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<td>Submitted By</td>
<td>JEFF BILSLAND</td>
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Represented by:

DPT

8105 N. University, Peoria, IL 61615
Phone: (309) 692-2685  Fax: (309) 692-2714
Electrical Supply Requirements
Liebert PDX/PCW Unit
PX029UA1C8A198

Configuration Number: PX029UA1C8HH2801P0U0PA198
208 Voltage, 3 Phase, 60 Hz

FLA: 73.9
WSA: 90.1
OPD: 100

65,000 Amp Short Circuit Rating
Locking Disconnect

Indoor Net Capacity Data

Total Capacity: 105,900 Btuh (31.0 kW)
Sensible Capacity: 91,400 Btuh (26.8 kW)
75°F (23.9°C) drybulb, 45% Relative Humidity

Liebert MC Condenser
Model Number: MCM040E1YDG593
Quantity: 1

208-230 Voltage, 3 Phase, 60 Hz
FLA: 2.3
WSA: 3.2
OPD:

LIEBERT PDX/PCW DETAILED DESCRIPTION
Indoor Cabinet

Air Flow Configuration :
- Upflow
- Front Air Return

Color: RAL 7021, Black Gray Matte

Indoor Evaporator Section

Cooling System Type :
- Air-Cooled

Refrigerant and Circuits
- R-410A Refrigerant, Field Supplied
• Single Refrigerant Circuit

**Compressor**

• Digital Scroll
• Thermal Expansion Valve
• Crankcase Heater
• Compressor Sound Jacket

**Fan And Motor**

• EC Fan
• Fan Motor HP: 4.15
• Air Volume: Standard CFM
• External Static Pressure: 0.2 Inches of Water

**Filter**

• Filter Rating: MERV 8 per ASHRAE 52.2-2007
• Filter Clog Alarm

**Humidifier**

• Infrared Humidifier
• Capacity: 7.7 lb/h (3.5 kg/h)

**Reheat**

• Electric Reheat
• Capacity: 51.6 kBtuh (15.1 kW)

**Control,Sensors And Monitoring**

• Integrated Controls and Color Touch Screen User Interface
• Display Language is English
• Supply Air Sensor
• Common Alarm Contact

**Optional Equipment**

• Dual-float condensate pump
• One Remote Shut Down Contact
• Three Alarm Contacts
• One (1) Liebert IntelliSlot Unity Card (IS-UNITY-DP) per Unit
CONDENSATE PUMP
The dual-float condensate pump is complete with integral primary and secondary float switches, pump, motor assembly and reservoir. The secondary float sends a signal to the local alarm and shut down the unit upon high water condition.

LOCKING DISCONNECT SWITCH
A manual fused disconnect switch is mounted in the electrical panel and be capable of disrupting the flow of power to the unit operation from the outside of the unit. The electric panel compartment is accessible only with the switch in the Off position. The electric panel is conveniently located behind the Liebert iCOM® display door for quick access. Main fuses are located within disconnect.

SHORT CIRCUIT CURRENT RATING (SCCR)
All 60 Hz units are manufactured with components necessary to provide a 65,000 Amp RMS Short Circuit Current Rating for the entire unit.

CABINET DESCRIPTION
The exterior panels are 20 gauge galvanized steel and powder coated with RAL 7021 Black Gray Matte color paint to protect against corrosion. The exterior panels are insulated with 1/2" to 1" (12.7 to 25.4mm) 1-1/2 lb(0.68 kg) insulation. Front and side panels are captive, 1/4 turn fasteners. The cabinet is designed so that all components are serviceable and removable using the front and right sides of the unit. The front door can be opened for service without shutting off the system.

INDOOR EVAPORATOR SECTION

SYSTEM TYPE
Air-Cooled
Single refrigeration circuit including a liquid line filter drier, a refrigerant sight glass with moisture indicator, an externally equalized expansion valve, pressure safety switches, and a liquid line solenoid valve.

REFRIGERANT
The system is designed for use with R410A refrigerant, which meets the U.S. Clean Air Act for phaseout of HCFC refrigerants.

COMPRRESSOR
Digital Scroll
The compressor is scroll-type with variable capacity operation from 20-100%, commonly known as a Digital Scroll. The compressor solenoid valve will unload the compressor to provide variable capacity operation. The controller engages and disengages the compressor on a 15 second control cycle. Includes a suction gas cooled motor, vibration isolators, internal thermal overloads, automatic reset high pressure switch, rotalock service valves, low pressure pressure transducer, Crankcase heater, internal centrifugal oil pump and an operating speed of 3500 RPM at 60Hz. The Crankcase heater and a discharge check valve is provided for additional system protection from refrigerant migration during Off cycles.

Compressor Sound Jacket
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 lb/ft3 density compressor sound jacket that encloses the compressor. All sound deadening material is non-shedding.

Thermal Expansion Valve
A thermal expansion valve is factory piped and wired to the refrigerant circuit.

COIL DESCRIPTION
The direct expansion tilted-slab cooling coil is constructed of copper tubes and hydrophilic coated aluminum fins. The hydrophilic coating significantly improves the speed of condensate drainage from the fins and provides superior water carryover resistance. One stainless steel condensate drain pan is provided.

FAN AND MOTOR
EC FAN
The unit is equipped with one plug fan: direct driven with backward curved blades and Electronically Commutated DC motor; commonly referred to as EC plug fan. The fan speed is variable and automatically regulated by the Liebert iCOM®
control through all modes of operation. The fan has a dedicated motor, fault monitoring circuitry and speed controller which provides a level of redundancy. Impeller is made of steel and factory balanced. This design uses less energy than standard centrifugal blowers by lowering motor kW. The EC Plug Fan uses 10-30% less energy on average than standard AC motor. The EC Plug Fan is located within the unit.

**AIR FLOW CONFIGURATION**

Upflow with Front Air Return
The supply air exits from the top of the unit. The EC plug fan is mounted in the top of the unit
The return air enters through the front of the unit

**FILTER**

Filter Rating: MERV 8 per ASHRAE 52.2
Includes a Filter Clog Alarm

**HUMIDIFIER**

Infrared Humidifiers
The humidifier is of the infrared type consisting of high intensity quartz lamps mounted above and out of the water supply. The evaporator pan is stainless steel and arranged to be serviceable without disconnecting water supply lines, drain lines or electrical connections. The complete humidifier section is pre-piped ready for final connection. The infrared humidification system uses bypass air to prevent over-humidification of the controlled space. The auto flush system automatically flush deposits from the humidifier pan. The system is field adjustable to change the cycle time to suit local water conditions. An automatic water supply system continuously maintains water level and an automated flush system greatly reduces mineral precipitation. A flow control valve permits operation at water pressures between 5 and 150 PSIG (34.5 and 1034 kPa). A Y-strainer is included.

