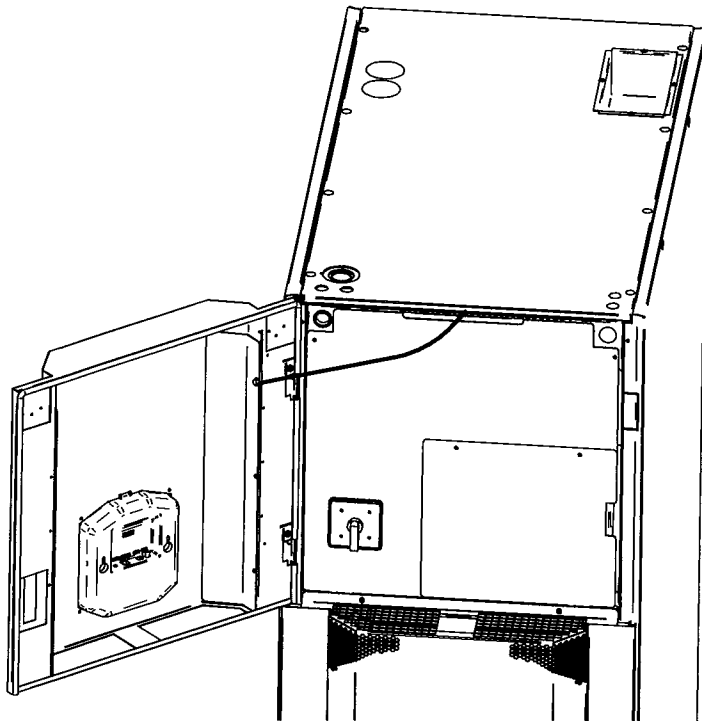
Left Side View



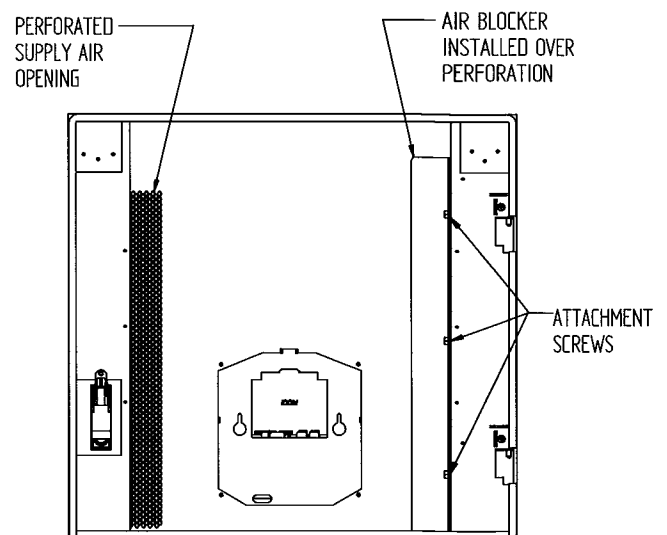
The angles of the vanes in each baffle segment have been optimized. For proper operation, the airflow direction must always point up.

LIEBERT CRV ADJUSTABLE SUPPLY AIR BLOCKER PLATE

A blocker plate located inside the display door can be adjusted to supply air left, right, or both directions. The blocker plate should be adjusted to direct air towards the racks the Liebert CRV is intended to condition. The blocker can be readjusted at any time as cooling needs change. Make sure that the unit is shutdown, with input power removed, when performing any work on the unit.



FRONT VIEW



INSIDE DISPLAY DOOR

The Liebert CRV is shipped with the air blocker plate installed on one side of the display door as shown in the above image. If a Liebert CRV is installed at the end of a row, the air blocker should be positioned to allow airflow down the cold-aisle, toward the racks. If the cooling unit is installed in-between racks, the blocker plate can be removed to allow air to discharge left and right.

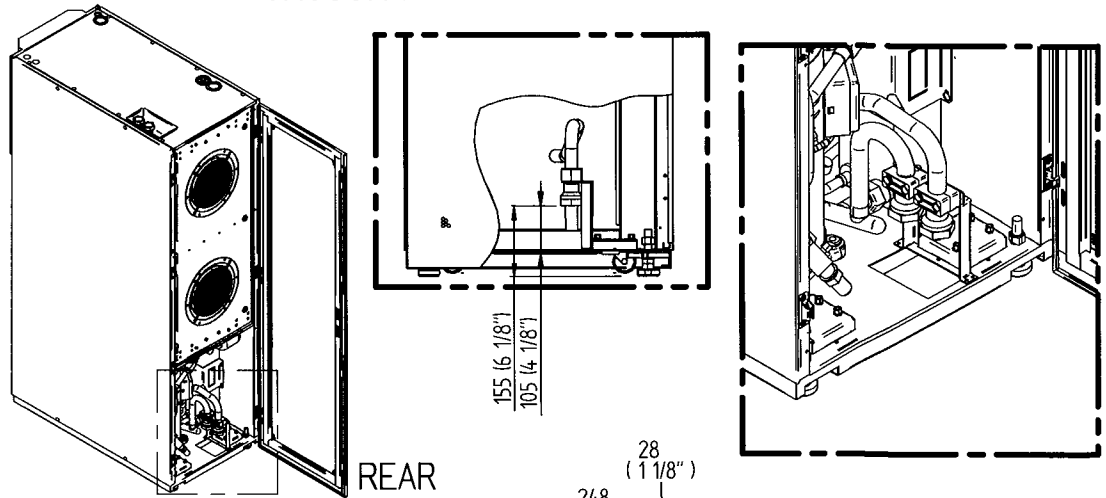
Instructions to adjust the air blocker

- A.) Remove the three screws that attach the blocker plate to the display door.
- B.) Reattach the blocker plate to the other side of the display door or remove entirely.

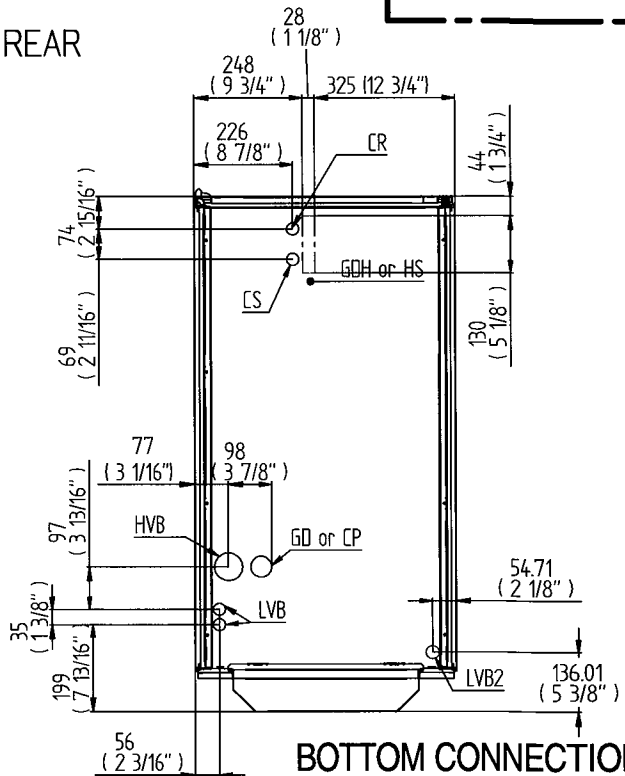
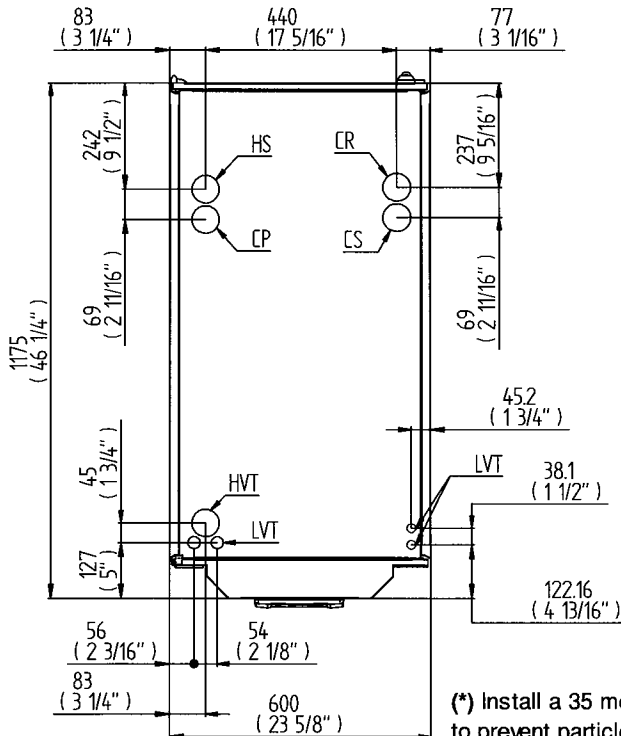
LIEBERT CRV CONNECTIONS: WATER MODELS

