



Liebert® XDC™

**50 & 60 Hz, 130 & 160kW Nominal Cooling Capacity;
Model Revision 5 or Higher**

User Manual

Technical Support Site

If you encounter any installation or operational issues with your product, check the pertinent section of this manual to see if the issue can be resolved by following outlined procedures. Visit <https://www.VertivCo.com/en-us/support/> for additional assistance.

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1 IMPORTANT SAFETY INSTRUCTIONS

Save These Instructions

This manual contains important safety instructions that should be followed during the installation and maintenance of the Liebert XDC. Read this manual thoroughly before attempting to install or operate this unit.

Only qualified personnel should move, install or service this equipment.

Adhere to all warnings, cautions, notices and installation, operating and safety instructions on the unit and in this manual. Follow all operating and user instructions.

Follow all local codes.



WARNING! Risk of arc flash and electric shock. Can cause equipment damage or death. Disconnect all local and remote electric power supplies and wear protective equipment per NFPA 70E before working within electric control enclosure. Failure to comply can cause serious injury or death.

Customer must provide earth ground to unit, per NEC, CEC and local codes, as applicable. Before proceeding with installation, read all instructions, verify that all the parts are included and check the nameplate to be sure the voltage matches available utility power.

The Liebert iCOM microprocessor does not isolate power from the unit, even in the Unit Off mode. Some internal components require and receive power even during the Unit Off mode of Liebert iCOM control.

The line side of the disconnect switch on the front of the unit contains live high-voltage. The only way to ensure that there is NO voltage inside the unit is to install and open a remote disconnect switch. Refer to unit electrical schematic. Follow all local codes.



WARNING! Risk of unit falling over. Can cause equipment damage, injury and death. The Liebert XDC is top-heavy. Use extreme caution and care when moving and installing this unit.



WARNING! Risk of refrigerant system explosion or rupture from overpressurization. Can cause equipment damage, injury and death.

Installer must install a 400 psig pressure relief valve in each of the two R-407C refrigerant circuits of the Liebert XDC system. Do not install shutoff valves between the compressors and the pressure relief valves.

For systems requiring EU CE compliance, the pressure relief valves must be CE-certified by a notified body to the EU Pressure Equipment Directive.



CAUTION: Risk of piping and component rupture. Can cause equipment damage and injury. Closing service valves may isolate liquid refrigerant, causing high pressure and rupture of piping. Do not close valves without following recommended procedures for repair, maintenance and replacement of components. Install pressure relief valves in field piping that may become isolated by service valves.



CAUTION: Risk of contact with hot surfaces. Can cause burn injury.

The compressors, pump motors and refrigerant discharge lines are extremely hot during unit operation. Allow sufficient time for the compressors, pump motors and refrigerant discharge lines to cool before working within the unit cabinet. Use extreme caution and wear protective gloves and arm protection when working on or near hot compressor, pump motors or discharge lines.



CAUTION: Risk of improper installation and startup. Can cause warranty cancellation, equipment damage and injury.

Read and follow completely the installation and start up instructions that are factory supplied with the unit.



CAUTION: Risk of sharp edges, splinters and exposed fasteners. Can cause personal injury.

Only properly trained personnel wearing appropriate safety headgear, gloves, shoes and glasses should attempt to move, lift, remove packaging from or prepare the unit for installation.

NOTICE

Risk of a leaking coil due to freezing and/or corrosion. Can cause equipment and serious building damage.

Cooling and heat rejection coils, heat exchangers and piping systems that are connected to open cooling towers or other open water/glycol systems are at high risk for freezing and premature corrosion. Fluids in these systems must contain the proper antifreeze and inhibitors to prevent freezing and premature coil corrosion. The water or water/glycol solution must be analyzed by a competent water treatment specialist before startup to establish the inhibitor requirement. The water or water/glycol solution must be analyzed every six months to determine the pattern of inhibitor depletion. The complexity of water-caused problems and their correction makes it important to obtain the advice of a water treatment specialist and follow a regularly scheduled maintenance program.

NOTICE

Risk of leaking chilled water lines. Can cause equipment and building damage.

Lines and joints must be inspected regularly. Improper installation, application and service practices can result in water leakage from the unit. Water leakage can result in severe property damage and loss of critical data center equipment. Do not locate unit directly above any equipment that could sustain water damage. Vertiv recommends installing monitored leak detection equipment for the unit and supply and return lines.

NOTICE

Risk of clogged or leaking drain lines. Can cause equipment and building damage.

This unit requires a water drain connection. Drain lines must be inspected regularly and maintenance must be performed to ensure that drain water runs freely through the drain system and that lines are clear and free of obstructions and in good condition with no visible sign of damage or leaks. This unit may also require an external water supply to operate.

Improper installation, application and service practices can result in water leakage from the unit. Water leakage can result in severe property damage and loss of critical data center equipment.

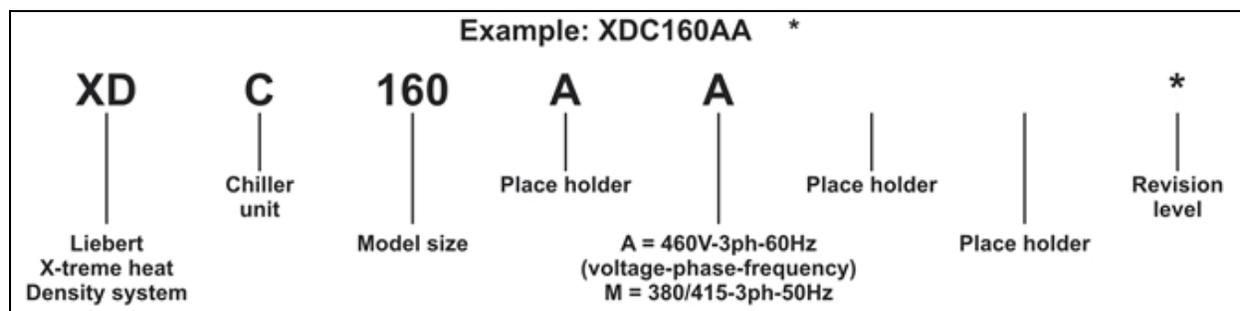
Do not locate unit directly above any equipment that could sustain water damage.

Vertiv recommends installing monitored leak detection equipment for the unit and the supply and return lines.

NOTE: This document must be used with site specific documentation and documentation for other parts of the system (heat rejection devices and cooling modules).

NOTE: Before any action that could cause a disturbance in the Liebert XD system's cooling function is begun, the facility manager **MUST** be informed. In addition, after the action is taken and the work is finished, the facility manager **MUST** be informed.

Figure 1.1 Model number nomenclature



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2 PRODUCT DESCRIPTION

2.1 General Product Information

2.1.1 Product/System Description

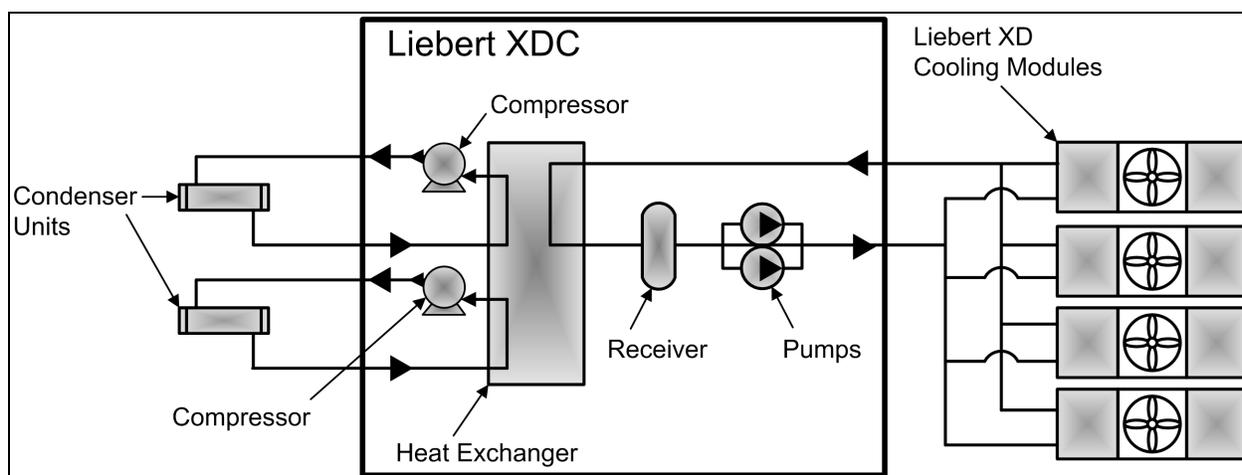
The Liebert XDC™ (X-treme Density Chiller) is a self-contained refrigeration distribution unit designed to cool rooms with high heat producing equipment. There are two distinct circuits, each utilizing different refrigerants and mechanical parts. The R-134a circuit is the “pumped” circuit containing redundant circulating pumps, a brazed plate heat exchanger along with valves and piping. The R-407C circuit is the dual direct expansion circuit containing scroll compressors, expansion valves, brazed plate heat exchanger, and piping. Heat removal is accomplished by using condensers connected to the dual direct expansion circuit. Heat rejection is available in two options: an outdoor air-cooled condenser and a water/glycol condenser. See Figure 2.1 below.

The Liebert XDC monitors room conditions and prevents coil condensation by maintaining the refrigerant being pumped to the cooling modules at a temperature above the room dew point. All functions, such as temperature control, switching pumps (if necessary), etc., are automatic.

The Liebert XDC’s minimum recommended operating load is 40% of system nominal capacity. For example, a Liebert XDC160 60Hz system’s minimum load would be 64kW. Loading below this value can unfavorably affect system operation.

See Table 11.1 on page 127 for the Liebert XDC160 rated cooling capacity.

Figure 2.1 Liebert XDC components



2.2 Equipment Inspection

When the unit is delivered, inspect all items for visible and concealed damage. Damage should be immediately reported to the carrier and a damage claim filed with a copy sent to Liebert or to your sales representative.

NOTICE

Risk of improper storage. Can cause equipment damage.

Keep the Liebert XDC upright, indoors and protected from dampness, freezing temperatures and contact damage.

2.3 Equipment Handling



WARNING! Risk of unit falling over. Can cause injury or death.

The Liebert XDC is top-heavy. Use extreme caution when moving and installing this unit. Use lifting equipment that is rated for the weight of the unit by an OSHA-certified rating organization. See Table 11.1 on page 127 for unit weights. Personnel should be properly trained and certified to move and rig equipment



CAUTION: Risk of sharp edges, splinters and exposed fasteners. Can cause personal injury.

Only properly trained personnel wearing appropriate safety headgear, gloves, shoes and glasses should attempt to move, lift, remove packaging from or prepare the unit for installation.

2.3.1 Handling the Liebert XDC While it is on Skid and Packaged

- Always keep the unit upright, indoors and protected from damage.
- If possible, transport the unit using a forklift truck. Otherwise use a crane with slings and spreader cables. In either case, do NOT press on the top edges of the packaging.
- If using a forklift or pallet jack, make sure the forks (if adjustable) are spread to the widest allowable distance to still fit under the skid.
- When moving the skidded unit with a forklift, do not lift the unit any higher than 3" (76mm). If circumstances require the unit to be lifted higher than 3" (76mm), great care must be exercised and all by-standing personnel are to be no closer than 20 feet (6m) from the lift point of the unit.

NOTICE

Risk of structural interference. Can cause equipment or building damage.

While on the skid, the unit is too tall (83" [2108mm] overall height) to fit through a standard doorway. Any attempt to move the unit, while skidded, through a standard doorway will cause damage to the unit and to the building.

NOTICE

Risk of damage from forklift. Can cause unit damage.

Keep the forklift tines level and at a height suitable to fit below the skid and/or unit to prevent exterior and/or underside damage.

NOTICE

Risk of improper storage. Can cause unit damage.

Keep the Liebert XDC upright, indoors and protected from dampness, freezing temperatures and contact damage.

NOTICE

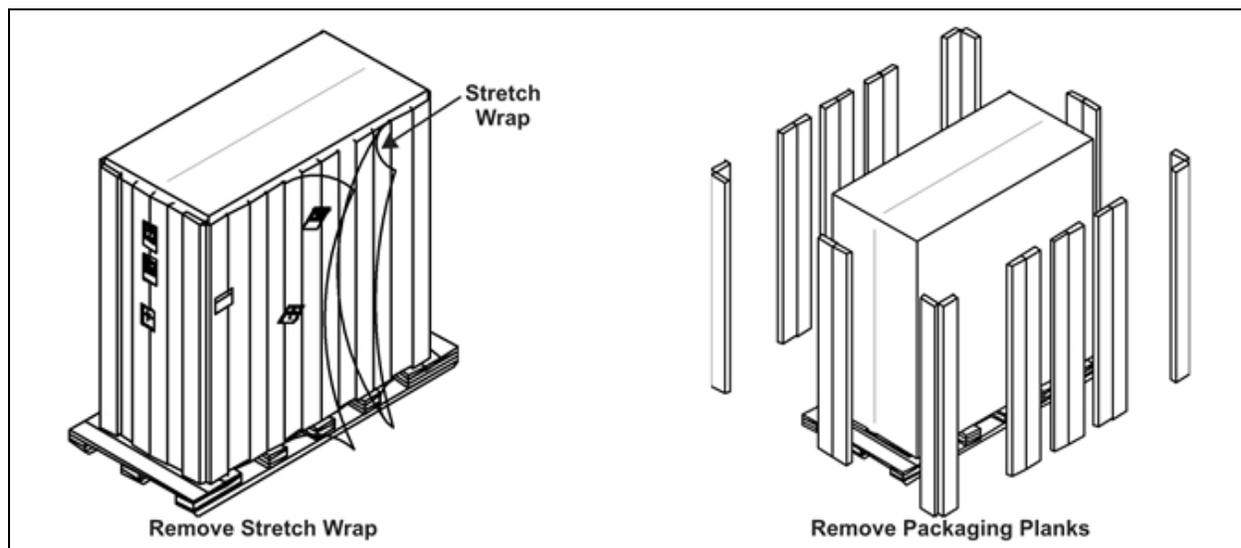
Risk of overtightening securing straps. Can cause damage to panels.

Place a protective material between the straps of the piano jacks and the unit. Ensure that the straps are not tightened to a point of damaging panels.

2.3.2 Unpacking the Liebert XDC

1. Remove the exterior stretch wrap packaging from the unit, exposing the protective corner and side packaging planks.
2. Remove the corner and side packaging planks from the unit, exposing the bag over the unit. The bag may remain in place for dust and panel protection or removed for immediate unit installation.
3. Remove the bag from the unit when ready to remove the skid for installation.

Figure 2.2 Unpacking the Liebert XDC



2.3.3 Removing the Unit from the Skid Using a Forklift

1. Align the forklift with either the front or rear side of the unit.

Make sure the tines of the forklift are locked at their widest position.