**REHEAT**

2-Stage Electric Reheat
The low-watt density, 304/304, stainless steel, finned-tubular electric reheat coils is capable of maintaining room dry bulb conditions when the system is calling for dehumidification. The reheat section includes UL/CSA recognized safety switches to protect the system from overheating.

**CONTROL, SENSOR AND MONITORING**

**LIEBERT iCOM**

The Liebert iCOM unit control is factory-set for Intelligent Control which uses 'fuzzy logic' and 'expert systems' methods. Proportional and Tunable PID are user selectable options. Internal unit component control includes the following: System Auto Restart, Sequential Load Activation, Hot Water Flush Cycles (if hot water coil is present), and Predictive Humidity Control. The control system and electronic circuitry is provided with self-diagnostics to aid in troubleshooting. The microcontroller board is diagnosed and reported as pass/not pass. Control inputs are indicated as on or off at the front monitor panel. Control outputs are able to be turned On or Off from the front monitor panel without using jumpers or a service terminal.

The display and housing are viewable while the unit panels are open or closed. The display is organized into three main sections: User Menus, Service Menus and Advanced Menus. The system displays user menus for: active alarms, event log, graphic data, unit view/status overview (including the monitoring of room conditions, operational status in % of each function, date and time), total run hours, various sensors, display setup, and service contacts. A password is required to make system changes within the service or advanced menus.

The Liebert iCOM control can activate an audible and visual alarm in event of any of the following conditions: High/Low Temperature, High/Low Humidity, Change Filters, Loss of Air Flow or Power, and four separate Custom Alarms.

Unit-to-Unit communication with other LiebertPDXPCW and two IntelliSlot communication card housings are included as standard.

**iCOM – 9 INCH COLOR TOUCHSCREEN DISPLAY**

The standard user interface is the 9" Color Touchscreen Display which presents system information and allows all parameters to be viewed and adjusted. It features a resistive touchscreen for navigation and LED color indicating operational status.
SUPPLY AIR SENSOR
A factory installed and commissioned supply air sensor ships with the unit for sensor location in the field by others. The sensor is terminated on the Liebert iCOM unit controller terminal strip and the associated cable wiring is coiled within the unit for shipment. It is the responsibility of others to uncoil and locate the sensor in accordance with acceptable best practices and any local codes.

COMMON ALARM CONTACT
The common alarm contacts provide the customer with a set of normally open contacts for remote indication of unit alarms.

COMMUNICATION CARDS
LIEBERT INTELLISLOT® UNITY-DP™ CARD
The Liebert IntelliSlot Unity Card (IS-UNITY-DP) provides ground fault isolated RS-485 Modbus, BACnet IP and Modbus IP network connectivity to Building Management Systems for unit monitoring and management. Also, it 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 e-mail and SMS for mobile messaging. The card supports IP and 485 protocols simultaneous.

LIEBERT MC CONDENSER DETAILED DESCRIPTION
STANDARD FEATURES
- Microchannel aluminum coil(s)
- Integrated fan motor/blade/guard assembly
- Electronic control of fan speed
- Fused, locking and lockable electrical disconnect switch
- Variable fan speed motor
- Short Circuit Current Rating of 65,000 Amps, rms
- Two factory wired and mounted NEMA 3R boxes containing main electrical panel and 575V transformer to allow 575V input power.

CABINET
- Bright aluminum exterior panels
- Bright aluminum NEMA 3R box containing electrical panel

CONTROL/COMMUNICATION/FAN
- Variable speed EC fan
- Premium electronic control & communication board
- CANbus connection terminals for communication with iCOM

REFRIGERANT & CIRCUITS
- R-410A set points
- Single refrigerant circuit

OPTIONAL FEATURES
- Liebert Lee-Temp receiver and head pressure control for field installation
- Variable speed fan programming for Liebert Lee-Temp system
- Galvanized steel legs with cross-braces
DX COOLING COIL The evaporator coil is constructed of copper tubes and hydrophilic coated aluminum fins. A stainless steel condensate drain pan is provided.

REFRIGERATION SYSTEM Single refrigeration circuit shall include a liquid line filter drier, a refrigerant sight glass with moisture indicator, an expansion valve, pressure safety switch, and a liquid line solenoid valve.

DIGITAL SCROLL COMPRESSOR The compressor is an R-410A scroll-type with variable capacity operation from 20-100%. Compressor solenoid valve unloads the compressor to provide variable capacity operation. The compressor has a suction gas cooled motor, EPDM vibration isolators, internal thermal overloads, automatic reset high pressure switch with lockout after three failure occurrences, RotoLock service valves, low pressure transducer and crankcase heater.

ELECTRONICALLY COMMUTATED (EC) FAN is plug type, integral direct driven fan with backward curved blades and Electronically Commutated DC motor; commonly referred to as an EC fan. The fan speed shall be variable and automatically regulated by the Liebert iCOM® control through all modes of operation. The impeller shall be made of aluminum and dynamically balanced. The fan shall be located to draw air through the coil to ensure even air distribution and maximum coil performance.

CABINET The exterior panels are 20 gauge steel and powder coated with RAL7021 black gray matte color paint to protect against corrosion. Exterior panels are insulated with ½" (sides) or 1" (front and rear), 1-1/2 lb insulation. Front and side panels have captive, 1/4 turn fasteners to allow quick panel removal. The cabinet is designed so that all components are serviceable and removable using the front and right sides of the unit.

FILTER - The filter shall be deep-pleated, 2 in (51mm) thick with a MERV8 rating efficiency based on ASHRAE 52.2-2007.

LIEBERT iCOM CONTROL SYSTEM The Liebert PDX is controlled by the iCOM Control System. The standard user interface is a 9 inch color touch screen which presents system information and allows all parameters to be viewed and adjusted. It features a 3-level password protection system. Unit-to-Unit communication with other Liebert PDX units and two IntelliSlot communication card housings are included as standard.