CR035RW

PIPING AND ELECTRICAL
CONNECTIONS AVAILABLE AT
THE TOP AND BOTTOM OF UNIT.



TOP CONNECTIONS



BOTTOM CONNECTIONS (possible with raised floor)

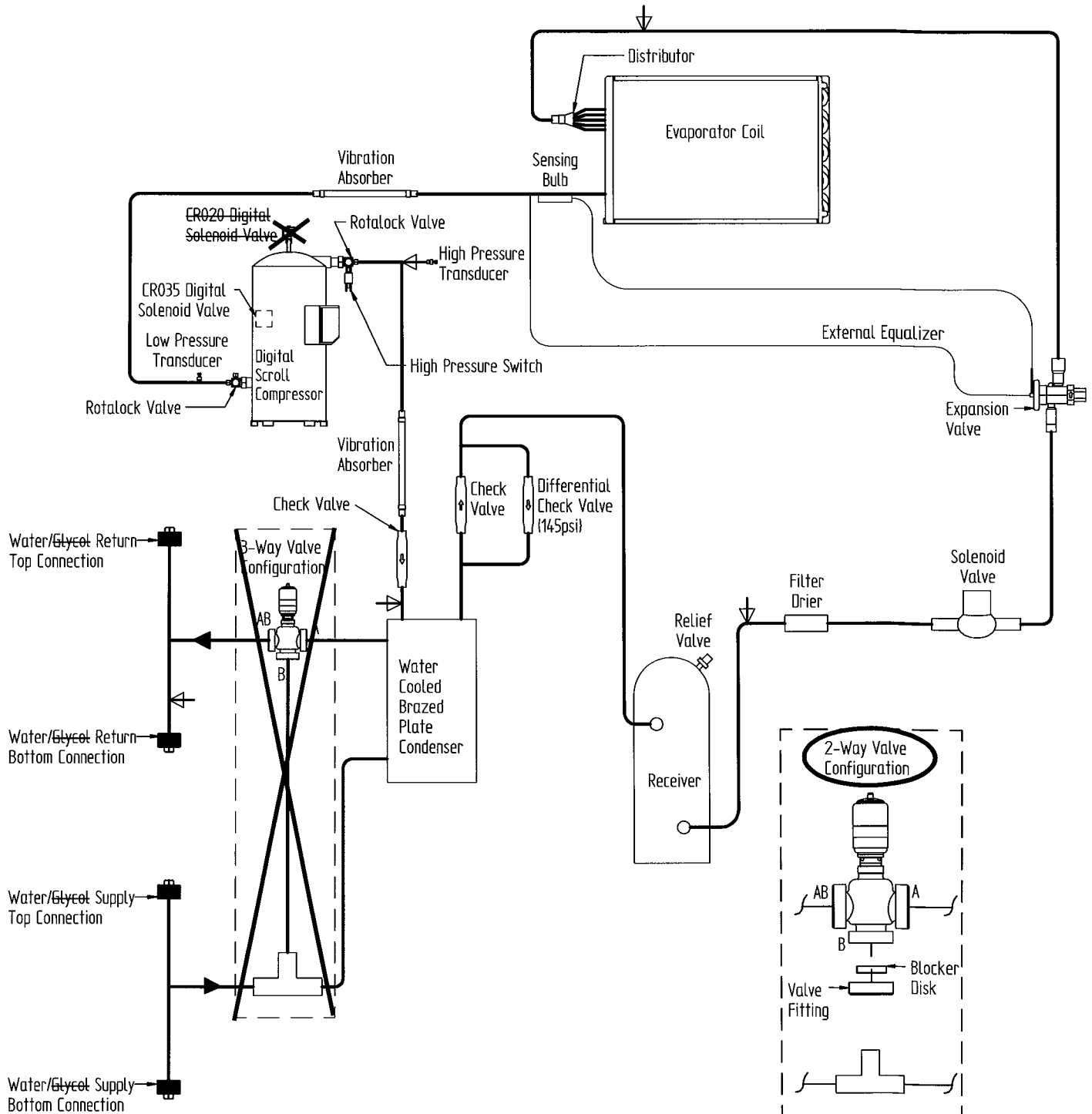
(*) Install a 35 mesh strainer, in an easily accessible location, on the Water/Glycol Supply to prevent particles from entering the heat exchanger. Strainer bypass valves are recommended to allow the strainer to be cleaned while maintaining flow to the cooling unit.

UNIT CONNECTIONS		CR20W (50Hz)	CR35W (50Hz)	CR20W (60Hz)	CR35W (60Hz)
CS	Water/Glycol Coolant Supply		32mm GAS F		1-1/4" FPT
CR	Water/Glycol Coolant Return		32mm GAS F		1-1/4" FPT
GD	Gravity Coil Pan Drain		20mm I.D.		1" MPT
GDH	Gravity Humidifier Drain		22mm I.D.		N/A
HS	Humidifier Supply		1/2" GAS F (top connection), 3/4" GAS F (bottom connection)		1/2" FPT (top connection), 1/4" Compression Fitting (bottom connection)
CP	Condensate Pump		1/2" GAS F		1/2" FPT
HVT	High Voltage Top Connection		Combination Knockout Hole Diameter 35mm (1-3/8"), 44.5mm (1-3/4") and 63.5mm (2-1/2")		Combination Knockout Hole Diameter 35mm (1-3/8"), 44.5mm (1-3/4") and 63.5mm (2-1/2")
HVB	High Voltage Bottom Entrance (feed through the base of the unit)		Hole Diameter 63.5mm (2-1/2")		Knockout Hole Diameter 63.5mm (2-1/2")
LVT	Low Voltage Top Connection		Hole Diameter 22mm (7/8") 2 places		Knockout Hole Diameter 22mm (7/8") 4 places
LVB	Low Voltage Bottom Entrance (feed through the base of the unit)		Hole Diameter 28mm (1-7/64") 2 places		Knockout Hole Diameter 27.8mm (1-3/32") 2 places
LVB2	Low Voltage Bottom Entrance (feed through the base of the unit)		---		Knockout Hole Diameter 44.5mm (1-3/4") 1 place

LIEBERT CRV

GENERAL ARRANGEMENT DIAGRAM

WATER-COOLED



- FACTORY REFRIGERANT PIPING
 SERVICE / SCHRADER (ACCESS) CONNECTION NO VALVE CORE
 SERVICE / SCHRADER (ACCESS) CONNECTION WITH VALVE CORE

NOTES:

1. SCHEMATIC REPRESENTATION SHOWN. DO NOT USE FOR SPECIFIC CONNECTION LOCATIONS.
2. INSTALL A 35 MESH STRAINER, IN AN EASILY ACCESSIBLE LOCATION, ON THE WATER/GLYCOL SUPPLY TO PREVENT PARTICLES FROM ENTERING THE HEAT EXCHANGER. STRAINER BYPASS VALVES ARE RECCOMENDED TO ALLOW THE STRAINER TO BE CLEANED WHILE MAINTAINING FLOW TO THE COOLING UNIT.