Use the center of gravity indicators to determine the entry points for the tines. The tines must be equally spaced on either side of the center of gravity indicator (see Figure 2.3 on the next page).

2. Insert the tines of the forklift under the unit.

Make sure the tines are level. The tines must be low enough to fit under the unit without damaging it.

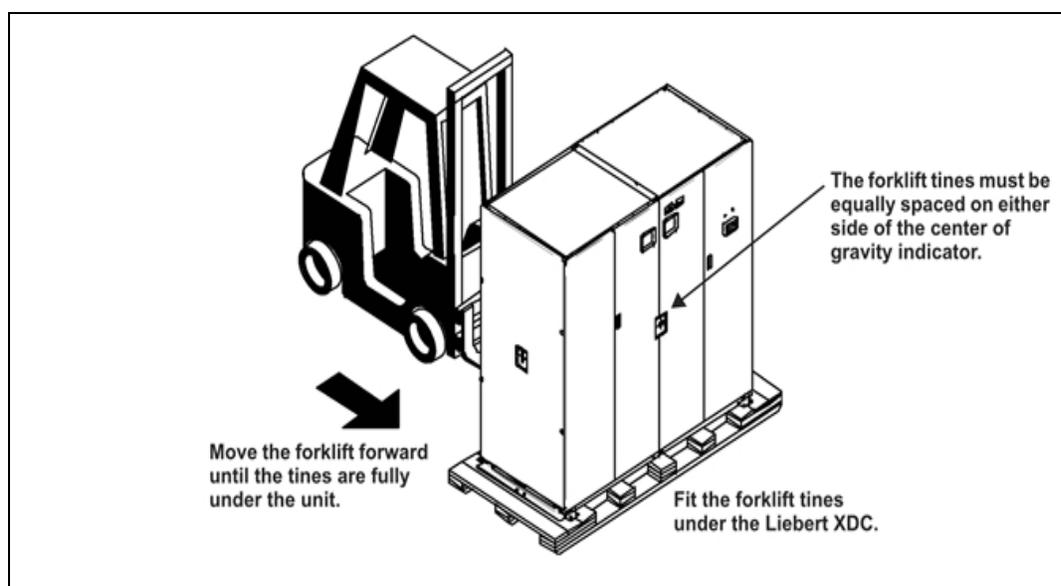
Make sure the tines extend beyond the opposite side of the unit.

3. Remove the 12 lag bolts and two brackets that secure the unit to the skid.

NOTE: Each lag bolt is 1-1/2" (38mm) long. They can be removed with a 9/16" socket or wrench.

4. Lift the unit to a height that it is not being support by the skid.
5. Move the skid from under the unit.

Figure 2.3 Use a forklift to remove the Liebert XDC from the skid



2.3.4 Removing the Unit from the Skid using Rigging

1. Use the center of gravity indicators on the unit to position the slings. The slings must be equally spaced on either side of the center of gravity indicator (see Figure 2.4 on the facing page).
2. Place slings under the unit using spaces provided between the skid deck boards.

NOTE: Unit is shown without outer packaging. These instructions may be applied with the outer packaging in place.

3. Use spreader bars or an equivalent method to ensure proper protection of the unit.
4. Ensure that the panels, if attached, are well protected from the slings with cushioning material.

NOTE: If rigging is to be used to move the unit closer to the site for installation, place one or two horizontal straps around the unit and vertical straps at mid height.

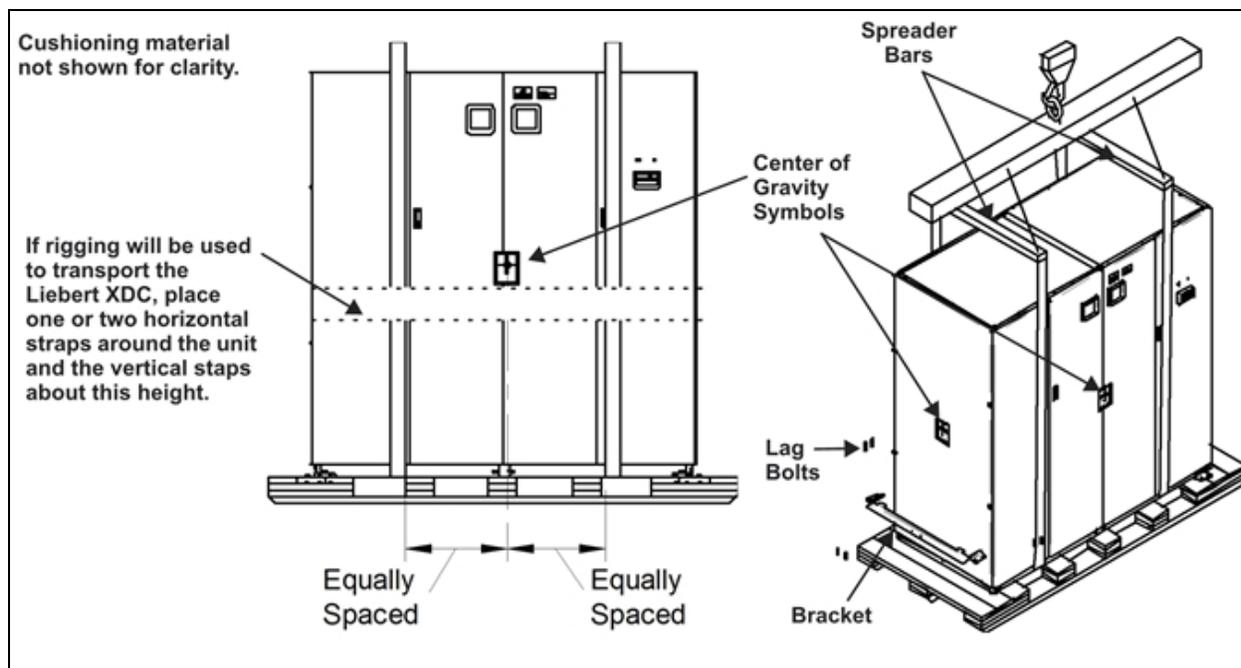
5. Remove the 12 lag bolts and two brackets that secure the unit to the skid.

NOTE: Each lag bolt is 1-1/2" (38mm) long. They can be removed with a 9/16" socket or wrench.

6. Lift the unit off of the skid to an elevation point where the skid is not supporting the weight of the unit.
7. Remove the skid from under the unit.

NOTE: Depending on final installation location and the method of moving the Liebert XDC, the skid may need to remain under the unit.

Figure 2.4 Removing the unit from the skid using rigging

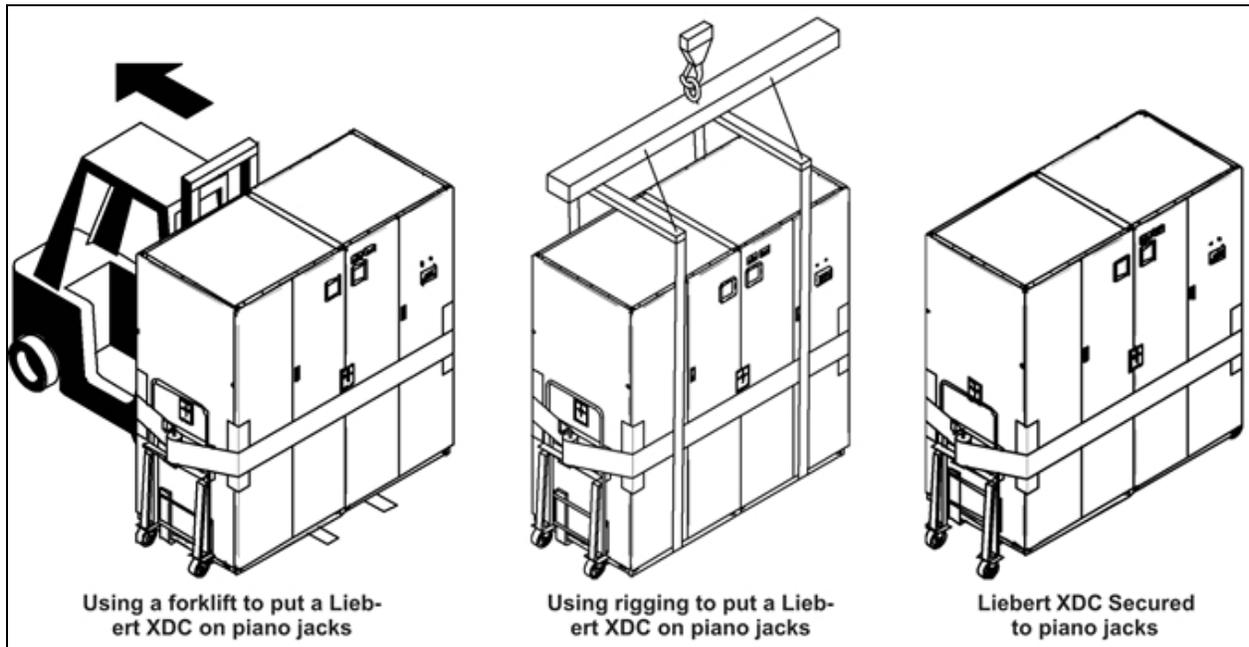


2.3.5 Moving the Liebert XDC Using Piano Jacks

1. Elevate the Liebert XDC with a lifting mechanism, such as a forklift or rigging.
1. Position one piano jack at each end of the Liebert XDC.
2. Lower the unit to a height suitable for placing it on the piano jacks.
3. Put protective material between the Liebert XDC and the piano jacks and straps.
4. Secure the Liebert XDC to the piano jacks.
5. Release the the Liebert XDC from the straps securing it to the lifting mechanism and move the mechanism away from the unit.

Using the piano jacks, at least two properly trained and qualified personnel can move the unit.

Figure 2.5 Securing the Liebert XDC to piano jacks



2.3.6 Removing the Unit from the Piano Jacks

1. Lower the Liebert XDC as far as the piano jacks will allow.
2. Undo all strapping holding the piano jacks to the unit.
3. Lift one end of the Liebert XDC off one piano jack with a pry bar or similar device, taking care not to damage the unit's cabinet.
4. Repeat step 3 to remove the piano jack from under the opposite end of the Liebert XDC.
5. Remove all material used to protect the unit from the piano jacks and strapping.

3 INSTALLATION

3.1 Mechanical Considerations

3.1.1 Positioning the Liebert XDC

Install the Liebert XDC according to the site specific documentation and secure the unit to the floor.

The Liebert XDC can be installed near a wall or another Liebert XDC. However, there must be at least 3 feet (92cm) clearance in front of the Liebert XDC as service access for components in the unit.

NOTE: During installation of the Liebert XDC, the top, bottom, front and left side of the unit must be accessible.

Figure 3.1 Dimensional data

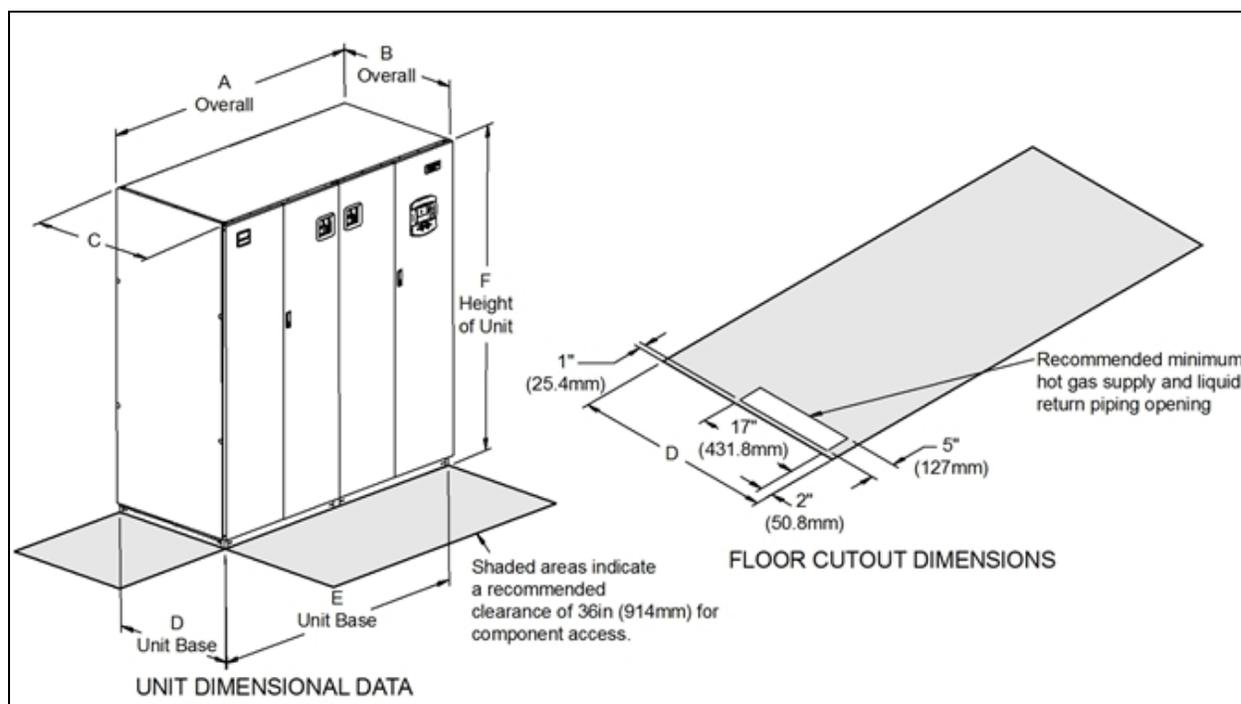


Table 3.1

Liebert XDC dimensions, weight

Air-Cooled Model	Dimensional Data, inches (mm)						Shipping Weight lb. (kg)	
	A	B *	C	D	E	F	Domestic	Export
XDC160	74 (1880)	34 (864)	33-1/8 (841)	33 (838)	72 (1829)	78 (1981)	1975 (896)	2109 (957)

*Dimension does not include the bezel of the disconnect switch, the handle or the control bezel.