UNIT DISCONNECT SWITCH A “Locking-Type” fused disconnect switch is available. The “Locking-Type” consists of a main unit switch operational from the outside of the unit. Access to the high voltage electric panel can be obtained only with the switch in the “off” position. The disconnect has main fuses within the disconnect.

65,000 AMP SHORT CIRCUIT CURRENT RATING (SCCR) The 60Hz electrical panel provides 65kA SCCR.

REMOTE SHUTDOWN TERMINAL The remote shutdown terminal shall provide the customer with a location to remotely shut down the unit, complying with the National Fire Code.

COMMON ALARM CONTACT The common alarm contacts shall provide the customer with a set of normally open contacts for remote indication of unit alarms. Four alarm contacts shall be provided for units without a condensate pump. Three alarm contacts shall be provided for units with a condensate pump.

SUPPLY AIR SENSOR The supply air temperature sensor shall provide real-time, direct feedback to the downflow raised floor cooling unit to provide a consistent supply air temperature by adjusting the compressor capacity or the chilled water valve accordingly to maintain set point. The supply air temperature sensor will provide real-time, monitoring of discharge air temperature on all other units.
STANDARD FEATURES
AIR COOLED

INFRARED 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 304/304 stainless steel fin tubular electric reheat elements provide reheat to control room dry bulb temperature.
OPTIONAL FEATURES
AIR COOLED
(Refer to specification sheet for options supplied)

STEAM GENERATING HUMIDIFIER is factory-installed in the cooling unit and is operated by the Liebert 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 Liebert iCOM display. The humidifier is designed to operate with water conductivity from 330-670 (60Hz) microS/cm. System automatically fills and drains as well as maintains the required water level based on conductivity. A 1” (25mm) air-gap within the humidifier assembly shall prevent backflow of the humidifier supply water.

SCR REHEAT is a 6kw electric reheat element controlled by a variable output Silicon Controlled Rectifier (SCR) control. The SCR reheat option provides precise temperature control. PX011 models only.

DUAL-FLOAT CONDENSATE PUMP has a capacity of 5 GPM (18.9 l/min) at 40ft (12.2 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. The condensate pump shall be factory-installed on upflow units and field-installed on downflow units.

DIGITAL SCROLL COMPRESSOR SOUND JACKET The compressor sound jacket shall reduce the level of sound emitted from the compressor. It shall consist of a 3/8 inch closed cell polymeric 4.5 - 8.5 lb/ft³ density jacket that encloses the compressor.

STANDARD SCROLL COMPRESSOR The compressor is an R-410A scroll-type with a suction gas-cooled motor, EPDM vibration isolators, internal thermal overloads, automatic reset high pressure switch with lockout after three failures, Rotolock service valves, and low pressure transducer. The crankcase heater and a discharge check valve shall be provided for additional system protection from refrigerant migration during off-cycles.

DUAL-COOL consists of an additional free-cooling chilled water/glycol coil and is constructed of copper tubes and hydrophilic coated aluminum fins. A 2-way or 3-way modulating valve controls the chilled water flow passing through the cooling coil. The free cooling coil is strategically located in the return air stream of an air-cooled unit to either precool or totally cool the air before entering the refrigeration coil. Liebert iCOM controls the activation/deactivation and modulation of the cooling sources allowing the system to function as a modulating chilled water/glycol system, as a compressorized system, or combination of both. Standard pressure rating is 150 psig (1034 kPa). Optional pressure rating is 400 psig (2758 kPa). This is a 4-pipe system.

ELECTRONIC EXPANSION VALVE shall be of stepper-motor type. The EEV shall maintain consistent superheat of the refrigerant vapor at the outlet of the evaporator coil over the unit’s operating range. The valve shall be controlled by a separate electronic controller. Superheat shall be determined through the suction pressure-temperature method

FILTER - The filter shall be deep-pleated, 2 in (51mm) thick with a MERV11 rating efficiency based on ASHRAE 52.2-2007.

DOUBLE SKIN PANELS The exterior panels shall be internally lined with 20 gauge galvanized steel, sandwiching the insulation between the panels for easy cleaning.

SMOKE SENSOR - The Smoke Sensor samples the return air and shuts down the unit upon activation and sends visual and audible alarms. Dry contacts are available for a remote customer alarm. This smoke sensor is not intended to function as or replace any room smoke detection system that may be required by local or national codes.
OPTIONAL FEATURES
AIR COOLED

HIGH TEMPERATURE SENSOR—The High Temperature Sensor is mounted in the electric panel with the sensing element in the return air flow. The high temperature sensor shall immediately shut down the system when high temperatures are detected.

COMRESSOR OVERLOAD SENSOR—A pair of N/O contacts shall be factory-installed and wired to each compressor to indicate Compressor Overload.

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.

REHEAT/HUMIDIFIER LOCKOUT—The option includes the relays necessary to disable the reheat and humidifier from an external customer supplied 24 Volt AC signal while on emergency power.

LOW VOLTAGE TERMINAL PACKAGE—One (1) extra N/O common alarm contacts shall be provided. Two (2) extra remote shutdown terminals shall be provided. One (1) pair of N/O contacts shall be factory-installed and wired to indicate Main Fan Overload. One (1) pair of N/O contacts shall be provided for Liqui-tec signal shut down. (Liqui-tec not included).

REMOTE HUMIDITY CONTACT—allows the unit’s humidity controller to control a humidifier outside the unit. Power to operate the remote humidifier does not come from the Liebert PDX unit.

INTELLISLOT UNITY CARD (IS-UNITY-DP) The Liebert IntelliSlot Unity Card (IS-UNITY-DP) shall provide ground fault isolated RS-485 Modbus, BACnet IP and Modbus IP network connectivity to Building Management Systems for unit monitoring and management. Also, it shall provide 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 e-mail and SMS for mobile messaging. The card shall support IP and 485 protocols simultaneously.

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

FLOOR STAND—Is constructed of galvanized steel and available in heights from 6" to 24" (150mm to 610mm) with vibration isolation pads provided on the adjustable legs.

RETURN AIR FLOOR STAND ASSEMBLY—The upflow unit with rear return air configuration shall be supplied with a skirted-floor stand assembly. The floor stand assembly shall be constructed of galvanized steel with powder-coated panels and supplied with air filter. The floor stand assembly shall be 24-1/8 in (613mm) high and have adjustable legs with vibration isolation pads. It provides a rear return duct flange and removable panel for filter access.