LIEBERT CRV

ELECTRICAL FIELD CONNECTIONS DESCRIPTIONS

60HZ ONLY

REFER TO PAGE 3 FOR CONNECTION LOCATIONS

STANDARD ELECTRICAL CONNECTIONS

- 1) **High voltage connection through the bottom of the electric panel** – 1-3/8" (34.9mm), 1-3/4" (44.5mm) & 2-1/2" (64mm) diameter concentric knockout.
- 2) **Low voltage connection through the bottom of the electric panel** - Quantity (2) 7/8" (22mm) diameter knockouts.
- 3) **High voltage connection through the top of the unit** – 1-3/8" (34.9mm), 1-3/4" (44.5mm) & 2-1/2" (64mm) diameter concentric knockout.
- 4) **Low voltage connection through the top of the unit** - Quantity (4) 7/8" (22mm) diameter knockouts.
- 5) **Three phase electrical service** – Connect to terminals on disconnect switch. Three phase service not by Liebert. (see page 2 for an important note regarding unit electrical service) ✓
- 6) **Factory Installed locking Disconnect Switch**
- 7) **Earth ground** - Terminal for field supplied earth grounding wire.
- 8) **Remote unit shutdown** - Replace existing jumper between terminals 37 & 38 with field supplied normally closed switch having a minimum 75VA, 24VAC rating. Use field supplied Class 1 wiring.
- 9) **Customer alarm inputs** - Terminals for field supplied, normally closed contacts, having a minimum 75VA, 24VAC rating, between terminals 3 & 50, 2 & 51, 5 & 55, or 3 & 56. Use field supplied Class 1 wiring. Terminal 3 & 56 are used for humidifier alarm when a humidifier is installed. The remaining terminals are available for customer alarm inputs, such as; smoke sensors and building fire alarms. ✓
- 10) **Common alarm** - On any alarm, normally open dry contact is closed across terminals 75 & 76 for remote indication. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
- 11) **Heat rejection interlock** - On any call for compressor operation, normally open dry contact is closed across terminals 70 & 71 to heat rejection equipment. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.

ELECTRICAL CONNECTIONS FOR ADDITIONAL FEATURES

- 12) **Condensate pump high water alarm** (available when optional pump is installed) - On pump high water indication, normally open dry contact is closed across terminals 88 & 89 for remote indication. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
- 13) **LiquiText shutdown and dry contact** (available when optional LiquiText sensor is installed) – On LiquiText activation, normally open dry contact is closed across terminals 58 & 59 for remote indication. The LiquiText sensor notifies iCOM of indication through terminals 60 & 61. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
- 14) ~~**Reheat and humidifier lockout** – Remote 24VAC required at terminals 82 & 83 for lockout of reheat and humidifier.~~
- 15) ~~**Additional Common Alarm** – On any alarm, one additional normally open dry contact is closed across terminals 94 & 95 for remote indication. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.~~

NOTE: Refer to specification sheet for total unit full load amps, wire size amps and max overcurrent protective device size.

LIEBERT CRV

ELECTRICAL FIELD CONNECTIONS DESCRIPTIONS

60HZ ONLY

Important note for 460V rated Liebert CRV units (CR***A)**

The electronically commutated (EC) motors included in the CRV unit are suitable for connection to an electrical service providing input power to the unit with 300V or less line to ground potential only.