Figure 3.2 Piping locations

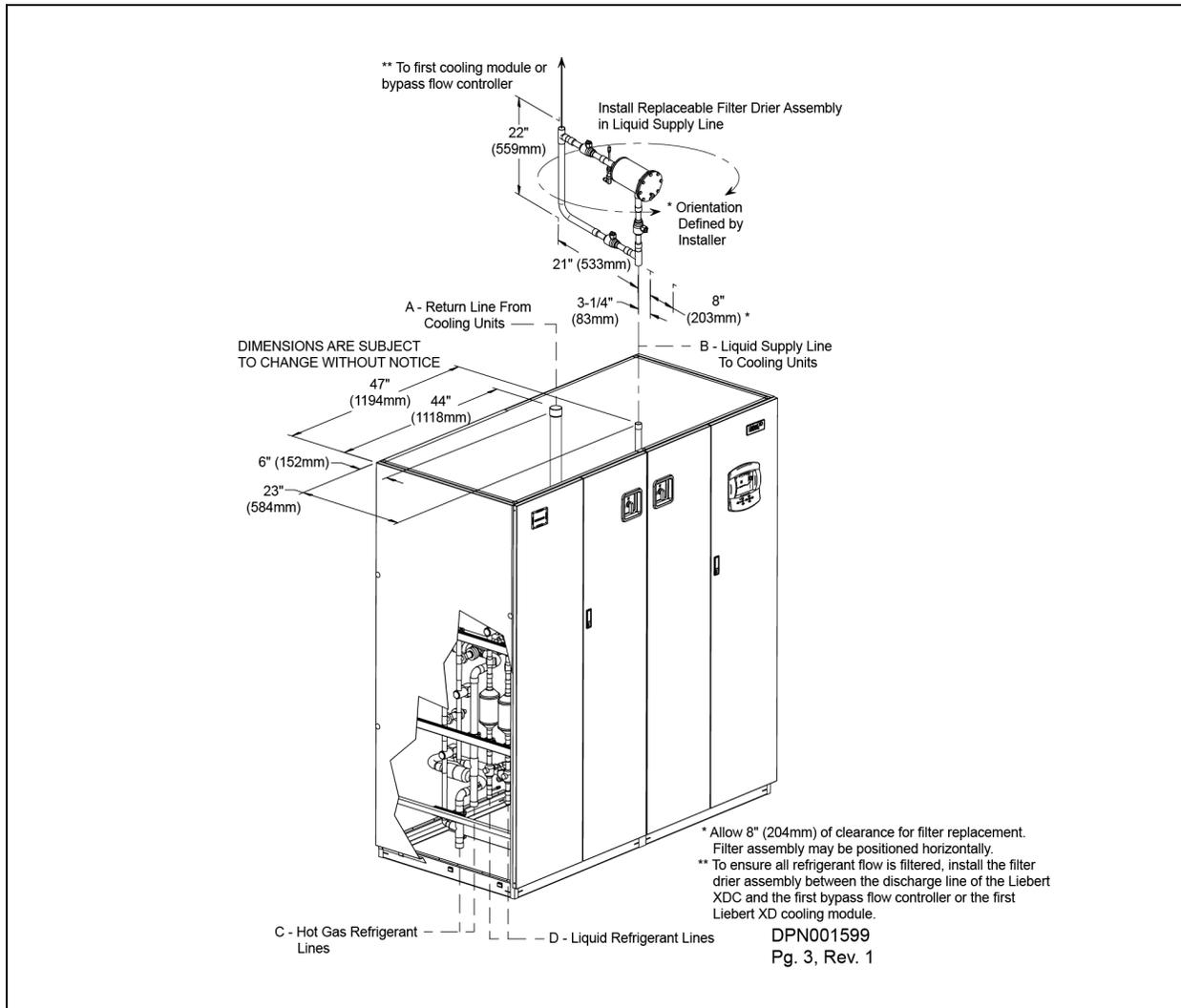


Table 3.2
Liebert XDC piping connection sizes

50/60Hz	Piping Outlet Connection Sizes, OD Cu, inches			
	A	B	C	D
XDC160	2-1/8	1-1/8	1-3/8	7/8

Source: DPN001599

3.1.2 Placing the Liebert XDC on a Floor Stand



WARNING! Risk of top-heavy unit falling over. Improper handling can cause equipment damage, injury or death.

Only properly trained and qualified personnel wearing appropriate safety headgear, gloves, shoes and glasses should attempt to move, lift, remove packaging from or prepare unit for installation.

Read all of the following instructions before attempting to move, lift, remove packaging from or preparing unit for installation.

The water/glycol floor stand can be located beneath the Liebert XDC unit or can be installed nearby.

NOTE: Consult the factory if the Liebert XDC is not installed on the water/glycol condenser floor stand to prevent exceeding the maximum piping distances.

Refer to the floor stand installation sheet shipped inside the water regulating valve package.

1. Move the floor stand assembly to its installation area and uncrate the unit.
2. Position the floor stand in its final location.
3. Insert leveler pads into each floor stand leg.
4. Level the top of the floor stand to the specified height with the flanged adjusting nut.
5. Tighten jam nuts on all legs against flanged adjusting nuts.
6. Using an appropriate lifting device or method, raise the Liebert XDC and move it above the floor stand.
7. Align the welded tabs on top of the floor stand with the inside of the unit frame base (see Detail A in Figure 3.3 on the next page).
8. Maintaining the alignment of the Liebert XDC and the floor stand, lower the Liebert XDC onto the floor stand.
9. Connect the hot gas refrigerant lines from the Liebert XDC to the floor stand with 1-3/8" tubing (see Figure 3.3 on the next page and Figure 3.4 on page 20).
10. Connect the liquid refrigerant lines as shown from the Liebert XDC unit to the floor stand with 7/8" tubing (see Figure 3.3 on the next page and Figure 3.4 on page 20).
11. Connect the water lines as shown with the provided valving (see Figure 3.3 on the next page and Figure 3.4 on page 20).
12. Connect capillary lines from each water regulating valve to condensers in the floor stand (see Figure 3.3 on the next page and Figure 3.4 on page 20).

Capillary length is limited to 48" (1219mm).
13. Check the pipes for leaks and evacuate air from all pipes.
14. Insulate all water/glycol lines.
15. Charge each condenser loop with R-407C (see Table 4.15 on page 57).

Figure 3.3 Water/glycol Liebert XDC on a floor stand—positioning and piping connections

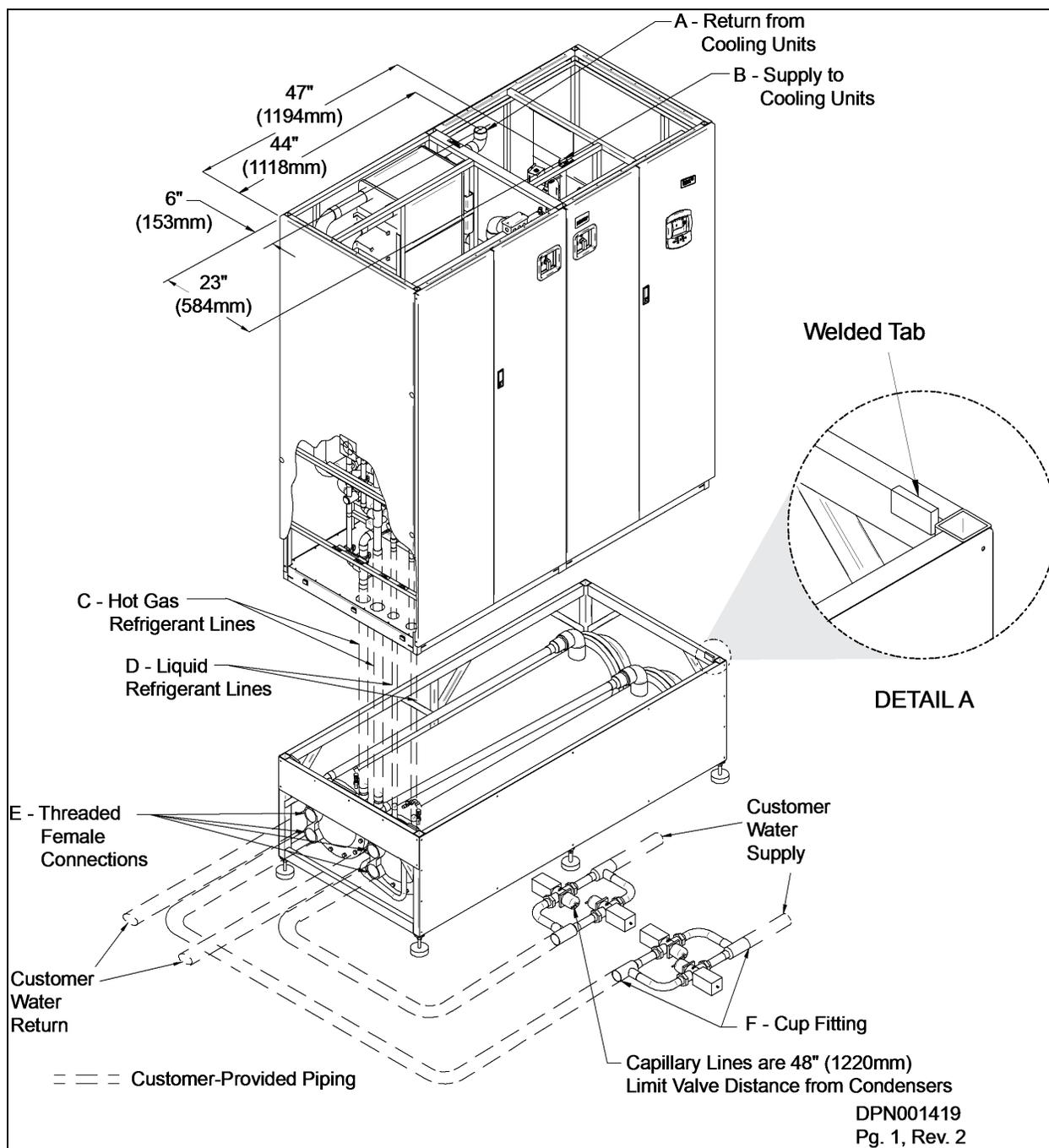
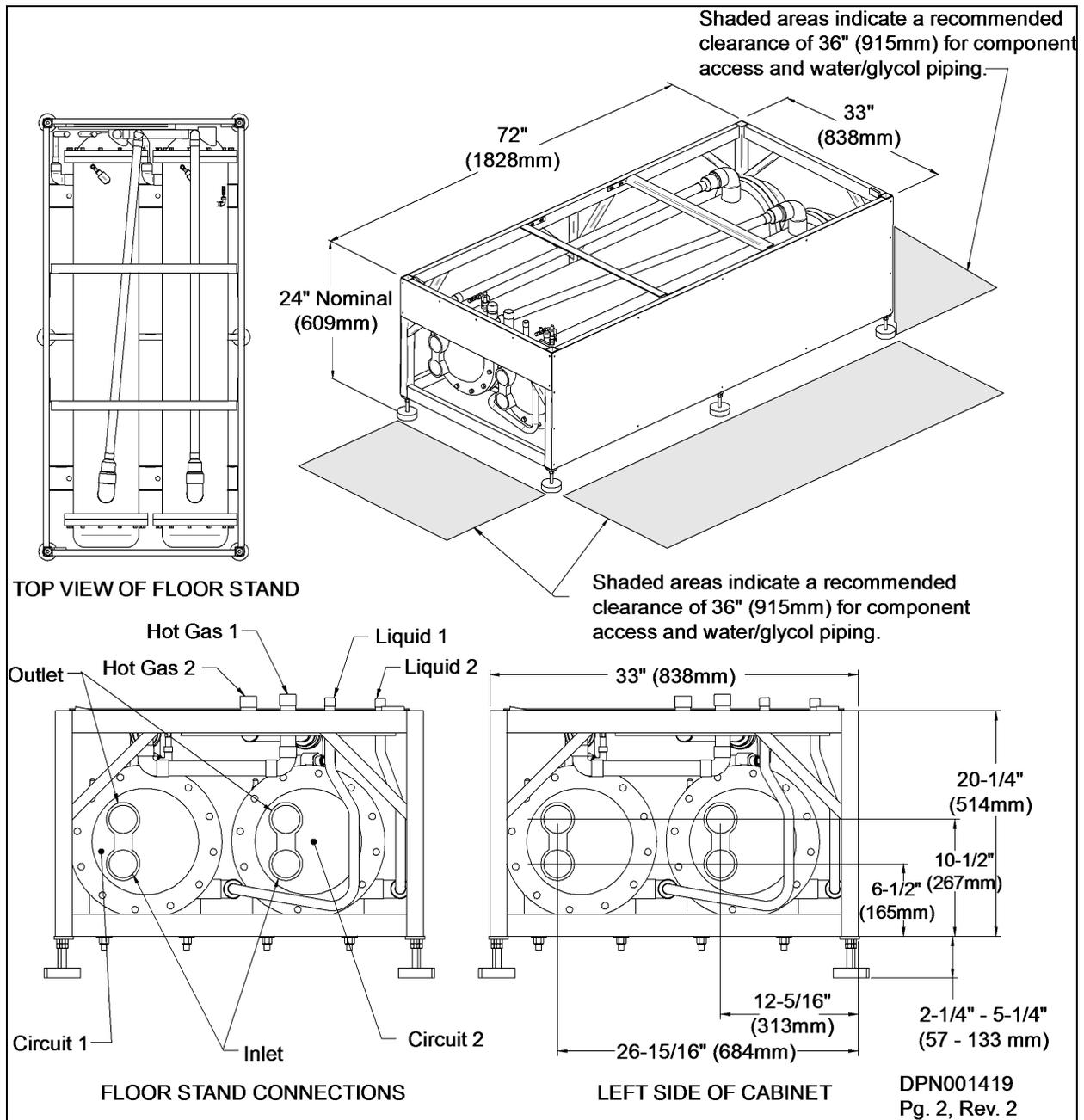


Table 3.3

Liebert XDC water/glycol piping connection sizes

Model	Piping Outlet Connection Sizes, OD Cu, inches					
50/60Hz	A	B	C	D	E ¹	F ²
XDC160	2-1/8	1-1/8	1-3/8	7/8	2-1/2	2-1/8 or 2-5/8
1. Threaded female connection 2. 2-1/8" for 1" water regulating valve; 2-5/8" for 1-1/4" water regulating valve Source: DPN001419 Rev. 2						