UPFLOW UNIT PLENUM(S)—are available in various configurations for upflow units: ducted air discharge with solid panels or 2-way, 3-way, or 4-way air discharge with grilles. Each plenum is constructed of 20 gauge steel with 1" (25.4mm), 1-1/2 lb. (.68kg) insulation and is powder coated with RAL7021 black gray matte color paint to protect against corrosion. The ducted air discharge plenum is available in 18" (457mm), 24" (610mm), 30" (762mm), 36" (914mm), 42" (1067mm), or 48" (1219mm), and the air discharge with grilles plenum is 18" (457mm) high.

DOWNFLOW UNIT PLENUM(S)—are available in various heights. Each plenum is constructed of 20 gauge steel with 1" (25mm), 1-1/2lb (.68kg) insulation and is powder coated with RAL7021 black gray matte color paint to protect against corrosion. The ducted air return plenum is available in 18" (457mm), 24" (610mm), 30" (762mm), 36" (914mm), 42" (1067mm), or 48" (1219mm).

LIQUI-TECT SENSOR—The water sensor is a hermetically sealed solid state device with no moving parts. When the sensor detects the presence of moisture, the alarm system is activated.
PIPING SCHEMATIC
AIR COOLED MODELS

NOTE: SCHEMATIC REPRESENTATION SHOWN. DO NOT USE FOR SPECIFIC CONNECTION LOCATIONS.

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

** A trap at the base of the riser is required for proper circuit operation.
CABINET DIMENSIONAL DATA

UPFLOW MODELS

Shaded area indicates a recommended minimum clearance be provided for component access.

Recommended Clearance for unit installation and for servicing these components if equipped: Reheat, or Gravity Drain Connections.

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Note: Unit with front return shown. Bottom return with rear return floorstand is also available (24-1/8" height rear return floorstand is required for use with bottom return unit).
NOTE: Drawing not to scale. Tolerance on all piping dimensions is ± 1/2" (13mm).

Field pitch Condensate Drain line a minimum of 1/8" (3.2 mm) per foot (305 mm). All units contain a factory installed condensate trap. Do not trap external to the unit. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

*Supplied on Dual Cooling Systems Only.

**Unit with front return shown. Bottom return with rear return floorstand also available.

---

**POINT** | **DESCRIPTION** | **X** | **Y** | **CONNECTION SIZE / OPENING**
---|---|---|---|---
L1 | LIQUID LINE SYSTEM 1 | 5-1/8" (131mm) | 25-5/8" | 3/8" (10mm) | 1/2" (13mm) | 5/8" (16mm) | PX011 | PX018, PX023 | PX029
G1 | HOT GAS DISCHARGE 1 | 2-7/8" (73mm) | 25-5/8" | 3/8" (10mm) | 1/2" (13mm) | 5/8" (16mm) | 7/8" (22mm) | PX011 | PX018, PX023 | PX029
CD | CONDENSATE DRAIN 1 | 16-5/8" (422mm) | 3-1/4" (80mm) | 3/4" FPT | PX011 | PX018, PX023 | PX029
CDP | CONDENSATE DRAIN WITH PUMP | 3-1/4" (83mm) | 5-7/8" (149mm) | 1/2" (13mm) | PX011 | PX018, PX023 | PX029
HUM | HUMIDIFIER SUPPLY LINE | 29-1/2" (750mm) | 26" | 1/4" (6mm) | PX011 | PX018, PX023 | PX029
ECS | ECON-O-COIL SUPPLY ** | 4-1/4" (111mm) | 3-1/4" (81mm) | 7/8" (23mm) | 1-1/8" (29mm) | PX011 | PX018, PX023 | PX029
ECR | ECON-O-COIL RETURN ** | 2-5/8" (67mm) | 10" | 7/8" (23mm) | 1-1/8" (29mm) | PX011 | PX018, PX023 | PX029
E1 | ELECTRICAL CONN. (HIGH VOLT) | 31-1/4" (794mm) | 30" | 7/8" (23mm) | 1-3/8" (35mm), 1-3/4" (44mm) | PX011 | PX018, PX023 | PX029
E2 | ELECTRICAL CONN. (HIGH VOLT) | 31-1/4" (794mm) | 27-3/4" (702mm) | 7/8" (23mm), 1-3/8" (35mm), 1-3/4" (44mm) | PX011 | PX018, PX023 | PX029
LV1 | ELECTRICAL CONN. (LOW VOLT) | 1-1/2" (38mm) | 27-1/2" (699mm) | 1" (25mm) | PX011 | PX018, PX023 | PX029
LV2 | ELECTRICAL CONN. (LOW VOLT) | 1-1/2" (38mm) | 26-1/2" (673mm) | 1" (25mm) | PX011 | PX018, PX023 | PX029

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* Field pitch Condensate Drain line a minimum of 1/8" (3.2 mm) per foot (305 mm). All units contain a factory installed condensate trap. Do not trap external to the unit. Drain line may contain boiling water. Select appropriate drain system materials. The drain line must comply with all local codes.

** Supplied on Dual Cooling Systems Only.

*** Unit with front return shown. Bottom return with rear return floorstand also available.
ELECTRICAL FIELD CONNECTIONS 
UPFLOW & DOWNFLOW MODELS

1. **High Voltage Entrance.** Supplied on top and bottom of electric box. Knockout size Ø1.75in (44.5mm).

2. **Low Voltage Entrance.** Ø1.375 in. (34.9mm) hole located on bottom of Electric Box.

3. **Three phase Electric Service and earth ground.** Field supplied.

4. **Three phase connection.** Electric service connection terminals on disconnect.

5. **Factory installed disconnect switch.** Fused disconnect switch provided on units.

6. **Earth ground connection.** Connection terminals for field supplied earth grounding wire.

7. **Earth ground bar.** 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. **Remote Alarm Device (RAD) Connections.** Alarm connections may be factory wired or field wired. See schematic, RAD1-4, for factory wired alarms. For field wired alarms, use Class 1 wiring to connect normally open contacts between terminals 24 & 50, 24 & 51, 24 & 55, or 24 & 56. Suitable for 24VAC.

11. **Smoke detector alarm connections.** Field supplied Class 1 wiring to 1 Amp, 24VAC maximum remote alarm circuits. Factory wired contacts from optional smoke detector are #91-Common, #92-NO, and #93-NC. Optional smoke detector trouble (SDT) connections #80 & #81.