Acceptable unit input electrical service for 460V (480V) nominal units

- 480V wye with solidly grounded neutral and 277V line to ground

Un-acceptable unit input electrical service for 460V (480V) nominal units

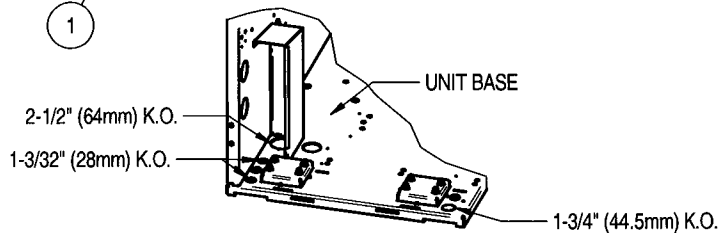
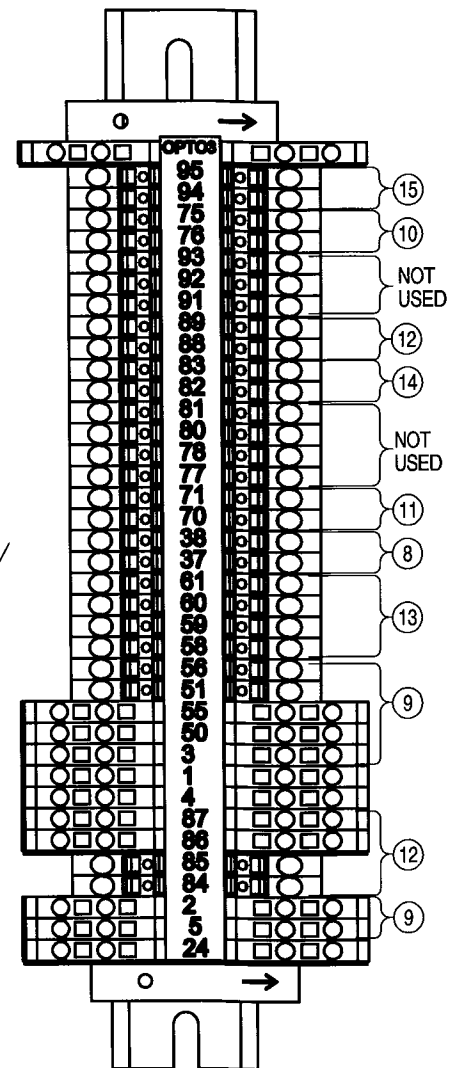
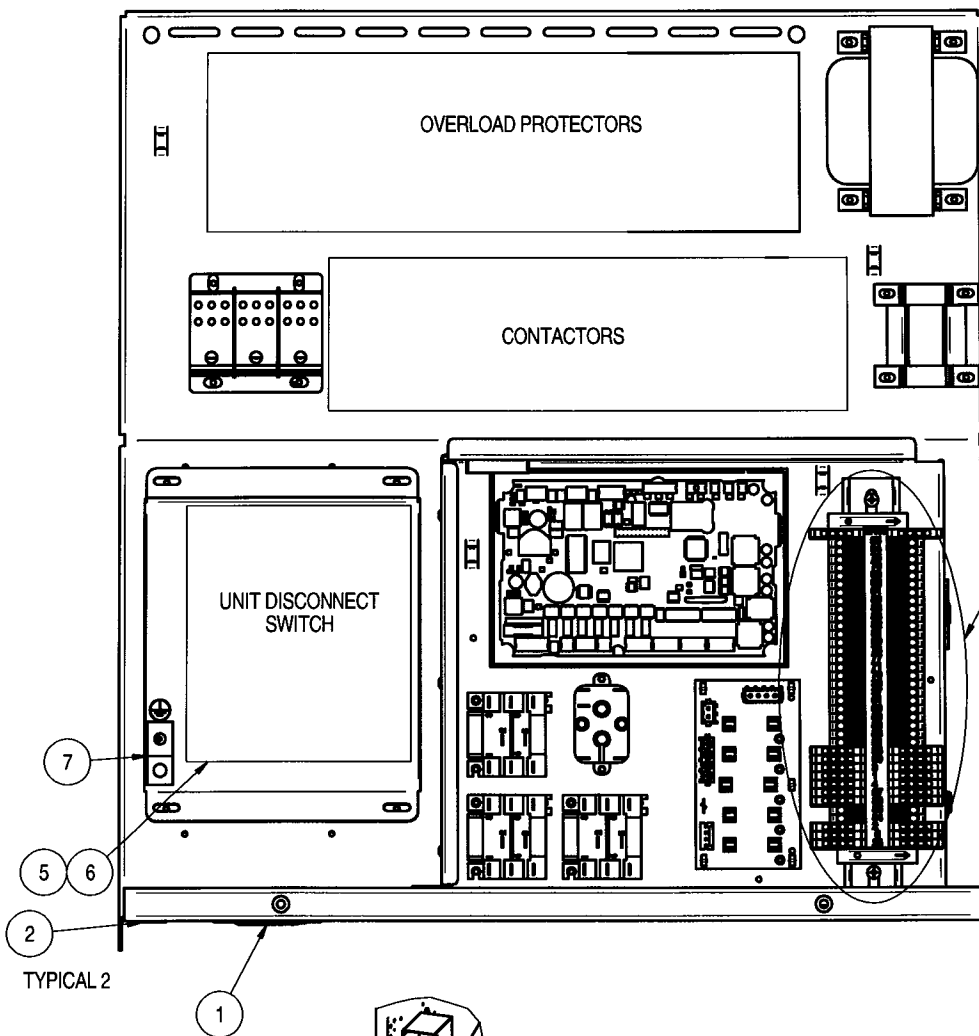
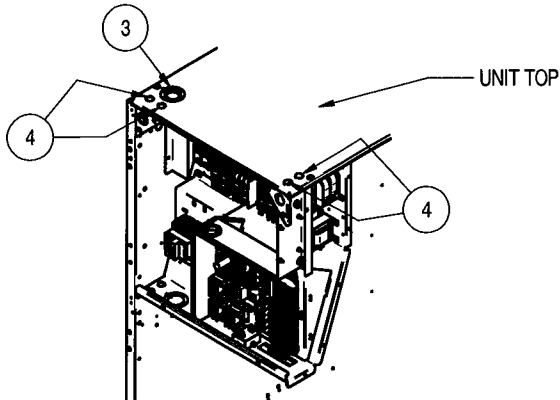
- wye with high resistance (or impedance) ground
- delta without ground or with floating ground
- delta with corner ground
- delta with grounded center tap

LIEBERT CRV

ELECTRICAL FIELD CONNECTIONS

60 Hz ONLY

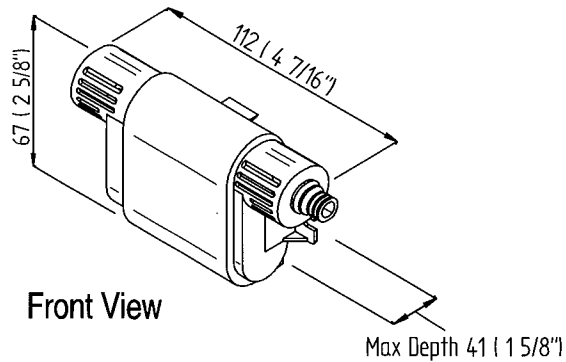
REFER TO PAGE 1 FOR CONNECTION DESCRIPTIONS



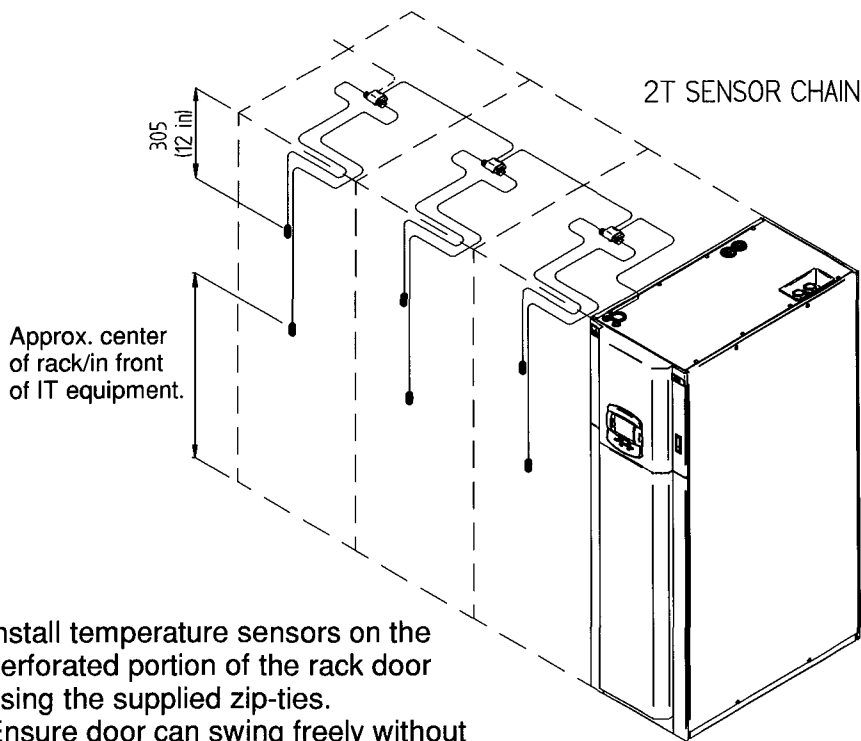
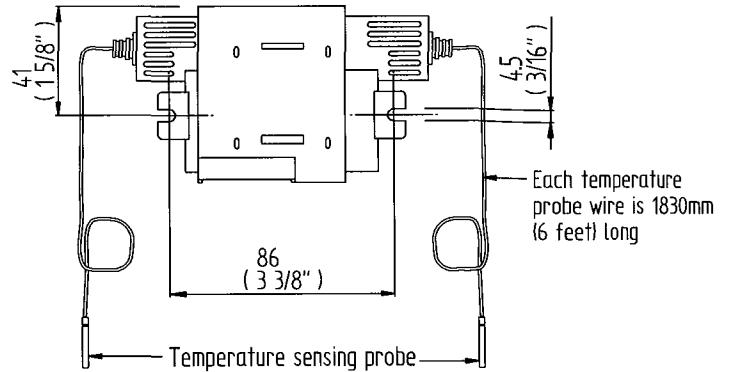
LIEBERT CRV