Figure 3.4 Piping locations—floor stand and valve assembly



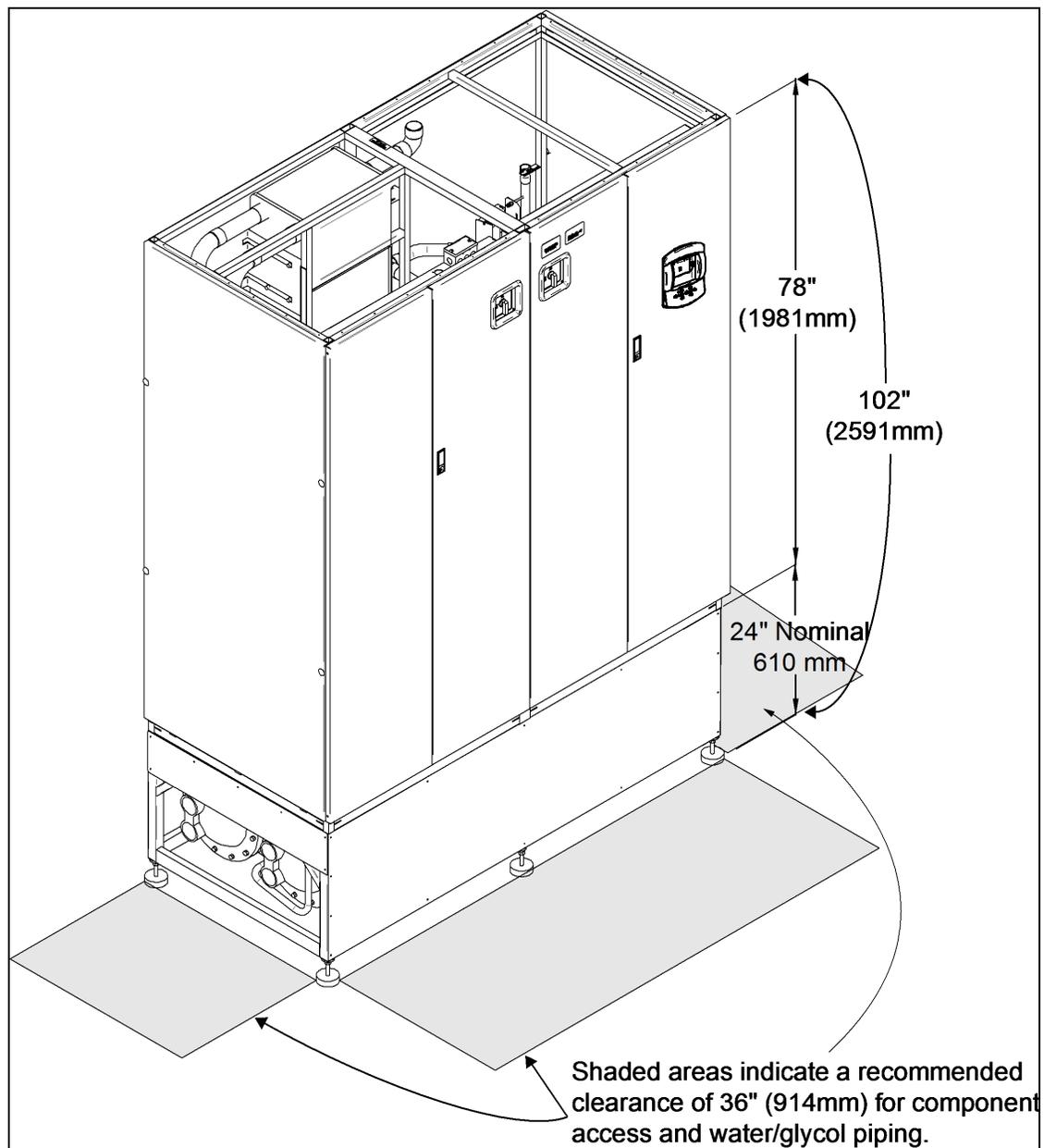
3.1.3 Positioning the Liebert XDC with Floor Stand

Install the Liebert XDC according to the site-specific documentation and secure the unit to the floor.

The Liebert XDC can be installed near a wall or another Liebert XDC. There must be at least 3 feet (914mm) clearance in front of the Liebert XDC for service access. When the Liebert XDC is combined with the optional water/glycol floor stand, Vertiv recommends leaving 3 feet (914mm) of clearance on the left side of the unit.

A Liebert XDC on a floor stand is 102 inches (2591 mm) high (see Figure 3.5 below). The unit can be raised or lowered 1.5 inches (38.1 mm) with the leveling feet.

Figure 3.5 Dimensions and clearances for Liebert XDC on floor stand



3.2 Electrical Considerations

3.2.1 High Voltage Connections

Make sure the actual supply voltage and frequency correspond to the voltage and frequency indicated on the Liebert XDC's rating plate.

Connect cables for high voltage supply to the electrical box in the Liebert XDC according to Figure 3.1 on page 15, Figure 3.7 on page 24 and Figure 3.8 on page 25 and make sure that the phases are correctly connected.



WARNING! Risk of electric shock. Can cause death and injury.
Disconnect all local and electric remote power supplies before working within.



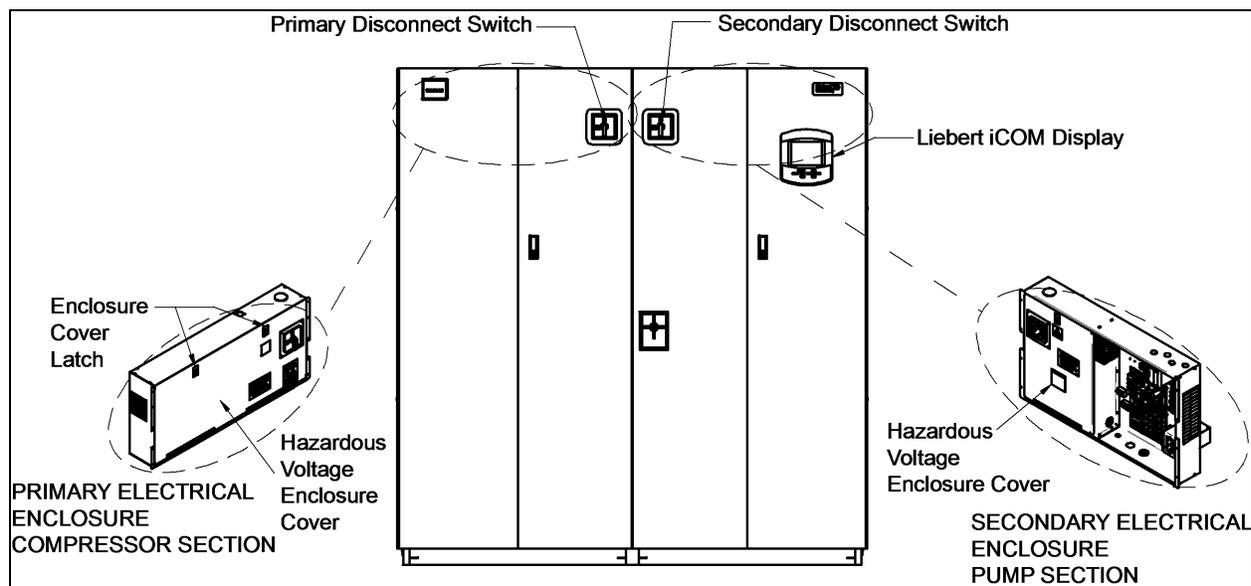
WARNING! Risk of electrical shock, short circuit and/or control malfunction. Can cause equipment damage injury and death. Damage to wiring or components can make unit unsafe to operate. Use caution when installing wiring to prevent damage to factory wiring. Install protective bushings in wiring knockouts as required to protect wiring from sharp edges. Do not disturb factory wiring or route field-installed wiring over electrical terminals. Use NEC Class 1 wiring for all hazardous voltage electrical power supplies. Check and retighten all wiring connections before starting the unit.

NOTE: Before beginning to install the Liebert XDC, read all instructions, verify that all the parts are included and check the nameplate to be sure the Liebert XDC voltage matches available utility power. Follow all local codes.

3.2.2 Connecting High-Voltage Cables

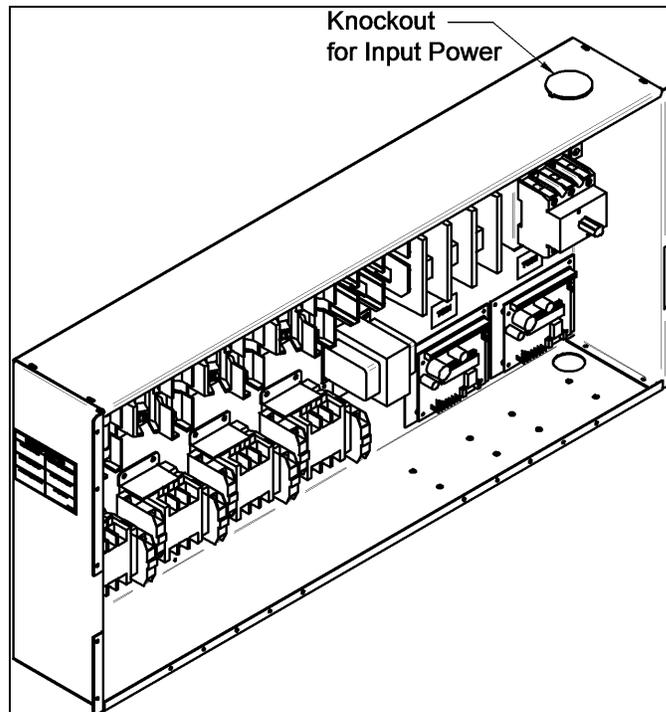
1. Turn the Liebert XDC's primary disconnect switch to the Off position (see Figure 3.6 below). Open the front doors and push down on the enclosure cover latch to open the hazardous voltage enclosure cover.

Figure 3.6 Front view of Liebert XDC and electrical enclosures



2. Determine which knockouts in the electrical enclosure will be used and remove them (see Figure 3.7 below).

Figure 3.7 Electrical enclosure knockout locations for field wiring



3. Route the input hazardous voltage electrical power wiring through the top right knockout on the primary electrical enclosure (see Figure 3.7 on the previous page) to the disconnect switch L1, L2 and L3 (see Figure 3.8 below). Observe proper phasing.
4. Connect the ground wire to the ground lug (see Figure 3.8 below and Figure 3.10 on the next page for 60Hz models and Figure 3.9 below and Figure 3.11 on the next page for 50Hz models).