12. **Common alarm connection.** Field supplied Class 1 wiring to common alarm terminals 75 & 76 (and optional 94 & 95, and 96 & 97), which are factory connected to normally open contacts, 1 Amp, 24VAC maximum on common alarm relay (R3).

13. **Heat rejection connection.** Field supplied Class 1 wiring to heat rejection interlock terminals 70 & 71 which are factory connected to normally open compressor side switch (self contained units only) or to GLYCOOL relay K11 (GLYCOOL units only). On Dual Cool units only, connect auxiliary cooling source terminals 72 & 73 to relay K11. See indoor and outdoor electric schematic for more information.

14. **Reheat and Humidifier Lockout.** Optional emergency power lockout of reheat and/or humidifier: Connections #82 & #83 are provided for remote 24VAC source and Class 1 wiring by others.

15. **Main Fan Auxiliary Switch.** Optional main fan auxiliary side switch. Terminals located on customer connection terminal block for remote indication that the evaporator fan motor/unit is on. Field to connect 24V maximum, Class 1 wiring to connections #84 & #85.

16. **Optional Condensate Alarm (Dual Float Condensate Pump only).** Relay terminals located on customer connection terminal block for remote indication. Field supplied Class 1 wiring to connections #88 & #89.

17. **Optional Remote Liquitect Indicator.** Optional remote liquitect indicator for unit shutdown. Terminals located on customer connection terminal block. Field to connect 24V maximum, Class 1 wiring to connections #58 & #59.

18. **Optional Analog Inputs #3 & #4.** Customer connection to terminals 41, 42, 43, 44 for analog inputs.

19. **Spare Terminals for Optional Devices.** Customer connection when optional device is supplied. See unit schematic.

20. **Heat Rejection CANBUS Connection (AIR Units only).** Customer connection to terminals 49-1, 49-3, & SH.

**NOTE:** Refer to specification sheet for total unit full load amps, wire size amps, and max overcurrent protective device size.
ELECTRICAL FIELD CONNECTIONS
UPFLOW & DOWNFLOW MODELS

UPFLOW UNIT

1. High Voltage Entrance
2. Low Voltage Entrance
3. 18
4. 17
5. 16
6. 15
7. 14
8. 13
9. 12
10. 11
11. 10
12. 9
13. 8
14. 7
15. 6
16. 5
17. 4
18. 3

DOWNFLOW UNIT

Terminal Block For Customer Connection
1 Opening for field wiring. Suggested entry point for HV field wiring to unit.
2 Opening for field wiring. Suggested entry point for LV field wiring to unit.
3 Vacant Intellislot. May contain optional Intellislot cards.
4 Populated Intellislot. Optional Intellislot cards may be placed in either of two supplied Intellislot locations.
5 Wire tie anchors. Use to secure field supplied network cables to Intellislot.
6 Wire tie anchors. Use to secure customer Ethernet wiring to control board and display.

* Wire needs to be routed outside Electric Box to Low Voltage knockout on bottom of Electric Box.
The Liebert iCOM® display is a microprocessor 9 inch color touch screen in an ergonomic, aesthetically pleasing housing. The display and housing will be viewable while the unit accent panels are open or closed. The display can be easily detached to view while the panel is open.

**Menu Layout** - The menus will be broken out into two main menu screens: User screen and Service screen. The User screen contains the menus to access parameters required for basic unit control and setup. The Service screen is designed for service personal and provides access to advanced control setup features and diagnostic information.

**Password Protection** - The display will contain two unique passwords to protect against unauthorized changes. An auto hide/show feature allows the user to see applicable information based on the login used.

**Unit Backup and Restore** - The user shall have the ability to create safety copies of important control parameters. The display has the ability for the user to automatically backup unit configuration settings to internal memory or USB storage drive. Configuration settings may be transferred to another unit for a more streamlined unit startup.

**Parameter Download** - The display has the ability for the user to download a report that lists parameter names, factory default settings and user programmed settings in .csv format for remote reference.

**Parameter Search** - The display has search fields for efficient navigation and parameter lookup.

**Setup Wizards** - The display will contain step by step tutorials or wizards to provide easy setup of the control.
Context Sensitive Help - The display will have an onboard help database. The database will provide context sensitive help to assist with setup and navigation of the menus.

Display Setup - The user has the ability to configure the display information based on the specific user's preference. Language, units of measure, screen contrast, home screen layout, back light timer and the hide/show of certain readouts will be configurable through the display.

Additional Readouts - The display has the ability for the user to configure custom widgets on the main screen. Widget options will include items such as fan speed, call for cooling, call for free cooling, maintenance status, call for hot water reheat, call for electric reheat, call for dehumidification, call for humidification, airflow, static pressure, fluid flow rate and cooling capacity.

Status LEDs - The display will provide the user with the unit's operating status using an integrated LED. The LED will indicate if the unit has an active alarm; if the unit has an active alarm that has been acknowledged; or if the unit is on, off, or in a standby status.

Unit Alarms – All unit alarms are annunciated through both audio and visual cues, clearly displayed on the screen, automatically recorded in the event log, and communicated to optional IntelliSlot monitoring cards.

Event Log – The display will automatically store the last 400 unit-only events (messages, warnings, and alarms).

Service Contact Information – The display has the ability to store the local service or sales contact information.

Upgradeable – Display upgrades are performed through a USB connection.

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

Product Specification/Installation Sheet

Liebert IntelliSlot Unity cards are a form, fit and function replacement for several existing Liebert IntelliSlot Web and 485 cards.

Description

The Liebert IntelliSlot Unity Platform brings SNMP, BACnet IP, BACnet MSTP, Modbus TCP, Modbus RTU, YDN23 and Web management capability to many models of Emerson Network Power’s power and cooling equipment. The cards employ Ethernet and RS-485 networks to monitor and manage a wide range of operating parameters, alarms and notifications. The card also supports communication for LIFE™ Services by Emerson Network Power.

See Table 1 for equipment supported and Table 2 for communication protocols supported.