2T RACK TEMPERATURE SENSOR CONNECTIONS

2T Sensor

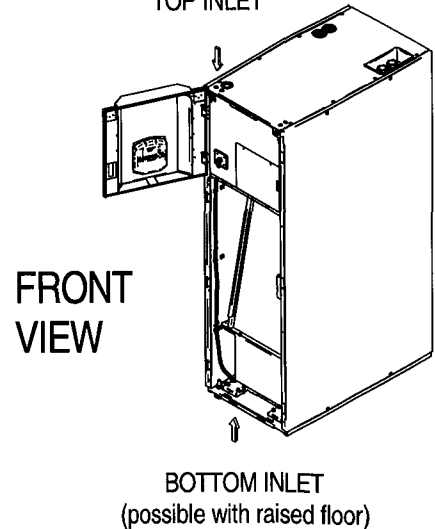


Back View

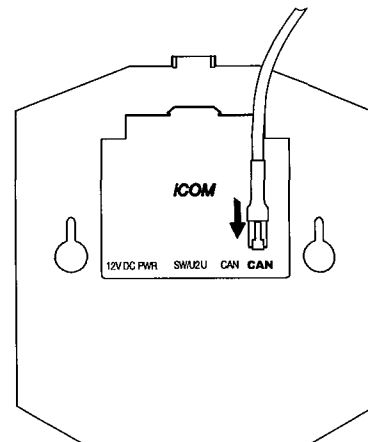
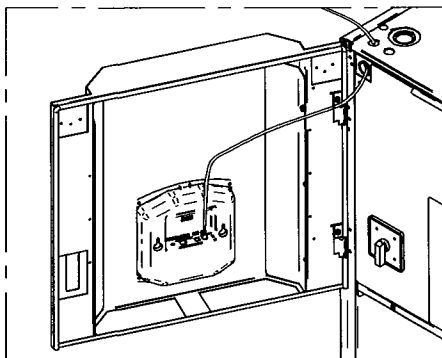


Install temperature sensors on the perforated portion of the rack door using the supplied zip-ties. Ensure door can swing freely without binding cables.

Cable Connection Entry
TOP INLET



FIRST SENSOR CABLE CONNECTION

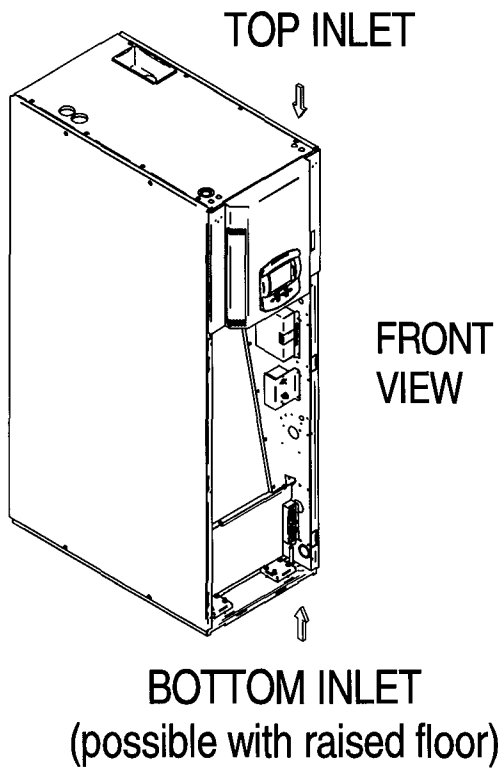


Insert the cable in either "CAN" socket on the back of the display.

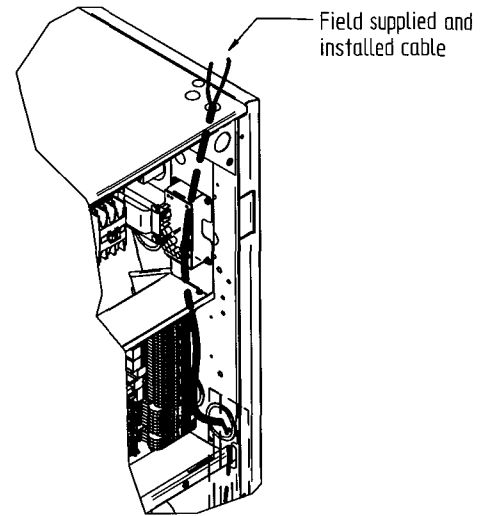
LIEBERT CRV

INTELLISLOT CABLE CONNECTION PATHS

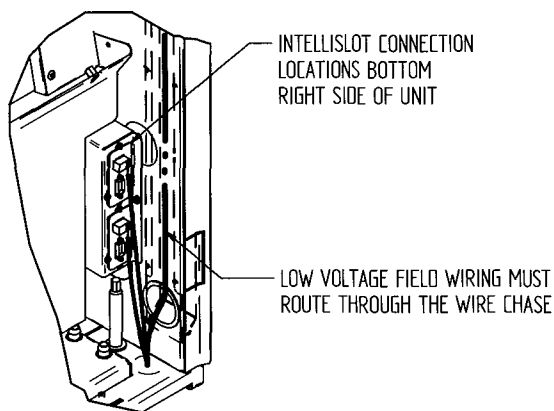
Cable Connection Entry



TOP INLET PATH



BOTTOM INLET PATH (possible with raised floor)



Notes:

1. All wiring connections must be made per local codes.

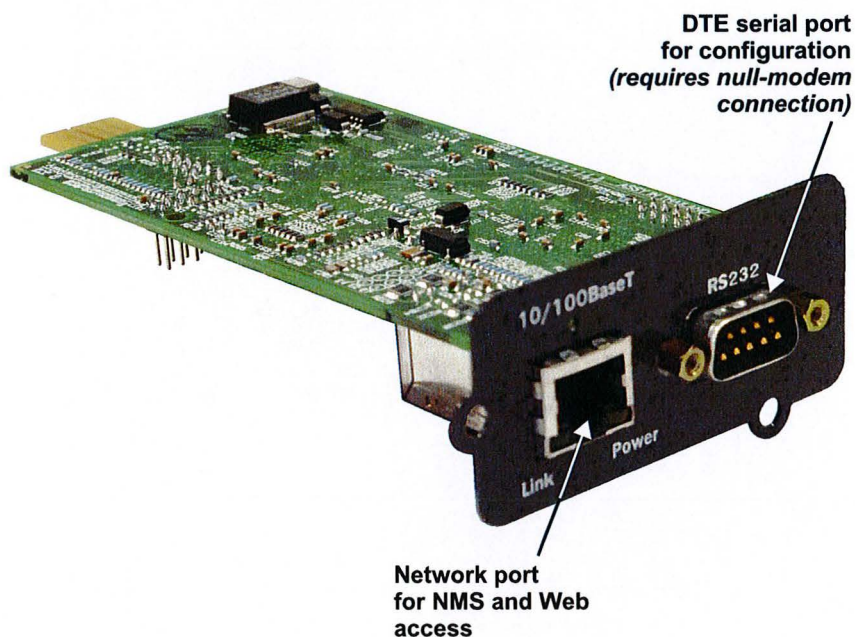
LIEBERT® INTELLISLOT® WEB CARDS

LIEBERT INTELLISLOT WEB CARD
LIEBERT INTELLISLOT WEB CARD-LB
LIEBERT INTELLISLOT WEB CARD-LBDS
LIEBERT INTELLISLOT WEB CARD NXL™
LIEBERT INTELLISLOT WEB CARD-X

LIEBERT INTELLISLOT WEB CARD-L
LIEBERT INTELLISLOT WEB CARD-IPBML MODBUS IP / BACNET IP
~~LIEBERT INTELLISLOT WEB CARD-S~~
LIEBERT INTELLISLOT WEB CARD-IPBMS MODBUS IP
LIEBERT INTELLISLOT WEB CARD-IPBMX MODBUS IP

Note: Liebert IntelliSlot Web cards are a form, fit and function replacement for the existing Liebert OpenComms™ Web cards.