Figure 3.8 60Hz models, high voltage connections—primary disconnect switch

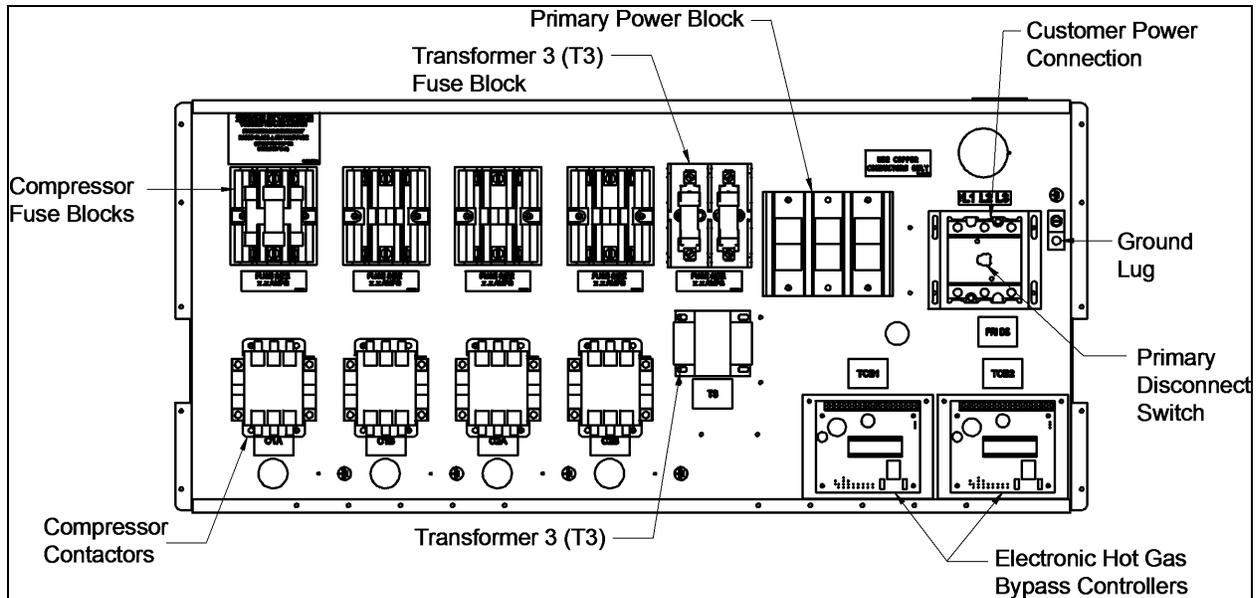


Figure 3.9 50Hz models high voltage connections—primary disconnect switch

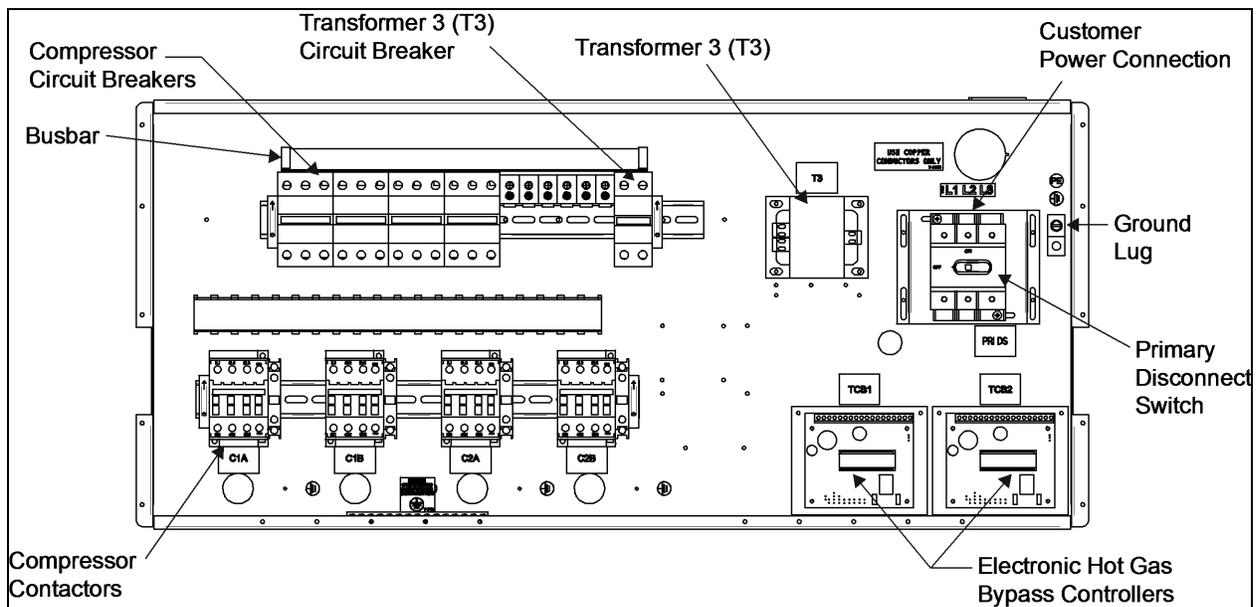


Figure 3.10 60Hz models high voltage connections—secondary disconnect switch

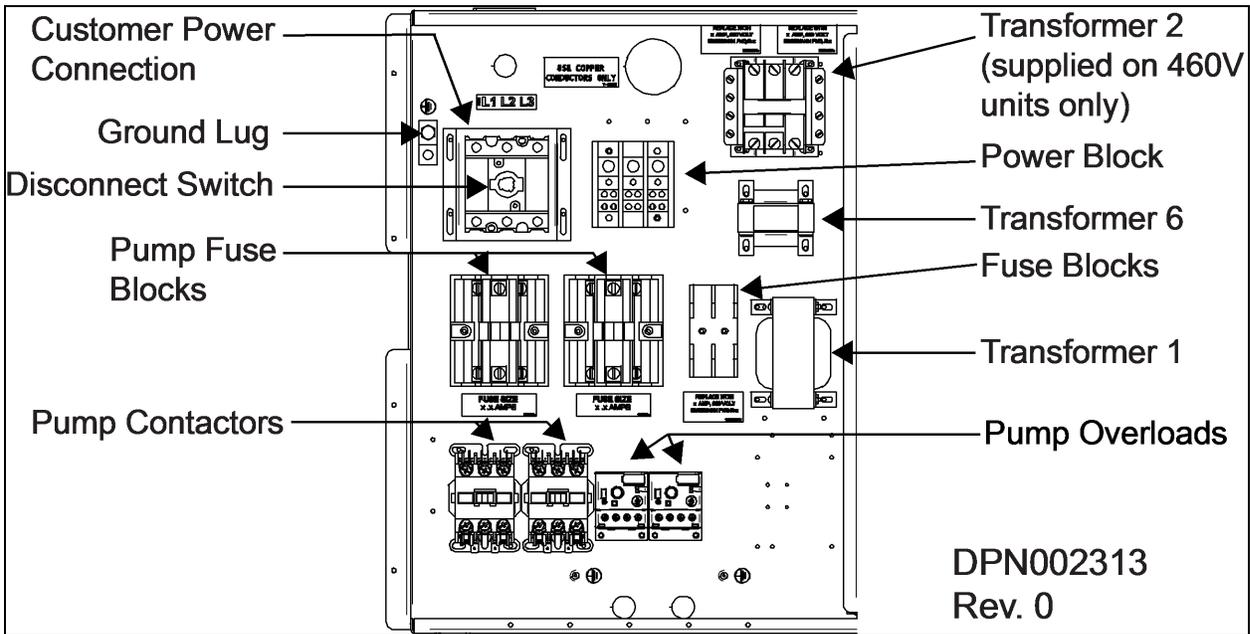
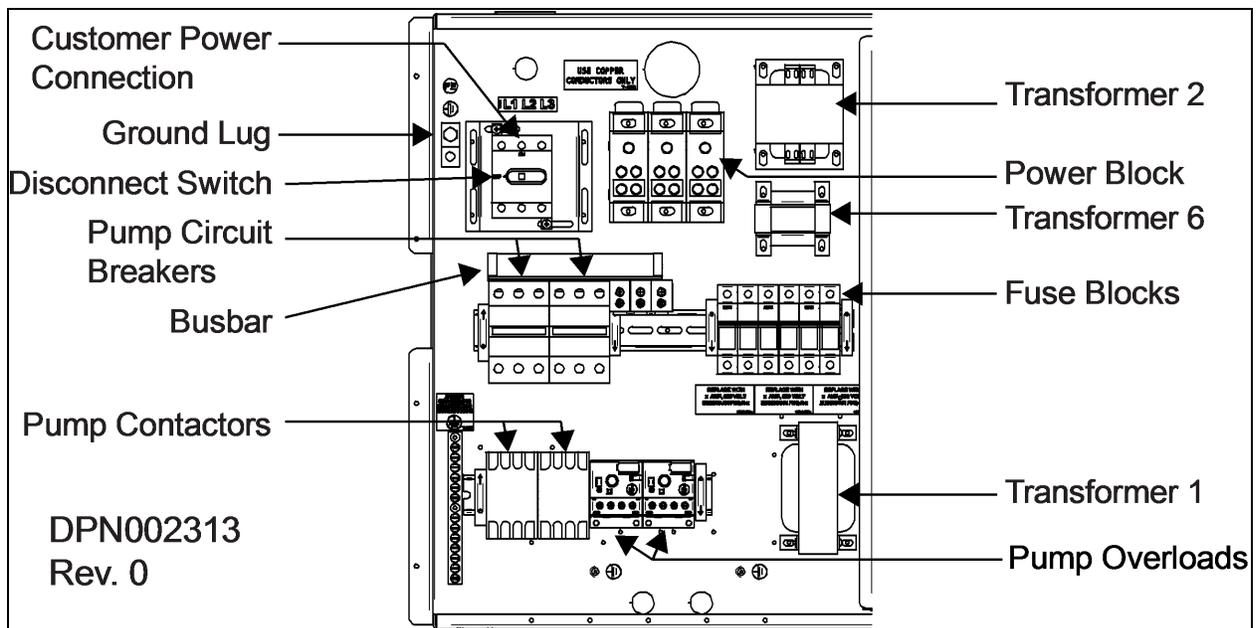


Figure 3.11 50Hz models high voltage connections—secondary disconnect switch



3.3 External Pump Overloads

The Liebert XDC is shipped with external pump overload with trip point settings and DIP switch settings for normal operations. The trip points are in increments of 0.25A and should not be changed from the factory settings. For 460V 60Hz and 380-400V 50Hz units, the trip point is set at 1.5A (Figure 3.12 below). See Figure 3.14 below for factory DIP switch settings for normal operation with reset mode set as automatic and Trip Class 20.

Figure 3.12 460V 60Hz and 400V 50Hz factory setting external pump overload trip point

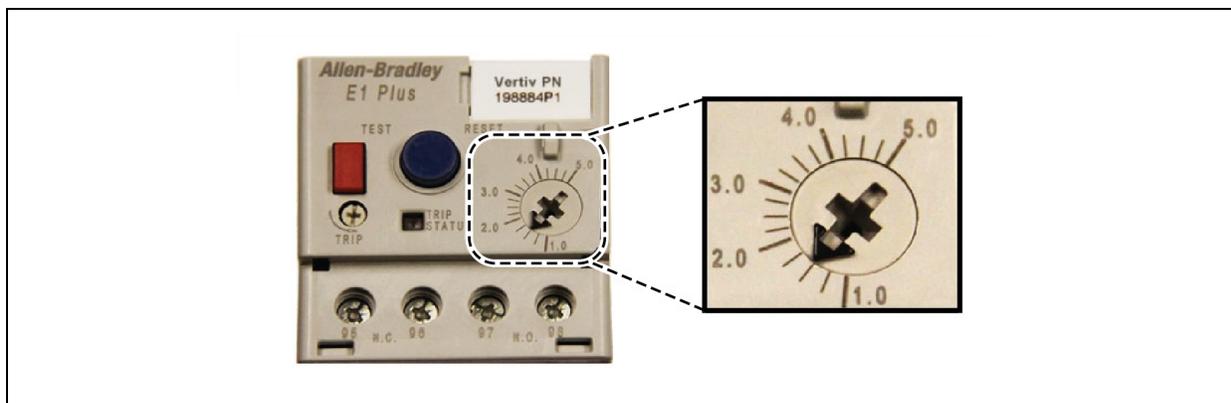


Figure 3.13 208V factory setting external pump overload trip point

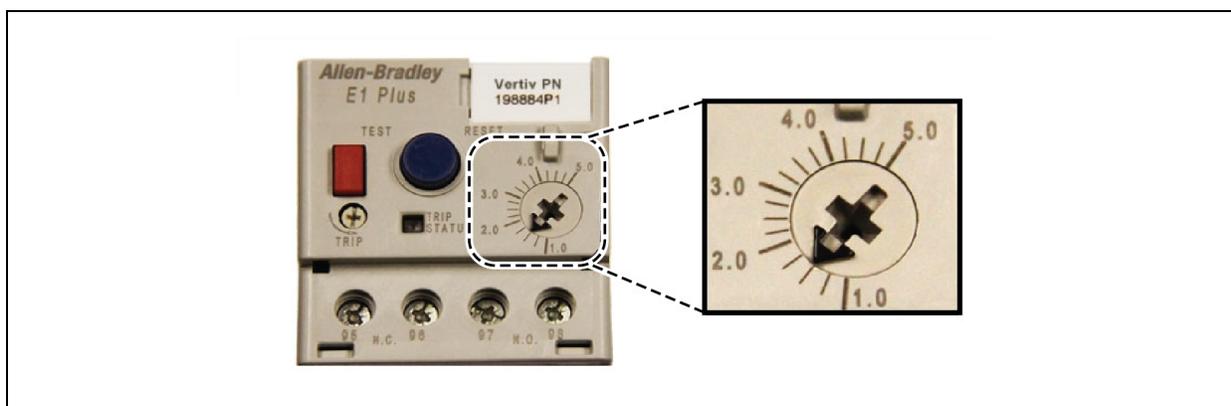
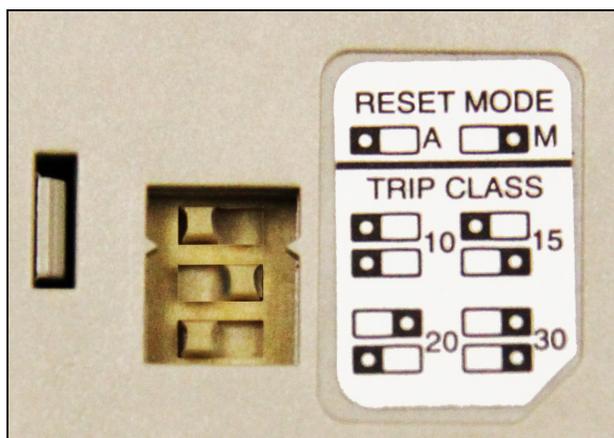


Figure 3.14 Factory DIP switch settings



3.4 Extra Low Voltage Connections

Extra Low Voltage (ELV) power output is 30V and 100VA or less.

1. Turn off all unit power before connecting cables or wires. Failure to do so may damage this equipment.
2. Route low voltage electrical connections through the appropriate knockouts as shown in Figure 3.17 on page 31.
3. User interface and temperature/humidity sensor wire is NEC Class 2. All electrical installation must comply with all national, state and local requirements.

Figure 3.15 Liebert XDC heat rejection connection points

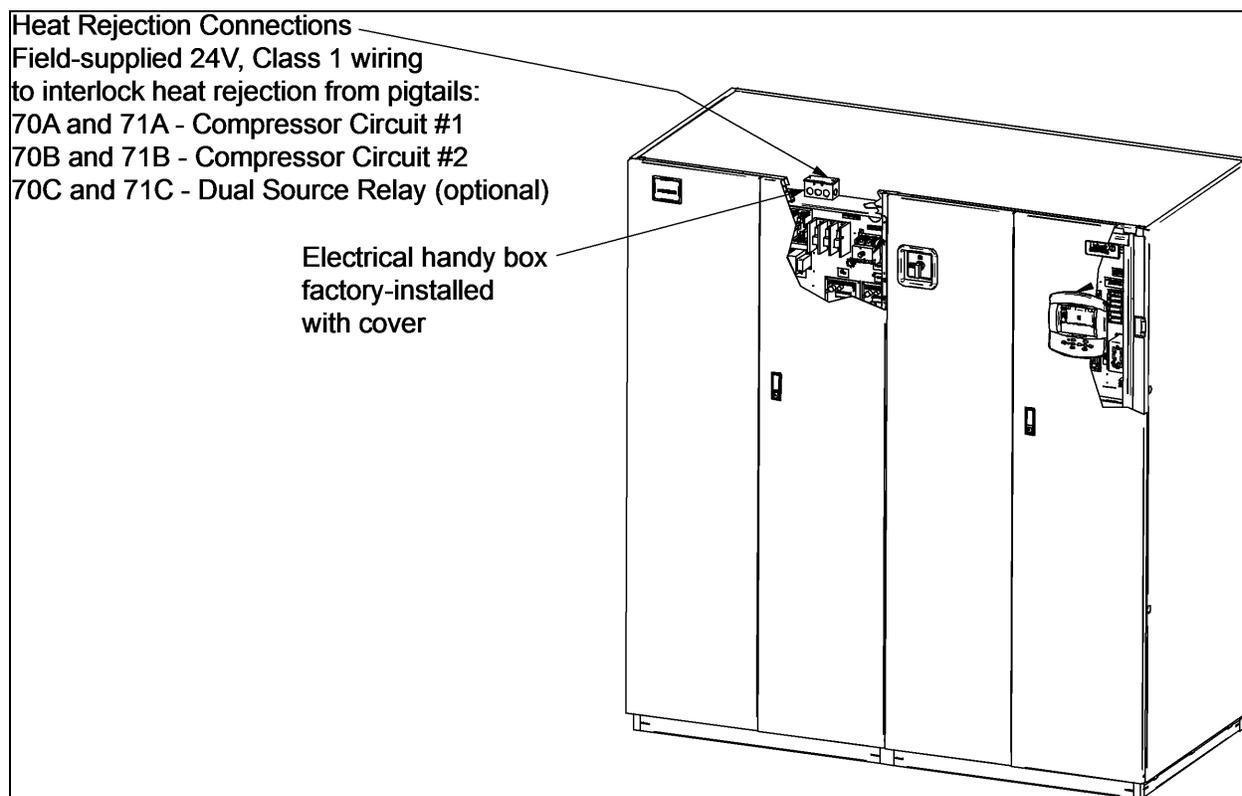
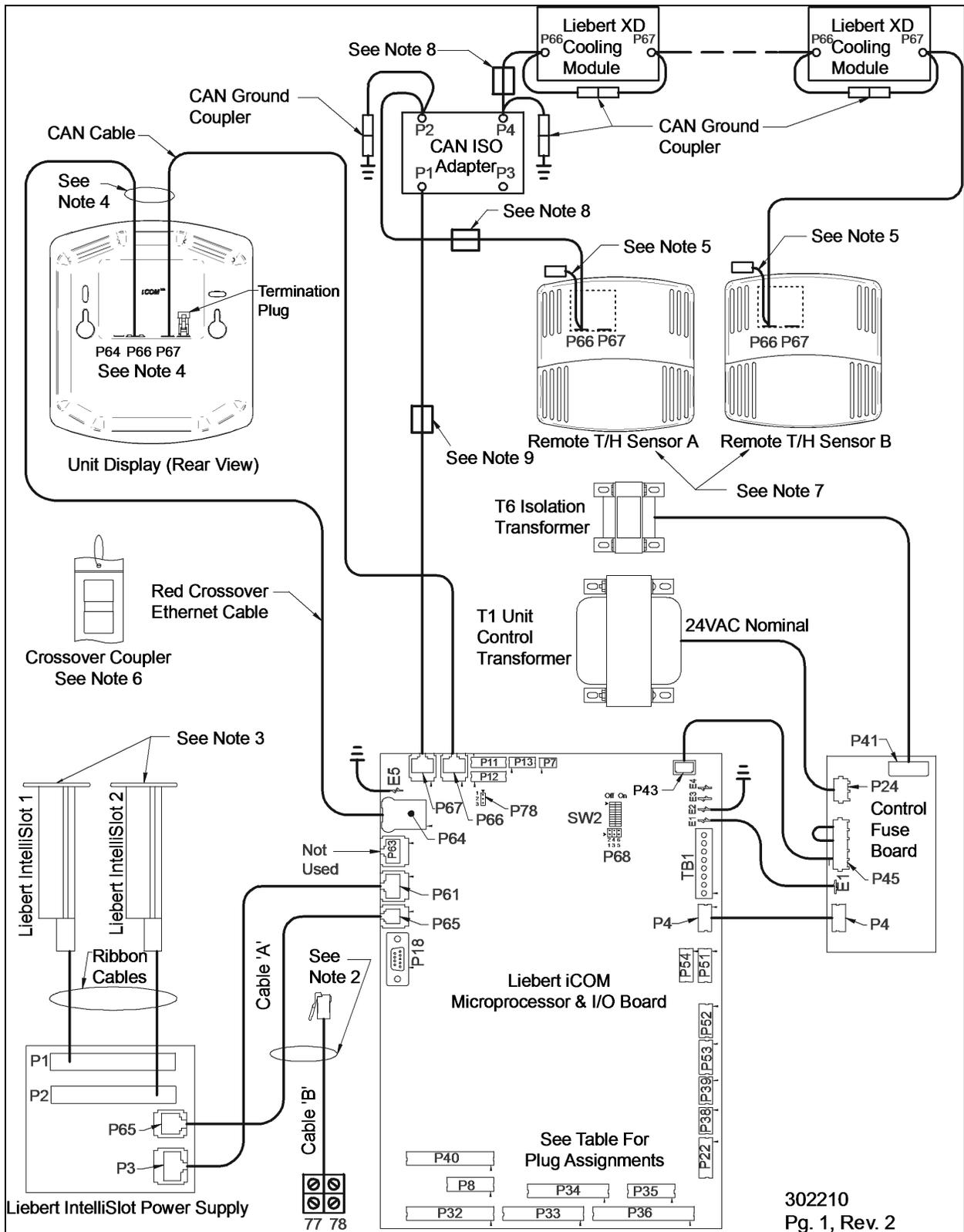