Additional Features

- SNMPv1, SNMPv2c and SNMPv3 with MIB-II support
- HTTP/HTTPS 1.1
- BootP
- DHCP per RFC2131/2132
- Remote firmware updates via a Web browser
- IPv6 support for HTTP/HTTPS, DHCPv6, e-mail, SMS, SNMP v1/v2c/v3 and Modbus TCP
- Liebert SN Environmental Sensor Support (Web, SNMP, SMS and SMTP): Temperature, Humidity, Door Closure, Contact Closure and Leak Detection: Liebert SN-2D, Liebert SN-3C, Liebert SN-L, Liebert SN-T, Liebert SN-TH, Liebert SN-Z01, Liebert SN-Z02 and Liebert SN-Z03

Compatibility With Other Emerson Products and Communication Protocols

### Table 1 Compatibility with Liebert equipment

<table>
<thead>
<tr>
<th>Liebert IntelliSlot Card</th>
<th>Compatible Liebert Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liebert IS-UNITY-LIFE</td>
<td></td>
</tr>
</tbody>
</table>

### Table 2 Liebert IntelliSlot card communication protocols

<table>
<thead>
<tr>
<th>Liebert IntelliSlot Card (Part #)</th>
<th>LIFE Services Support</th>
<th>Communication Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HTTP/HTTPS</td>
<td>Emson Protocol</td>
</tr>
<tr>
<td>Liebert IS-UNITY-DP (IS-UNITY-DP)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Liebert IS-UNITY-LIFE (IS-UNITY-LIFE)</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

* YDN23 supported only for Liebert PeX and Liebert NXL.
**Dimensions**

- Front of Liebert IntelliSlot Unity Card
- Top of Liebert® IntelliSlot™ Unity Card

**Specifications**

<table>
<thead>
<tr>
<th>Power Requirements</th>
<th>DC Inputs</th>
<th>Power Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7 to 12VDC</td>
<td>3.6W maximum</td>
</tr>
</tbody>
</table>

| Dimensions - W x D x H: in. (mm) | 2.97 x 5.2 x 1.45 (75.5 x 15 x 37) |

<table>
<thead>
<tr>
<th>Weight</th>
<th>Net, oz. (kg)</th>
<th>7 (0.2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shipping, lb. (kg)</td>
<td>1.3 (0.6)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ambient Operating Environment, °F (°C)</th>
<th>32 to 104 (0 to 40); 10% to 90% RH (non-condensing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient Storage Temperature, °F (°C)</td>
<td>-4 to 140 (-20 to 60)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Communication Ports</th>
<th>Ethernet Communications RJ-45 *</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RS-485 RJ-45 (RJ-45 to 2-Position Terminal Block Adapter)</td>
</tr>
</tbody>
</table>

* LIFE™ Services requires a network connection to the Internet.

**Wiring Specifications**

<table>
<thead>
<tr>
<th>Connection</th>
<th>Supported Wire Type</th>
<th>Maximum Wire Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/100Mb/s Ethernet Connector</td>
<td>Standard Category 5E Cable</td>
<td>328 ft. (100m)</td>
</tr>
<tr>
<td>RJ-45 - One-Wire Connector</td>
<td>Liebert® Integrated One-Wire Sensor Cable or 2m Cat 5E to Modular 1-Wire Sensor.</td>
<td>65.6 ft. (20m)</td>
</tr>
<tr>
<td>RJ-45 - RS-485 Connector</td>
<td>ADAPTER RJ45-2POS TERMINAL BLOCK EIA485 to 18-22 AWG Stranded &amp; Shielded <strong>18 AWG recommended</strong> Non Plenum - Belden 9461 Plenum - Belden 88761</td>
<td>3000 ft. (914m)</td>
</tr>
<tr>
<td>Micro-USB AB</td>
<td>Standard Micro-USB AB</td>
<td>16.4 ft. (5m)</td>
</tr>
</tbody>
</table>

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LIEBERT MC
PREMIUM EFFICIENCY CONTROL

STANDARD FEATURES

COIL
Liebert microchannel coils are all-aluminum construction. Tubes are created by extruding small parallel refrigerant flow paths into aluminum. Full-depth louvered aluminum fins fill spaces between the tubes. Tubes, fins and aluminum headers are oven-brazed to form a complete refrigerant-to-air heat exchange coil. Baffles are used in the headers to separate one coil slab into multiple passes as needed. Coils are factory leak tested at a minimum of 300 PSIG and dehydrated. Copper stub pipes are electric resistance welded to aluminum coils and joints are protected with polyolefin to seal joint from environmental corrosive elements. Hot gas and liquid lines are brazed to the stub pipes with spun closed ends for customer piping connections. Coil pipe assemblies are filled and sealed with a nitrogen holding charge for shipment. One coil is used per fan assembly.

FAN/MOTOR ASSEMBLY
The fan/motor assembly is complete with external rotor motor, fan blades and fan/finger guard. Fan blades are constructed of stamped aluminum or steel extrusion coated with PP plastic. Fan guards are heavy gauge, close meshed, steel wire, coated with a black corrosion resistant finish. Fan terminal blocks located on the top of the fan guard with IP54 protection class. Fans are factory balanced and tested before shipment.

Fan Motors
Fan motors are specifically designed for variable speed and have ball bearings. The EC fans provide internal overload protection through the built-in electronics. Each EC fan motor has built-in controller and communication module, linked via RS485 communication wire to each fan and the Premium Control Board. This allows each fan to receive and respond to precise fan speed inputs from the Premium control board.

PREMIUM EFFICIENCY FAN CONTROL
The Liebert premium efficiency condenser control system is complete with control board, EC fan motor(s), refrigerant-pressure transducer(s), refrigerant-temperature thermistor(s), ambient-temperature thermistor, and motor overload protection in the factory wired control panel. The control board maintains EC fans on the same circuit to the same speed in order to maintain refrigerant head pressure. The control board receives a run signal from the compressor of the indoor unit via field-supplied low voltage interlock wires and field-supplied CANbus communication wires from the indoor unit iCOM. The control system provides refrigerant head pressure and system starting for outdoor ambient temperature as low as -30°F (-35 °C), provided the total temperature design range (from minimum to maximum) is 125°F (70°C) or less.

HOUSING
The condenser housing is constructed of bright aluminum sheet and divided into individual fan sections by full width baffles. Internal structural support members, including coil support frame, are galvanized steel for strength and corrosion resistance. Panel doors are provided on two sides of each coil/fan section to provide for coil cleaning. Aluminum legs are provided with rigging holes for hoisting the unit into position.

COMMUNICATION
The Premium Efficiency Control communicates with the iCOM control of the indoor Liebert unit using field supplied CANbus wires. The communication link allows for condenser alarm condition communication to iCOM, communication of other measurable items on the condenser, and fan control features to improve efficiency, sound and wintertime operation based on iCOM programming.