Product Specification/Installation Sheet



Description

The Liebert IntelliSlot Web Card family delivers enhanced communications and control to Liebert UPS, AC Power and Precision Cooling systems.

Liebert IntelliSlot Web cards bring SNMP, Telnet, Modbus IP and BACnet IP and Web-management capability to many models of Emerson Network Power's line of Liebert UPS, power and cooling equipment. See **Table 1** for equipment supported and **Table 2** for communication protocols supported.

The cards employ an Ethernet network to monitor and manage a wide range of operating parameters, alarms and notifications.

Additional Features

- SNMP v1, v2c with MIB-II support
- SNMP v3 (for IS-WEBCARD HID9 only)
- HTTP/HTTPS 1.1
- Telnet
- BootP, DHCP per RFC2131/2132
- Secure Sockets (SSL)
- Remote firmware updates via HTTP

Compatibility With Other Emerson Products and Communication Protocols

The Liebert IntelliSlot Web Card family, formerly the OpenComms line, includes:

Table 1 Compatibility With Liebert equipment

Liebert IntelliSlot Card	Part Number	Compatible with:
Liebert IntelliSlot Web Card	IS-WEBCARD	• Liebert GXT™ • Liebert GXT 6kVA&10kVA • Liebert GXT3™ • Liebert GXT2U™ • Liebert Nfinity® • Liebert PowerSure PSI™ (prior to July 2008)
Liebert IntelliSlot Web Card-LB	IS-WEBLB	• Liebert Hinet™ • Liebert NX™
Liebert IntelliSlot Web Card-LBDS	IS-WEBLBDS	<i>Units with Liebert iCOM® Firmware prior to PA1.04.033.STD:</i> • Liebert Challenger 3000™ • Liebert CW™ • Liebert XDF™ • Liebert Challenger ITR™ • Liebert DS™
Liebert IntelliSlot Web Card-L Liebert IntelliSlot Web Card-IPBML Modbus IP / BACnet IP	IS-WEBL IS-IPBML	• Liebert APM™ (Modbus IP only) • Liebert CRV™ • Liebert HPC™ • Liebert HPM™ • Liebert XDP™ with Liebert iCOM <i>Units with Liebert iCOM Firmware PA1.04.033.STD or later:</i> • Liebert Challenger 3000 • Liebert Deluxe System/3™ • Liebert CW • Liebert DS • Liebert PeX™ • Liebert XDC™ with Liebert iCOM
Liebert IntelliSlot Web Card-S Liebert IntelliSlot Web Card-IPBMS Modbus IP	IS-WEBS IS-IPBMS	<i>Units with Velocity v4 control only:</i> • Liebert FDC™ • Liebert PPC™ • Liebert FPC™ • Liebert RDC™ • Liebert RX™
IntelliSlot Web Card-X IntelliSlot Web Card-IPBMX Modbus IP	IS-WEBX IS-IPBMX	• Liebert NXL™ (SA, SR, SN, MM, CD)

The Web cards support the following protocols:

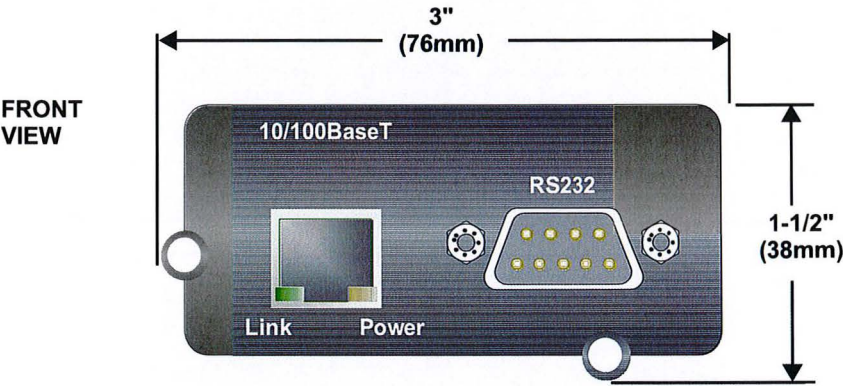
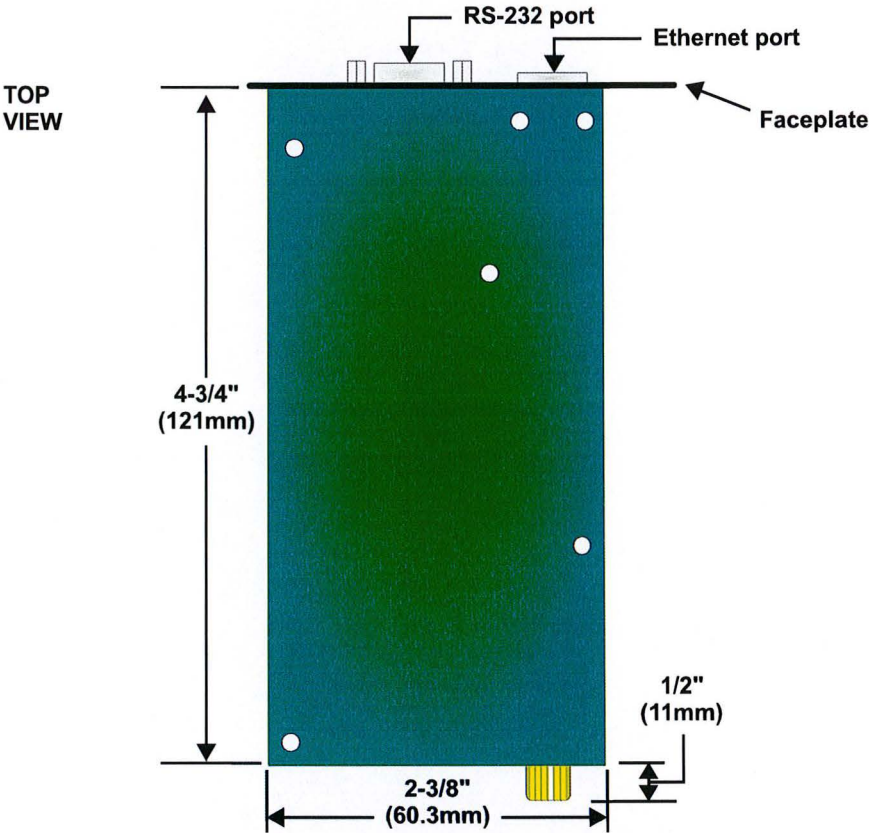
Table 2 Liebert IntelliSlot card communication protocols

Liebert IntelliSlot Card	Part Number	Communication Protocol								
		SNMP v1,v2c	SNMP v3	HTTP	HTTPS	EMAIL	SMS	TELNET	MODBUS IP/ BACNET IP	LIEBERT PROTOCOL
Liebert IntelliSlot Web Card	IS-WEBCARD	✓	✓*	✓	✓	✓	✓	✓	—	—
Liebert IntelliSlot Web Card-LB	IS-WEBLB	✓	—	✓	✓	✓	✓	✓	—	—
Liebert IntelliSlot Web Card-LBDS	IS-WEBLBDS	✓	—	✓	—	—	—	✓	—	—
Liebert IntelliSlot Web Card-L	IS-WEBL	✓	—	✓	✓	✓	✓	✓	—	✓
Liebert IntelliSlot Web Card-S	IS-WEBS	✓	—	✓	✓	✓	✓	✓	—	✓
Liebert IntelliSlot Web Card-X	IS-WEBX	✓	—	✓	✓	✓	✓	✓	—	✓
Liebert IntelliSlot Web Card-IPBML Modbus IP / BACnet IP	IS-IPBML	—	—	✓	✓	—	—	✓	✓ Both	✓
Liebert IntelliSlot Web Card-IPBMS Modbus IP	IS-IPBMS	—	—	✓	✓	—	—	✓	✓ Modbus IP only	✓
Liebert IntelliSlot Web Card-IPBMX	IS-IPBMX	—	—	✓	✓	—	—	✓	✓ Modbus IP only	✓