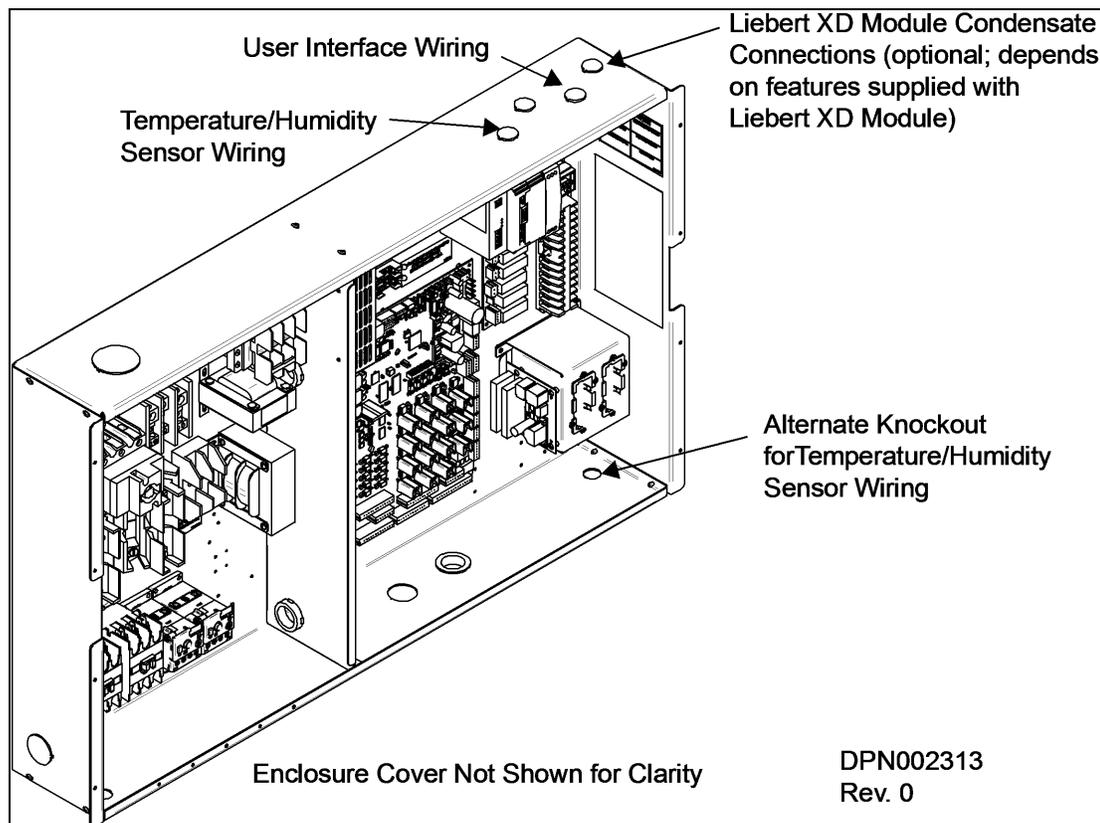
Figure 3.16 Connecting remote temperature/humidity sensors



Notes on Figure 3.16 on the previous page

1. See unit electrical schematic, installation and user manuals.
2. Cables A and B provided with each unit. Only one is used as follows:
 - a. Liebert IntelliSlot-Based Communications—Cable A is pre-connected to P65 on the microprocessor and I/O board and P65 on Liebert IntelliSlot power supply.
 - b. Non-Liebert IntelliSlot-Based Communications—Cable B is pre-connected to Terminals 77 & 78 but must be exchanged with Cable A at P65 on the microprocessor and I/O board.
3. Install applicable Liebert IntelliSlot cards.
4. Both cables (P64 and P66) are required.
5. It is not necessary to connect ground coupling on end of cable connected to Sensor A or B.
6. A crossover coupler is provided for unit-to-unit (U2U) networking. Unplug the red cable from P64 on the microprocessor and I/O board and connect to one side of the crossover coupler. The first customer connection point is to P64 on the microprocessor and I/O board. The second customer connection point is to the other side of the crossover coupler. This connects the microprocessor and I/O board and display to the private U2U network.
7. The remote sensors are interchangeable as to which connects to the Liebert XD cooling module and which connects to P2 on CAN ISO.
8. Field-install cables with factory-installed ferrite beads (when provided, typical two places). Each cable must make three passes through the ferrite bead. Locate the ferrite bead on top of the electric box. See instruction sheet provided with the cable assembly.
9. Factory-installed ferrite bead (when provided). Cable passes through ferrite bead three times.

Figure 3.17 Electrical enclosure knockout locations for Extra Low Voltage connections



Field Connections—All Units

- Place Sensor A in the higher-temperature portion of the cold aisle where the Liebert XD modules are located. Alternatively, it may be placed on the return air side of the primary air mover (e.g., Liebert DS™) in the room if it represents the conditions where all the Liebert XD cooling modules are located. Do not install the sensor where ambient air might cause false readings, for example, near unsealed doors, windows and similar areas.

1. Unpack the two remote temperature/humidity sensors and cables.

One sensor is labeled Sensor A and the other, Sensor B. The sensor cables are interchangeable; each bears labels indicating Sensor End and Unit End.

2. Connect the Sensor End of one of the supplied sensor cables to P66 on Sensor A (see Figure 3.16 on page 29).
3. Connect the Unit End of the sensor cable to P4 on the CAN Isolator inside the Liebert XDC (see Figure 3.16 on page 29). Secure the terminal plug on the cable shield to the into the terminal plug adjacent to P2 (see Figure 3.16 on page 29).
4. Connect the Sensor End of the second sensor cable to P66 on Sensor B (see Figure 3.16 on page 29).
5. Connect the Unit End of the cable to P4 on the CAN Isolator inside the Liebert XDC (see Figure 3.16 on page 29). Secure the terminal plug on the cable shield to the terminal plug adjacent to P4 (see Figure 3.16 on page 29).

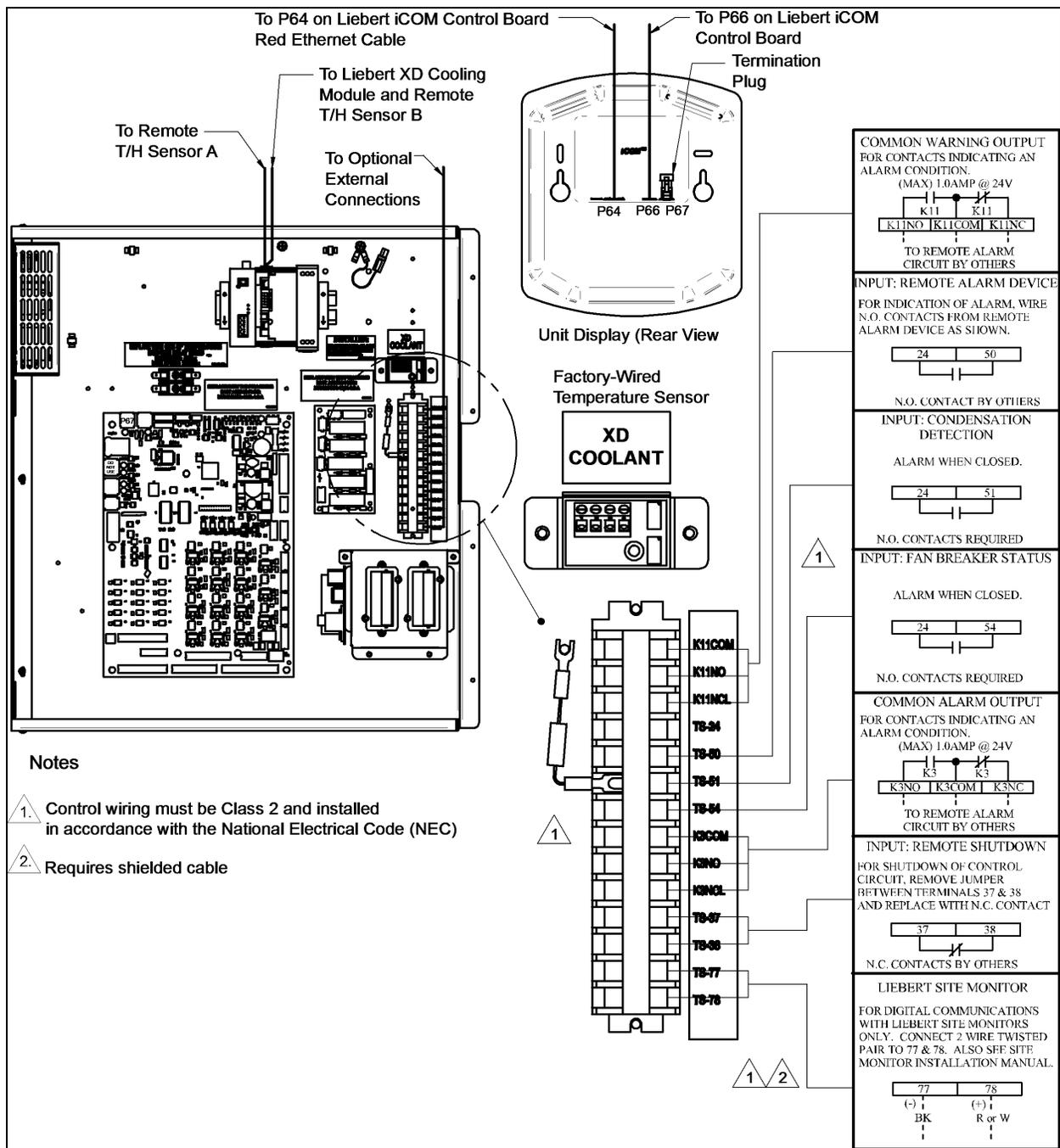
Field Connections—Optional for All Units

- Connect optional field wiring from remote devices to Remote Alarm Device, Common Alarm Output, IGM and Remote Shutdown, if applicable. See terminal strip descriptions in Figure 3.18 on the facing page.

Field Connections—Air-Cooled Units only

Connect field wiring to heat rejection connection terminals on the handy box as shown in Figure 3.15 on page 28.

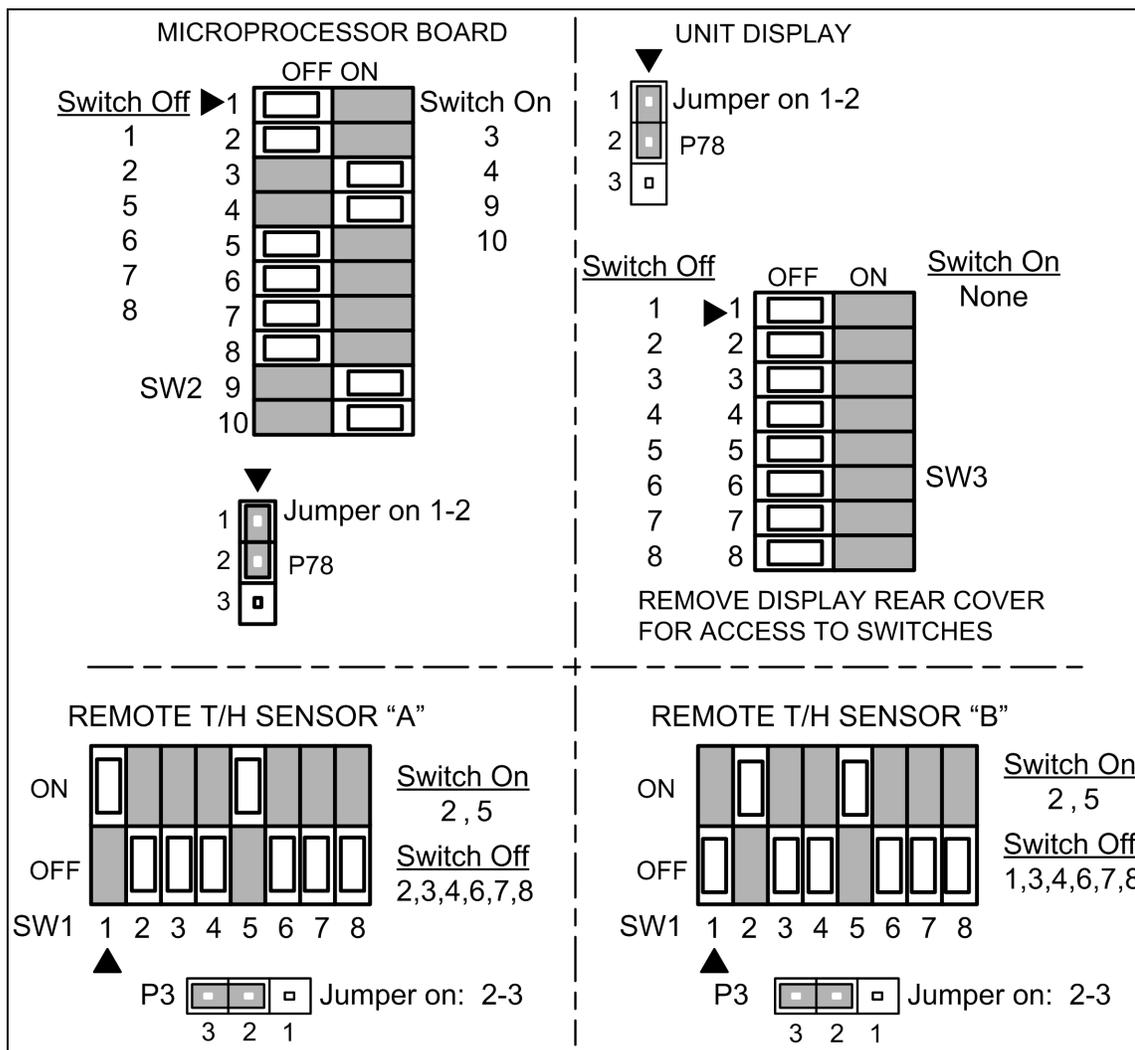
Figure 3.18 Extra Low Voltage field connection points



DIP Switch and Jumper Settings for remote sensors

The Liebert XDC is shipped with jumpers and DIP switch settings for normal operations. See Figure 3.19 below.