UNIT DISCONNECT SWITCH
Locking unit disconnect switch is factory installed and wired in attached condenser control section.

OPTIONAL FEATURES

LIEBERT LEE-TEMP LOW AMBIENT CONTROL
Lee-Temp receiver kits can be added to achieve head pressure control down to minimum ambient temperatures of -30 °F (-34 °C). The premium efficiency fan control when used with the Liebert Lee-Temp receiver kits runs the fan(s) at lower speeds during cold temperatures saving fan energy.

575V POWER SUPPLY
The factory installed condenser option will include a secondary enclosure, a 575V to 480V, 3 phase, step down transformer, secondary fuses for the transformer, and all wiring between the main and secondary electrical enclosures. Site power connections will be made in the main electrical enclosure and the secondary enclosure will be located on the condenser end opposite of the main electrical enclosure.
CABINET & ANCHOR DIMENSIONAL DATA
1 FAN (MCS028, MCM040, MCL055)

Note:
1. Emerson recommends a clearance of 36" (915mm) on each side for proper operation and component access.
2. Cross Bracing required for legs longer than 18" (457.2mm). Quantity varies per model & options selected.

<table>
<thead>
<tr>
<th>LIEBERT MODEL NUMBER</th>
<th>A</th>
<th>A* (575V ONLY)</th>
<th>C</th>
<th>D</th>
<th>K</th>
<th>L</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCS028</td>
<td>50-5/8 (1287)</td>
<td>58-7/8 (1485)</td>
<td>44-1/1 (1120)</td>
<td>42-1/2 (1080)</td>
<td>42-1/2 (1080)</td>
<td>51-1/4 (1303)</td>
<td>39-5/16 (999)</td>
</tr>
<tr>
<td>MCM040</td>
<td>57-3/16 (1453)</td>
<td>65-3/8 (1601)</td>
<td>48 (1219)</td>
<td>46-5/16 (1177)</td>
<td>46 (1168)</td>
<td>44-3/8 (1127)</td>
<td>39-5/16 (999)</td>
</tr>
<tr>
<td>MCL055</td>
<td>68 (1727)</td>
<td>77 (1975)</td>
<td>56 (1422)</td>
<td>54-3/8 (1381)</td>
<td>55-1/2 (1410)</td>
<td>53-7/16 (1368)</td>
<td>48-3/4 (1236)</td>
</tr>
</tbody>
</table>

All primary dimensions in tables are in inches (Secondary are in mm) unless specified.

Typical all legs

Entering Hot Gas and Leaving Liquid Piping

Lee-Temp Receiver
## CONDENSER AND OPTION WEIGHT DATA, lb(kg)

### SMALL (MCS)

<table>
<thead>
<tr>
<th>Condenser Model</th>
<th>MCS028</th>
<th>MCS056</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigerant Circuits</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Condenser Dry weight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18” Leg</td>
<td>154 (70)</td>
<td>270 (122)</td>
</tr>
<tr>
<td>36” Leg</td>
<td>286 (130)</td>
<td>419 (190)</td>
</tr>
<tr>
<td>48” Leg</td>
<td>318 (144)</td>
<td>451 (205)</td>
</tr>
<tr>
<td>60” Leg</td>
<td>349 (158)</td>
<td>482 (219)</td>
</tr>
</tbody>
</table>

### MEDIUM (MCM)

<table>
<thead>
<tr>
<th>Condenser Model</th>
<th>MCM040</th>
<th>MCM080</th>
<th>MCM160</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigerant Circuits</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Condenser Dry weight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18” Leg</td>
<td>231 (105)</td>
<td>441 (200)</td>
<td>441 (200)</td>
</tr>
<tr>
<td>36” Leg</td>
<td>363 (165)</td>
<td>590 (268)</td>
<td>590 (268)</td>
</tr>
<tr>
<td>48” Leg</td>
<td>395 (179)</td>
<td>622 (282)</td>
<td>622 (282)</td>
</tr>
<tr>
<td>60” Leg</td>
<td>426 (193)</td>
<td>653 (296)</td>
<td>653 (296)</td>
</tr>
</tbody>
</table>

### LARGE (MCL)

<table>
<thead>
<tr>
<th>Condenser Model</th>
<th>MCL055</th>
<th>MCL110</th>
<th>MCL165</th>
<th>MCL220</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigerant Circuits</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Condenser Dry weight</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18” Leg</td>
<td>344 (156)</td>
<td>602 (273)</td>
<td>602 (273)</td>
<td>891 (404)</td>
</tr>
<tr>
<td>36” Leg</td>
<td>486 (220)</td>
<td>766 (347)</td>
<td>766 (347)</td>
<td>1136 (515)</td>
</tr>
<tr>
<td>48” Leg</td>
<td>518 (235)</td>
<td>798 (362)</td>
<td>798 (362)</td>
<td>1184 (537)</td>
</tr>
<tr>
<td>60” Leg</td>
<td>549 (249)</td>
<td>829 (376)</td>
<td>829 (376)</td>
<td>1230 (558)</td>
</tr>
</tbody>
</table>

### Additional Weight for Options

<table>
<thead>
<tr>
<th>Lee-Temp</th>
<th>55 (25)</th>
<th>100 (45)</th>
<th>110 (50)</th>
<th>220 (100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coated Coil</td>
<td>4 (2)</td>
<td>8 (4)</td>
<td>5 (2)</td>
<td>10 (5)</td>
</tr>
<tr>
<td>575V Transformer</td>
<td>52 (24)</td>
<td>63 (29)</td>
<td>63 (29)</td>
<td>76 (34)</td>
</tr>
</tbody>
</table>

Total weight is the sum of 'Condenser' + ('Lee-Temp' or 'DSE Receiver 080-085' or 'DSE Receiver 125-165') + 'Coated Coil' + '575V Transformer'.
**PIPING LOCATIONS**

**SINGLE CIRCUIT WITH LEE-TEMP**

![Diagram of LIEBERT MC Condenser piping locations]

**FIELD PIPING DETAIL A**

**ISOLATOR**

**METAL CLAMP**

1. **LEAVING LIQUID LINE FROM CONDENSER**
2. **ENTERING HOT GAS LINE**
3. **POSITION ELBOW TO DIRECT RELIEF VALVE DOWNWARD**

**NOTE:**

1. The following materials are supplied by Liebert, shipped loose for each circuit and for field installation: Insulated LEE-TEMP receiver tank with electric heater pads and sight glasses, piping assembly with head pressure control valve and check valve, Roto-lock valve and pressure relief valve. All other piping and electrical wiring to be supplied and installed by others. Additional condenser leg per circuit when required, ships with the condenser.