* SNMP v3 available for Liebert GXT3 only

** Modbus IP only for IS-IPBMS and IS-IPBMX

Dimensions



Specifications

Power Requirements	DC Inputs	9 to 12VDC, 3.6W maximum
	Power Consumption	6VA maximum (1.75W)
Dimensions - W x D x H: in. (mm)		3 x 5-1/4 x 1-1/2 (76 x 134 x 38)
Weight	Net - oz. (kg)	7 (0.2)
	Shipping - lb. (kg)	1.3 (0.6)
Ambient Operating Environment, °F (°C)		32 to 131 (0 to 55); 10% to 90% RH (non-condensing)
Ambient Storage Temperature, °F (°C)		-4 to 140 (-20 to 60)
Protection		SELV Isolated User Connections, Watchdog Timer Circuitry
Communication Ports	Service Terminal (RS-232)	DB9F, DTE
	Ethernet Communications	RJ45

Wiring Specifications

Connection	Supported Wire Type	Maximum Wire Length
RS-232	Null Modem Cable	50 ft. (15.3m)
DB-9F Connector	DTE Null Modem Cable	50 ft. (15.3m)
RJ-45 Connector	Standard Category 5 Cable	328 ft. (100m)

Liebert Corporation

1050 Dearborn Drive Telephone: 1-800-877-9222
P.O. Box 29186 Facsimile: 1-614-841-6022
Columbus, OH 43229 www.liebert.com



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SL-29115_REV11_03-12

LIEBERT LIQUI-TECT® 410

Point Leak Detection Sensor

Product Specification Sheet

Note 7 TM-603

Description

The Liebert 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:



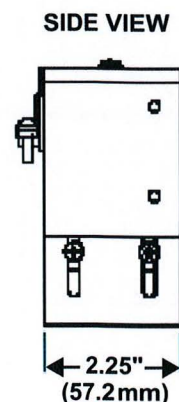
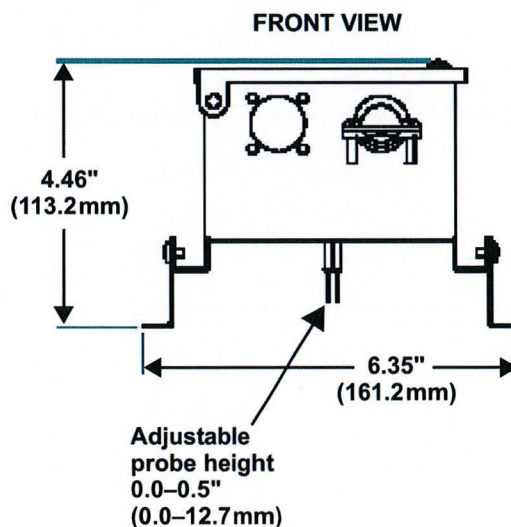
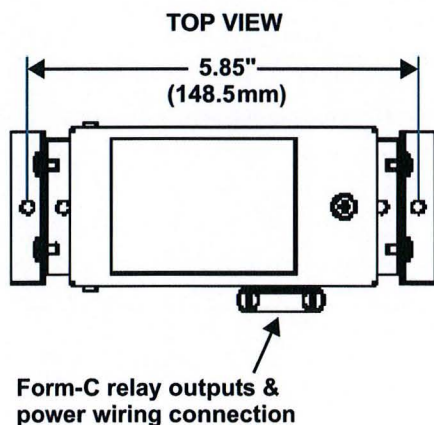
Applications

- Glycol, Chilled Water Cooling
- Humidification Feed Water Piping
- Condensate Pumps and Drains
- Unit and Ceiling Auxiliary Drip Pans
- Overhead Piping Troughs

Locations

- Large-Scale Network Control Centers
- Data Centers
- Server Rooms - Closets
- Unattended Remote Shelters
- Mechanical Equipment Rooms
- Sensitive Areas With Overhead Piping
- Industrial Process Control Rooms

Dimensions - Top, Front & Side Views

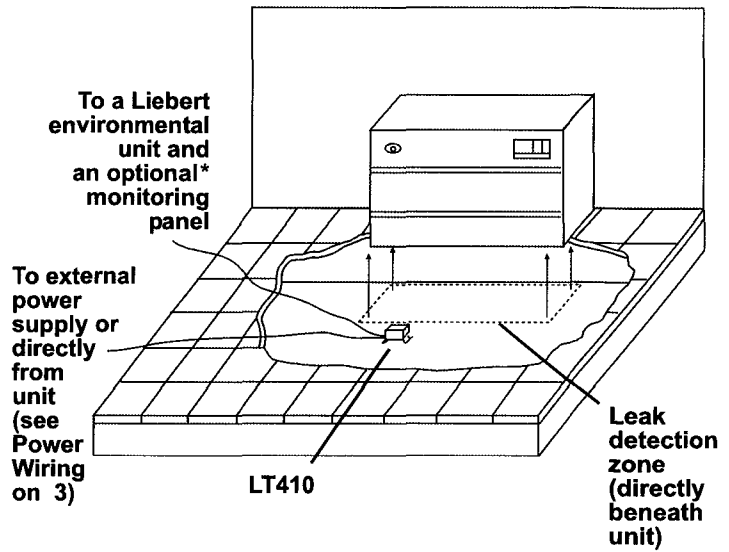


Shipping weight: 2 lbs (0.9 kg)
Mounting holes: #8 screws

Specifications

Liqui-TECT 410 Sensor	
Power requirements	24 VAC 100 mA, 50/60 Hz, 3 VA (max.)
Dimensions, in. (mm) W x D x H	6.35" x 2.25" x 4.46" (161.2 x 57.2 x 113.2)
Weight (assembled)	2.0 lb. (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

Placement on Subfloor Under Cooling Support Equipment

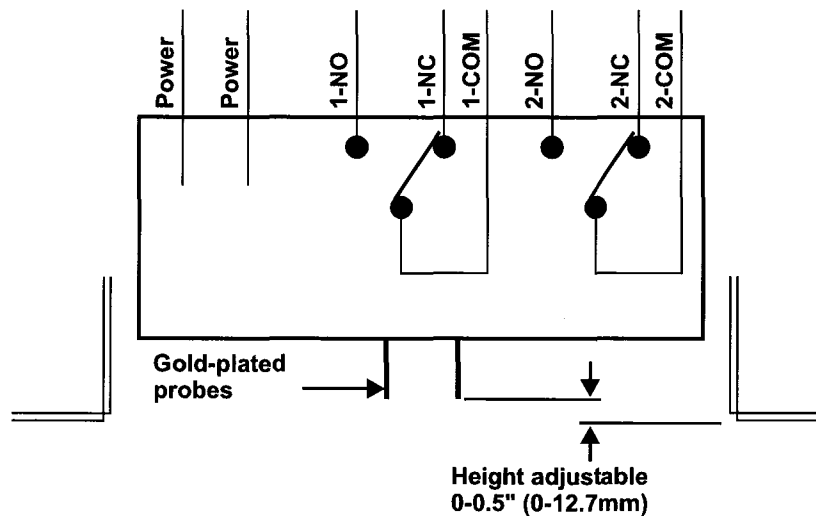


* Output connections to external alarm monitoring panels such as the Liebert contact closure alarm panels