Figure 3.19 DIP switch and jumper settings for remote sensors

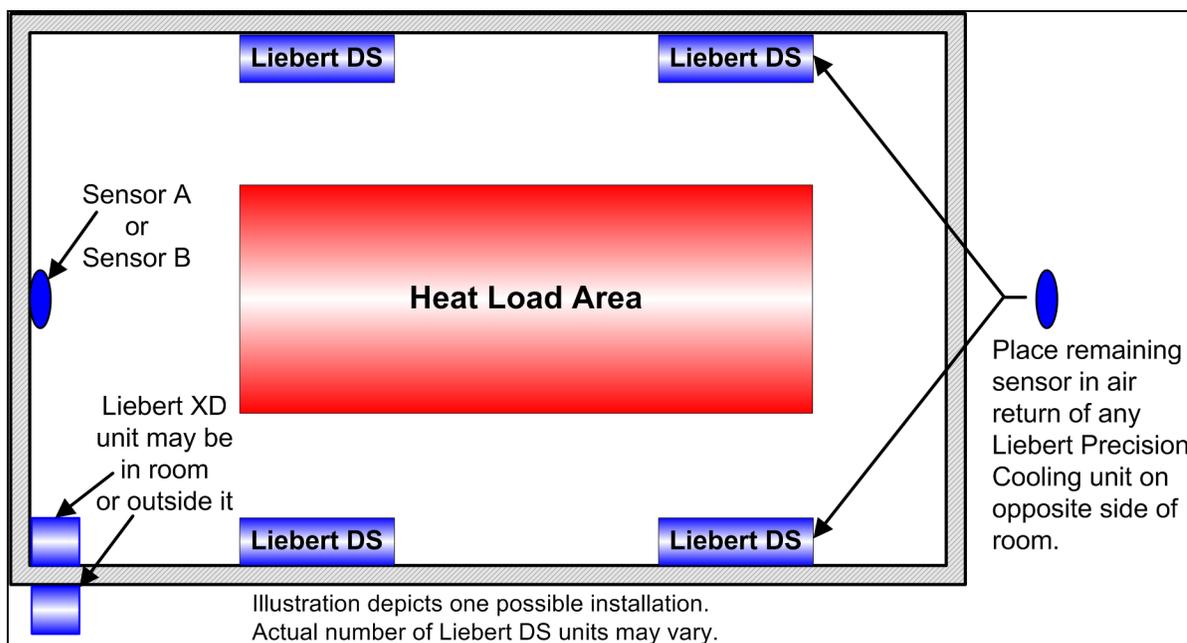


3.5 Remote Sensor Installation—Proper Placement

Placement of the two remote temperature/humidity sensors is critical to effective cooling of the conditioned space.

The remote sensors must be installed in areas where conditions are representative of the space conditioned by the Liebert XDC. Vertiv recommends installing the sensors in different areas near the cooling modules served by the Liebert XDC. If the return air side of the primary air mover, such as a Liebert DS, represents the conditions where the Liebert XD cooling modules are located, one sensor could be placed there. Vertiv suggests placing the other sensor on the wall opposite the heat load area (see Figure 3.20 on the facing page for guidance).

Figure 3.20 Suggested remote sensor placement



Do not install the sensors where ambient air might cause false readings, for example, near unsealed doors or windows, or areas with stagnant air.

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4 PIPING AND FILLING WITH REFRIGERANT: R-134A AND R-407C CIRCUITS

4.1 European Union Fluorinated Greenhouse Gas Requirements

Stationary air conditioning, refrigeration, heat pump equipments and stationary fire protection systems in the European Community market and operating with fluorinated greenhouse gases (f-gas), such as R407C, R134a, R410A, must comply with the F-Gas Regulation: (EC) No. 842/2006 (F-gas). The regulation prohibits, among other actions, venting fluorinated greenhouse gases to the atmosphere.

The F-Gas Regulation requires operators to use all measures that are technically feasible and do not entail disproportionate cost to prevent leakage of these gases, to test for leakage regularly and to recover f-gas before disposing of equipment, as well as during service and maintenance.

Refer to the full regulation for additional details.

4.2 Recommended Pipe Size

NOTE: Follow all local codes on maximum length and size of refrigerant lines.

Connect the main pipes between the Liebert XDC and the Liebert XD cooling modules according to site specific documentation and the configuration guide for the Liebert XD system.

Elbows and restrictions shall be minimized for proper operation.

Table 4.1

Supply, return pipe sizes for Liebert XD refrigerant loop

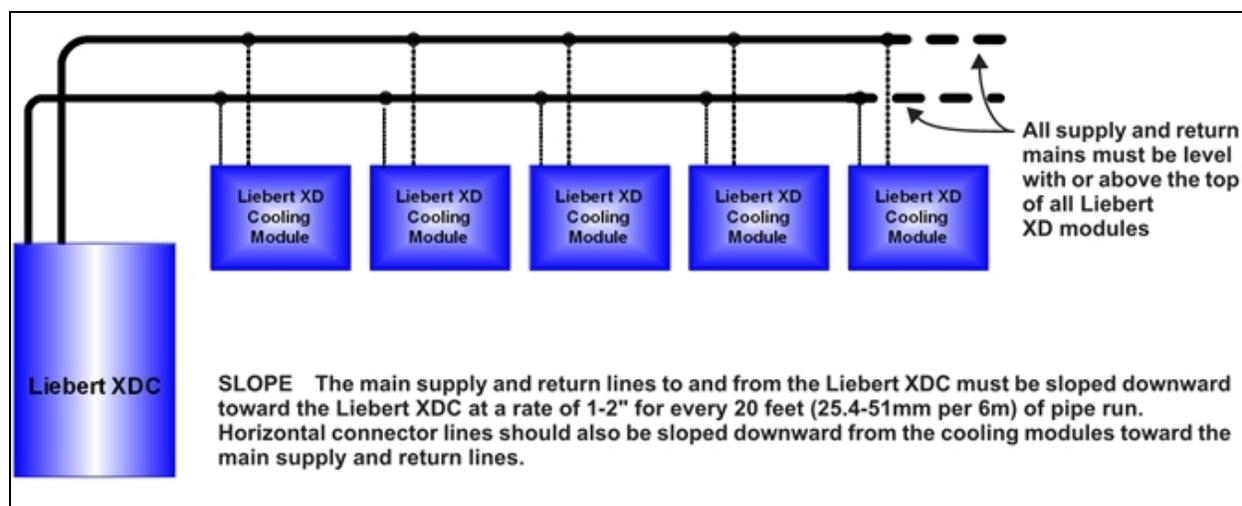
Pipe Function	Size/Equivalent Pipe Length
Liebert XDC supply line, from Liebert XDC supply to farthest Liebert XD cooling module	1-1/8" OD (1.025" ID) for lengths up to 60 feet
	1-3/8" OD (1.265" ID) for lengths over 60 but less than 175 feet
Liebert XDC return line, from farthest cooling module to Liebert XDC return	2-1/8" OD (1.985" ID) for lengths up to 60 feet
	2-5/8" OD (2.465" ID) for lengths over 60 but less than 175 feet
From any model Liebert XDO/Liebert XDH supply to supply line of Liebert XDC	1/2" OD (0.430" ID) for lengths up to 10 feet
	7/8" OD (0.785" ID) for lengths over 10 but less than 25 feet
From any model Liebert XDO/Liebert XDH return to return line of Liebert XDC	7/8" OD (0.785" ID) for lengths up to 10 feet
	1-1/8" OD (1.025" ID) for lengths over 10 but less than 25 feet
From any model Liebert XDV/Liebert XDCF supply to supply line of Liebert XDC	1/2" OD (0.430" ID) for lengths up to 10 feet
	5/8" OD (0.545" ID) for lengths over 10 but less than 35
From any model Liebert XDV/Liebert XDCF return to return line of Liebert XDC	5/8" OD (0.545" ID) for lengths up to 10 feet
	7/8" OD (0.785" ID) for lengths over 10 but less than 35 feet

4.3 Liebert XDC Interconnection With Liebert XD Cooling Module

All piping must be ASTM (American Society for Testing and Materials) Type ACR copper pipe.

The Liebert XDC may be connected to Liebert XD cooling modules with either Liebert’s XD prefabricated piping assembly or with rigid, off-the-shelf piping. In either setup, piping for the Liebert XD system is arranged in a manner similar to piping for a chilled water system. Liebert XD cooling modules are connected in parallel between main return and supply pipes going to and from the Liebert XDP/Liebert XDC. Figure 4.1 below represents a typical configuration. For piping details, refer to Liebert’s XD System Design Manual, SL-16655. The guidelines provided for pipe size must be strictly followed. Failure to size the main lines and connection lines adequately may result in reduced cooling capacity. The critical aspects of pipe sizing are related to refrigerant volume and pressure drop. Both must be minimized.

Figure 4.1 Liebert XD system diagram



4.4 Piping Installation Method

The assembly and connection means used for piping in the Liebert XD system are similar to those used for conventional refrigeration systems. All piping should be installed with high-temperature brazed joints. Soft soldering is not recommended.

During brazing, the lines must be filled with flowing dry nitrogen to prevent excessive oxidation and scale formation inside the piping. Prevailing good refrigeration practices must be employed for piping supports, leak testing, dehydration and charging. Failure to use good system practices may result in damage to the system. Refer to the ASHRAE refrigeration handbook for general good-practice refrigeration piping.

Insulate all piping lines to prevent condensation in applications where the dew point approaches the R-134a refrigerant temperature.

Vertiv recommends venting the pressure relief valves for both the R-134a and R-407C sides outside the conditioned space where it is open to the atmosphere. The R-134a side relief valve is inside the Liebert XDC unit at the top of the receiver. The R-407C water/glycol-cooled side relief valves are located at each condenser beneath the Liebert XDC unit in the floor stand. The R-407C air-cooled relief valves are located outside within the air-cooled system.

4.4.1 Piping Installation—R-134a Pumped Circuit

Vertiv recommends venting the relief pressure of the Liebert XDC (located at the top of the receiver) outside of the conditioned space where it is open to the atmosphere.

4.4.2 Bypass Flow Controllers

Two bypass flow controllers are required to ensure the Liebert XDC pumps operate within the optimum range. These devices are added to the field piping and simulate the flow of additional cooling modules.

Each bypass flow controller must be installed with one shutoff valve to allow the controller to be disabled when cooling modules are added to a Liebert XD system.

Bypass flow controllers should be connected between the main supply and the main return lines of the field piping. The connection points to the main supply and return lines should be in a convenient and accessible location between the Liebert XDP/Liebert XDC and the first Liebert XD module in the circuit. See Figure 4.2 below and Figure 4.3 on the next page for piping details of the bypass flow controller.

Refer to Table 4.2 below to determine the number of bypass flow controllers needed to be open to provide proper refrigerant flow, based on the total nominal cooling capacity of the cooling modules in each Liebert XD system.

Table 4.2

Bypass flow controllers for a Liebert XDC-based system

System Load kW Cumulative Module Model Size	Required Number of Open Bypass Flow Controllers
	Liebert XDC
32 to 63	N/A
64 to 95	2
96 to 127	1
128 to 160	0