**GENERAL ARRANGEMENT**

**LIEBERT SUPPLIED PIPING ASSEMBLY WILL INCLUDE 1 TO 3 HEAD PRESSURE VALVES AND CHECK VALVES DEPENDENT ON CONDENSER CAPACITY AND REFRIGERANT.**

**CONDENSER PIPING CONNECTION SIZES**

<table>
<thead>
<tr>
<th>MODEL NO.</th>
<th>CONDENSER CIRCUITS</th>
<th>HOT GAS (ODS-INCHES)</th>
<th>LIQ (ODS-INCHES)</th>
<th>HOT GAS TEE (IDS-INCHES)</th>
<th>LIQ TO L-T VALVE (IDS-INCHES)</th>
<th>RO TO ROTO LOCK (IDS-INCHES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCS028</td>
<td></td>
<td>7/8</td>
<td>5/8</td>
<td>7/8</td>
<td>5/8</td>
<td>5/8</td>
</tr>
<tr>
<td>MCM040</td>
<td>1</td>
<td>1-1/8</td>
<td>7/8</td>
<td>1-1/8</td>
<td>7/8</td>
<td>1-1/8</td>
</tr>
<tr>
<td>MCM080</td>
<td></td>
<td>1-3/8</td>
<td>1-1/8</td>
<td>1-3/8</td>
<td>1-1/8</td>
<td>1-1/8</td>
</tr>
<tr>
<td>MCL055</td>
<td></td>
<td>1-5/8</td>
<td>1-3/8</td>
<td>1-5/8</td>
<td>1-3/8</td>
<td>1-3/8</td>
</tr>
<tr>
<td>MCL110</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCL165</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCL220</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Shipping cover is not necessary for proper condenser operation and may be recycled if field piping interferes with proper reattachment.

---

**Legend:**
- Field piping = __________
- General arrangement = __________
- Cover * = __________

*Shipping cover is not necessary for proper condenser operation and may be recycled if field piping interferes with proper reattachment.*
## RECOMMENDED REFRIGERANT LINE SIZES CU, OD,

**FOR LIEBERT DX SYSTEMS WITH AND WITHOUT LIEBERT LEE-TEMP AND LIEBERT DSE SYSTEMS**

<table>
<thead>
<tr>
<th>System Fluid : R-410A</th>
<th>Standard and Digital Scroll Models</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50 ft (15m)</td>
</tr>
<tr>
<td><strong>Model</strong></td>
<td><strong>Equivalent Length</strong></td>
</tr>
<tr>
<td></td>
<td>Liquid Line, in.</td>
</tr>
<tr>
<td>CR035RA</td>
<td>Hot Gas Line, in.</td>
</tr>
<tr>
<td></td>
<td>Liquid Line, in.</td>
</tr>
<tr>
<td>PX011</td>
<td>Hot Gas Line, in.</td>
</tr>
<tr>
<td></td>
<td>Liquid Line, in.</td>
</tr>
<tr>
<td>PX018</td>
<td>Hot Gas Line, in.</td>
</tr>
<tr>
<td></td>
<td>Liquid Line, in.</td>
</tr>
<tr>
<td>PX023</td>
<td>Hot Gas Line, in.</td>
</tr>
<tr>
<td></td>
<td>Liquid Line, in.</td>
</tr>
<tr>
<td>PX029</td>
<td>Hot Gas Line, in.</td>
</tr>
<tr>
<td></td>
<td>Liquid Line, in.</td>
</tr>
<tr>
<td>DA080/ DA08S</td>
<td>Hot Gas Line, in.</td>
</tr>
<tr>
<td></td>
<td>Liquid Line, in.</td>
</tr>
<tr>
<td></td>
<td>Liquid Line, in.</td>
</tr>
<tr>
<td>DA150</td>
<td>Hot Gas Line, in.</td>
</tr>
<tr>
<td></td>
<td>Liquid Line, in.</td>
</tr>
<tr>
<td></td>
<td>Liquid Line, in.</td>
</tr>
</tbody>
</table>

**System Fluid : R-407C**

<table>
<thead>
<tr>
<th>Model</th>
<th>Equivalent Length</th>
<th>50 ft (15m)</th>
<th>100 ft (30m)</th>
<th>150 ft (45m)</th>
<th>200 ft (60m)</th>
<th>50 ft (15m)</th>
<th>100 ft (30m)</th>
<th>150 ft (45m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS028</td>
<td>Hot Gas Line, in.</td>
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<td>7/8</td>
<td>7/8</td>
<td>1-1/8</td>
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<tr>
<td></td>
<td>Liquid Line, in.</td>
<td>1/2</td>
<td>5/8</td>
<td>5/8</td>
<td>1-1/8</td>
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</tr>
</tbody>
</table>

Consult factory for proper line sizing for runs longer than 300 ft. (91.4m) equivalent length.

1. Must downsize vertical riser one trade size (1-1/8” to 7/8” or 7/8” to 3/4” or 5/8” to 1/2”).

2. When the vertical elevation between the indoor DA150/165 unit exceeds 25 ft the liquid line pipe diameter can be 7/8”

3. Downsize vertical riser one trade size (1-1/8” to 7/8”)

4. Digital scroll not available on 077 and 105 models and Semi-Hermetic not available on Challenger Models.

5. Double risers are required when hot gas vertical rise is 15 ft (4.6m) or more. Refer to XDC user manual.

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**FOR RUNS LONGER THAN 150 FT. (45.7m) EQUIV. LENGTH CONSULT FACTORY**

Rev Date 11/15
Field installed relief valve(s) required for 50Hz EU CE units.

Notes:
1. Single refrigeration circuit shown for clarity.
2. Schematic representation shown. Do not use for specific connection locations.
3. Components are not supplied by Liebert, but are required for proper operation and maintenance.
   Traps must be installed and horizontal lines pitched to ensure proper oil return and to reduce liquid floodback to compressor.
4. Pitch horizontal hot gas piping at a minimum of 1/2" per 10 feet (42mm per 10m) so that gravity will aid in moving oil in the direction of the refrigeration flow.