Wiring Interconnections

(Circuits shown in powered, non-alarm state)

Red Wires	Orange Wires	Yellow Wires
24 V, AC/DC	Alarm Contact Rating	Alarm Contact Rating
@ 0.10A, 50-60 Hz, DC	24 VAC @ 3A	24 VAC @ 3A
Class 2 Circuit Only	Class 2 Circuit Only	Class 2 Circuit Only



NOTE: All power and alarm connections Class 2 circuits only

Power Wiring

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

Figure 1 24V from Liebert environmental units to LT410

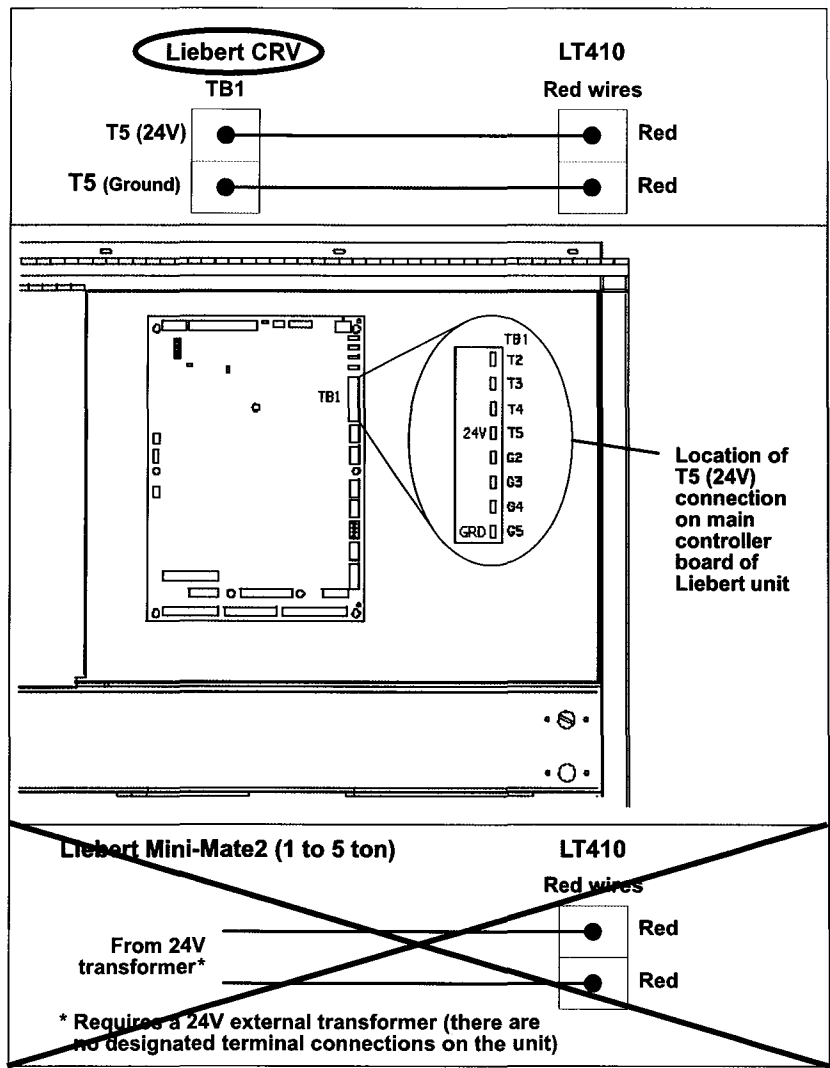
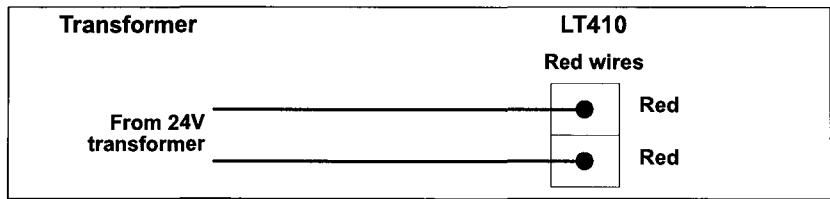


Figure 2 24V from transformer to LT410



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

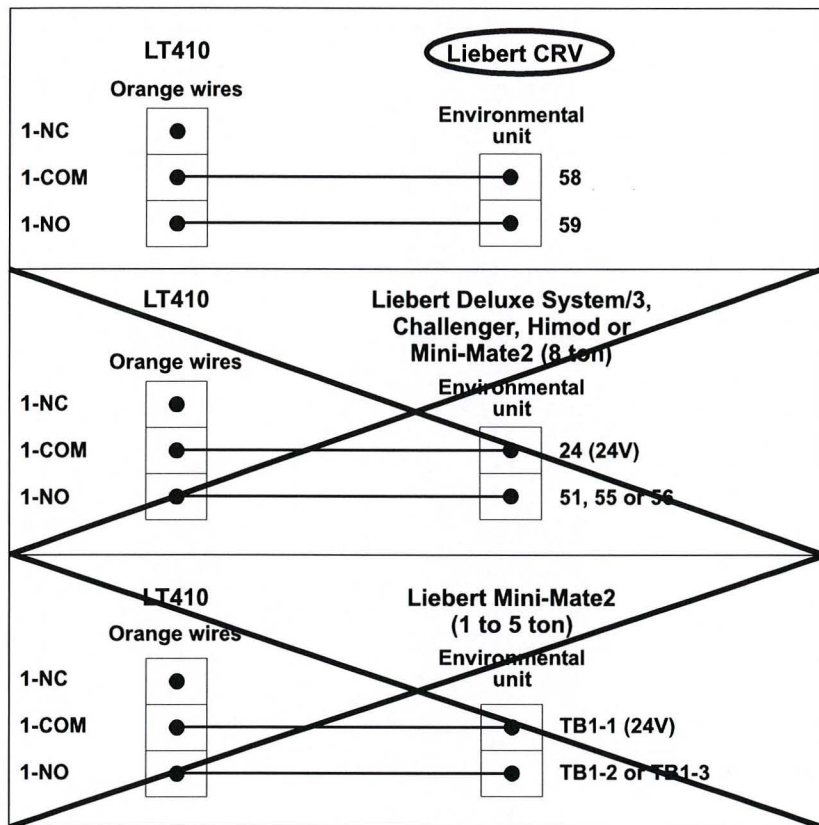
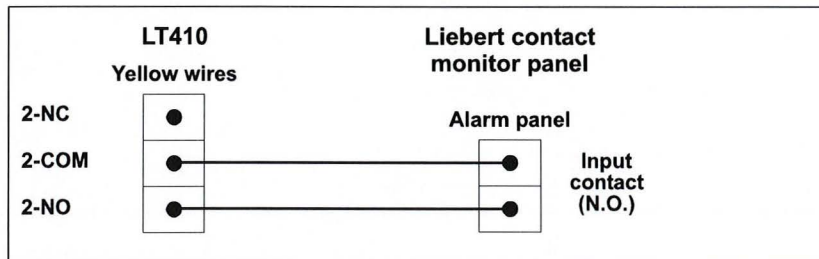


Figure 4 LT410 to Liebert contact monitor panel



Ordering Information

Product Number	Quantity	Description
LT410	4	Point Leak Detection Sensor



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www.liebert.com



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SL-31050_REV0_06-07