Figure 4.2 Bypass flow controller details, dimensions

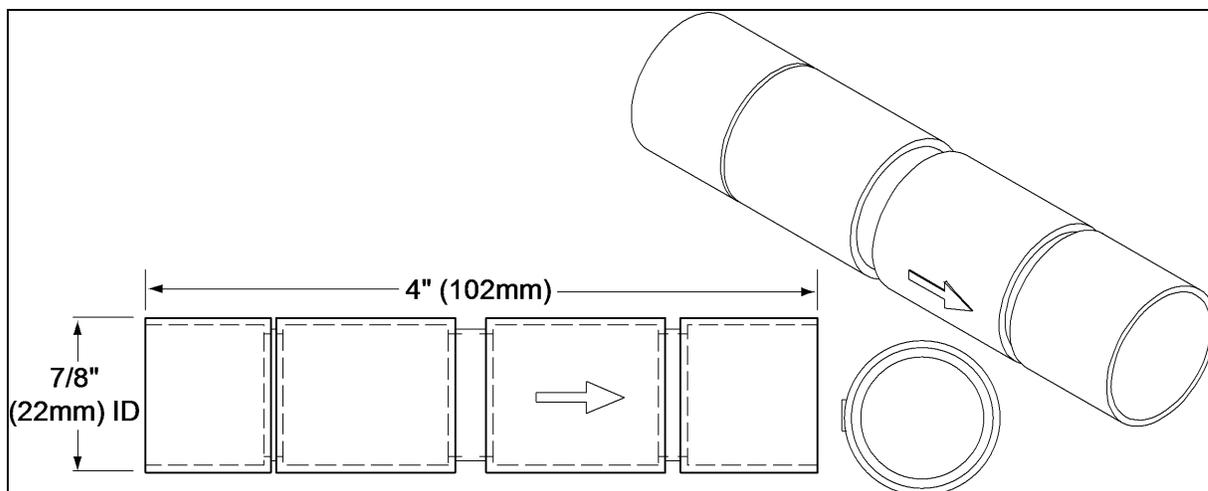


Figure 4.3 Bypass flow controller arrangement

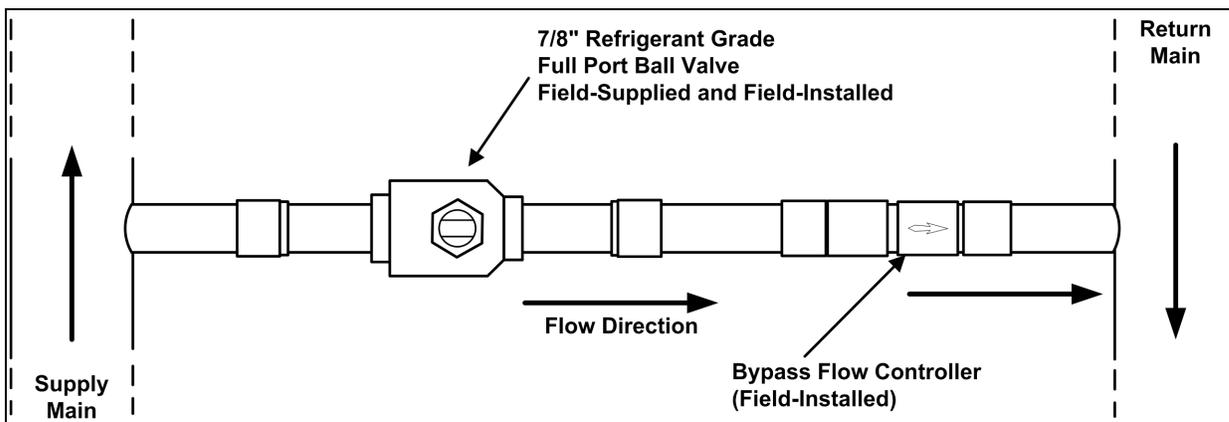
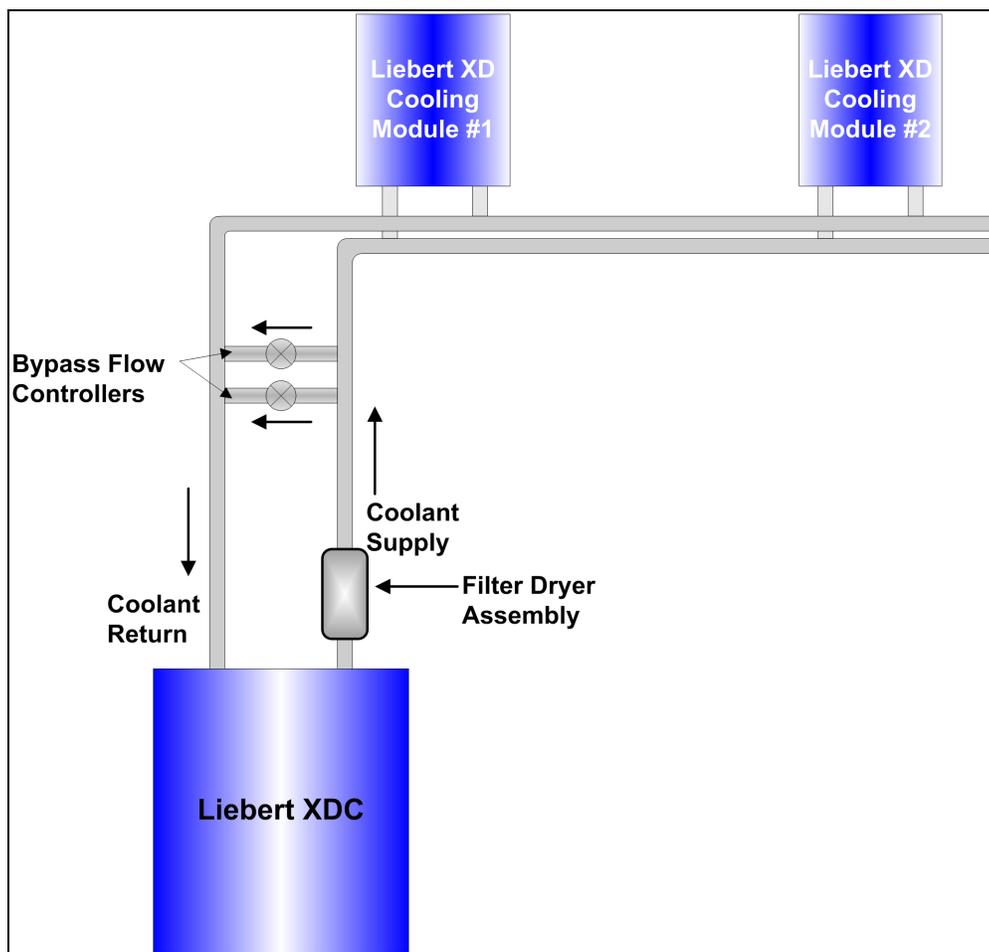


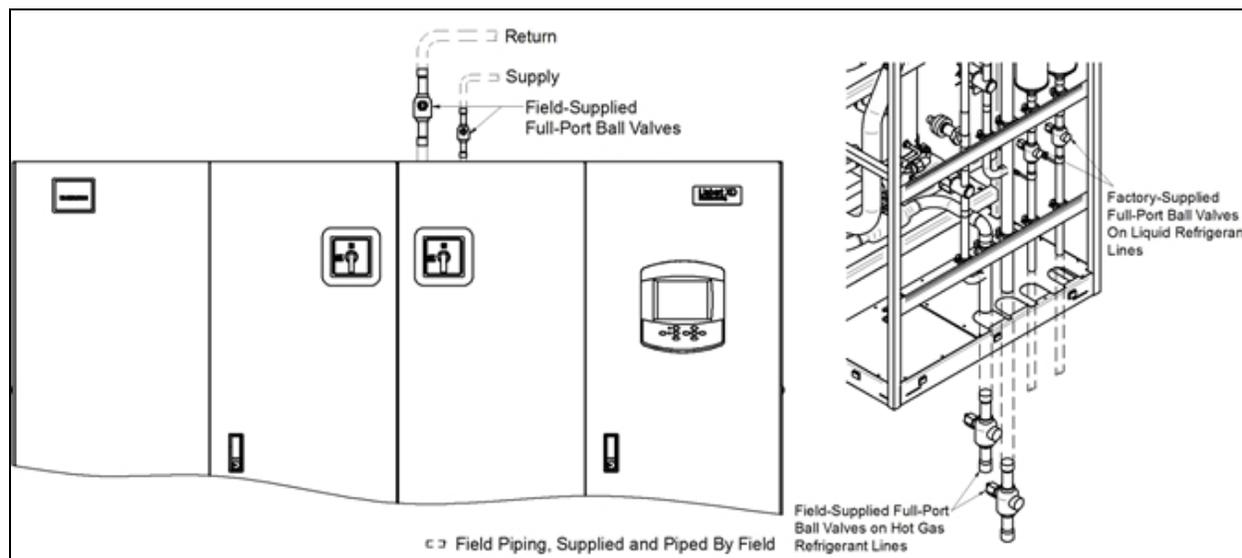
Figure 4.4 Bypass flow controller piping



4.5 Piping Details—Shutoff/Isolation Valves

Isolation valves must be installed on the Liebert XDC's refrigerant circuit to permit maintenance on the unit (see Figure 4.5 below.)

Figure 4.5 General piping details



Evacuation and Leak Check—R-134a Pumped Circuit

1. Open all service valves, including those located outside of the Liebert XDC.
2. Attach a jumper hose from one of the Schrader valve fittings on a pump outlet before the check valve to a Schrader valve fittings after the check valve.
3. Place 150 psig (1034kPa; 10.34 bars) of dry nitrogen with a tracer of R-134a in the system.

NOTE: Risk of overpressurization. Can cause equipment damage. Do not exceed 150 psig (1034 kPa; 10.34 bars) in the R-134a circuit.

4. Check the system for leaks with a suitable leak finder on the pumps' suction lines.
5. After completion of the leak testing, release the test pressure (per local code) and connect to vacuum pump(s) at the Schrader valves.
6. After four hours of pulling a deep vacuum, check the vacuum level and if it has not changed, break the vacuum with dry nitrogen.
7. Pull a second vacuum to 500 microns or less. Recheck the vacuum level after 2 hours.

Insulation

NOTE: Piping should not be insulated before it has been checked for leaks. Applying good insulation to pipes before checking for leaks would prevent easy detection of leaks.

Insulate all piping between the Liebert XDC and cooling modules to prevent condensation where the piping passes through non-conditioned areas.

4.6 Filling the Pumped Circuit—R-134a

1. Connect a charging manifold to the Schrader valve fittings on the pump suction lines.

2. Purge the hoses.
3. Calculate the amount of R-134a refrigerant needed to charge the system, using the values in Table 4.3 below, Table 4.4 below, Table 4.5 on the facing page and Table 4.6 on the facing page; for assistance, refer to [Calculating Refrigerant Charge—Example](#) on page 44. The section includes a worksheet to calculate system refrigerant charge requirements.
4. Weigh in the calculated charge.
5. After adding the calculated charge, allow the system to sit 15 to 30 minutes to reach equilibrium. Observe the refrigerant level through the sight glasses of the receiver.
6. If the refrigerant level is improper, the charge must be adjusted.

If the level is too high or too low, recalculate the required charge and reduce or increase the amount as needed to reach the proper level.

NOTE: All lengths in Table 4.4 below, Table 4.5 on the facing page and Table 4.6 on the facing page are actual pipe lengths, not equivalent pipe lengths.

NOTE: System refrigerant volume calculations derived from Table 4.3 below, Table 4.4 below, Table 4.5 on the facing page and Table 4.6 on the facing page are based on a fully loaded system. Additional charge may be required for lightly loaded systems.

Table 4.3

System R-134a charge for a Liebert XDC with any model Liebert XDH/Liebert XDO/Liebert XDV/Liebert XDCE

Refrigerant Charge, lb. (kg)	Per Liebert XD Unit (Excludes Connector Lines to and from Liebert XD Cooling Module)
157 lb. (65.7kg)	Liebert XDC
3.55 lb. (1.61kg)	Liebert XDO
2.32 lb. (1.05kg)	Liebert XDV
5.32 lb. (2.41kg)	Liebert XDH
1.41 lb. (0.64kg)	Liebert XDCE
4.0 lb. (1.81kg)	Liebert XDR

Table 4.4

System refrigerant charge for the supply and return mains

Refrigerant Charge, lb/foot (kg/m)	Supply/Return Main Length and Diameter
0.45 (0.67)	Main supply actual length per 1-1/8" OD copper tubing
0.68 (1.01)	Main supply actual length per 1-3/8" OD copper tubing
0.28 (0.42)	Main return actual length per 2-1/8" OD copper tubing
0.43 (0.64)	Main return actual length per 2-5/8" OD copper tubing

Table 4.5

R-134a refrigerant charge for hard-piped connector lines to and from any model Liebert XDH/Liebert XDO/Liebert XDV/Liebert XDCF

Refrigerant Charge, lb/foot (kg/m)	Hard-Piped Connector Length and Diameter
0.08 (0.12)	1/2" OD Liebert XDO/Liebert XDH/Liebert XDV/Liebert XDCF/Liebert XDR supply connector actual length
0.13 (0.19)	5/8" OD copper tubing Liebert XDV/Liebert XDCF supply connector actual length
0.26 (0.39)	7/8" OD Liebert XDO/Liebert XDH/Liebert XDR supply connector actual length
0.02 (0.03)	5/8" OD copper tubing Liebert XDV/Liebert XDCF return connector actual length
0.04 (0.06)	7/8" OD copper tubing Liebert XDV/Liebert XDCF return connector actual length
0.04 (0.06)	7/8" OD copper tubing Liebert XDH/Liebert XDO/Liebert XDR return connector actual length
0.07 (0.1)	1-1/8" OD copper tubing Liebert XDH/Liebert XDO/Liebert XDR return connector actual length

Table 4.6

R-134a refrigerant charge for Liebert XD Flex Pipe connector lines to and from any model Liebert XDO/Liebert XDH/Liebert XDV/Liebert XDCF

Refrigerant Charge, lb. (kg)	Metal Liebert XD Flex Pipe Connector Length
Supply Line Diameter 1/2"	
0.3 lb. (0.14)	4 ft. Liebert XD Flex Pipe Liebert XDH/Liebert XDO/Liebert XDV/Liebert XDCF/Liebert XDR supply
0.5 lb. (0.23)	6 ft. Liebert XD Flex Pipe Liebert XDH/Liebert XDO/Liebert XDV/Liebert XDCF/Liebert XDR supply
0.7 lb. (0.32)	8 ft. Liebert XD Flex Pipe Liebert XDH/Liebert XDO/Liebert XDV/Liebert XDCF/Liebert XDR supply
0.8 lb. (0.36)	10 ft. Liebert XD Flex Pipe Liebert XDH/Liebert XDO/Liebert XDV/Liebert XDCF/Liebert XDR supply
Return Line Diameter 5/8"	
0.01 lb. (0.01)	4 ft. Liebert XD Flex Pipe existing Liebert XDV systems
0.02 lb. (0.01)	6 ft. Liebert XD Flex Pipe existing Liebert XDV systems
0.03 lb. (0.01)	8 ft. Liebert XD Flex Pipe existing Liebert XDV systems
0.03 lb. (0.01)	10 ft. Liebert XD Flex Pipe existing Liebert XDV systems
Return Line Diameter 1"	
0.13 lb. (0.06)	4ft Liebert XD Flex Pipe Liebert XDH/Liebert XDO/Liebert XDV/Liebert XDCF/Liebert XDR supply
0.2 lb. (0.096)	6ft Liebert XD Flex Pipe Liebert XDH/Liebert XDO/Liebert XDV/Liebert XDCF/Liebert XDR supply
0.27 lb. (0.126)	8ft Liebert XD Flex Pipe Liebert XDH/Liebert XDO/Liebert XDV/Liebert XDCF/Liebert XDR supply
0.33 lb. (0.15)	10ft Liebert XD Flex Pipe Liebert XDH/Liebert XDO/Liebert XDV/Liebert XDCF/Liebert XDR supply

4.6.1 Calculating Refrigerant Charge—Example

Using Table 4.3 on page 42, Table 4.4 on page 42, Table 4.5 on the previous page and Table 4.6 on the previous page, calculate the refrigerant charge of the individual sections of your Liebert XD system. Add the calculated charge amounts to determine the amount of R-134a refrigerant required for one system combining a Liebert XDC with Liebert XD cooling modules (Liebert XD CoolFrame, Liebert XDH, Liebert XDO and Liebert XDV). The example below combines one Liebert XDC with 20 Liebert XDV8 cooling modules.

Table 4.7
Calculating refrigerant charge—example

Components	Number of Units or Piping Length, feet	Pounds Per Component	Total, lb.
Liebert XDC	1	157	157
Liebert XDV8 Cooling Modules	20	2.32	46.4
Supply Main, 1-1/8"	100	0.45	45
Return Main, 2-1/8"	100	0.28	28
Liebert XDV 1/2" supply Liebert XD Flex Pipes	20	0.8	16
Liebert XDV 5/8" return Liebert XD Flex Pipes	20	0.03	0.6
		Total	293

Table 4.8
Worksheet to calculate refrigerant charge

Components	Number of Units or Piping Length	Pounds Per Component	Total
		Total	

4.6.2 Piping for Direct Expansion (DX) Circuit—R-407C Air-Cooled Units



WARNING! Risk of refrigerant system explosion or rupture from overpressurization. Can cause equipment damage, injury or death.

Installer must install a 400 psig pressure relief valve in each of the two R-407C refrigerant circuits of the Liebert XDC system. Do not install shutoff valves between the compressors and the pressure relief valves.

For systems requiring EU CE compliance, the pressure relief valves must be CE-certified by a notified body to the EU Pressure Equipment Directive.

4.7 Install Double Discharge Risers

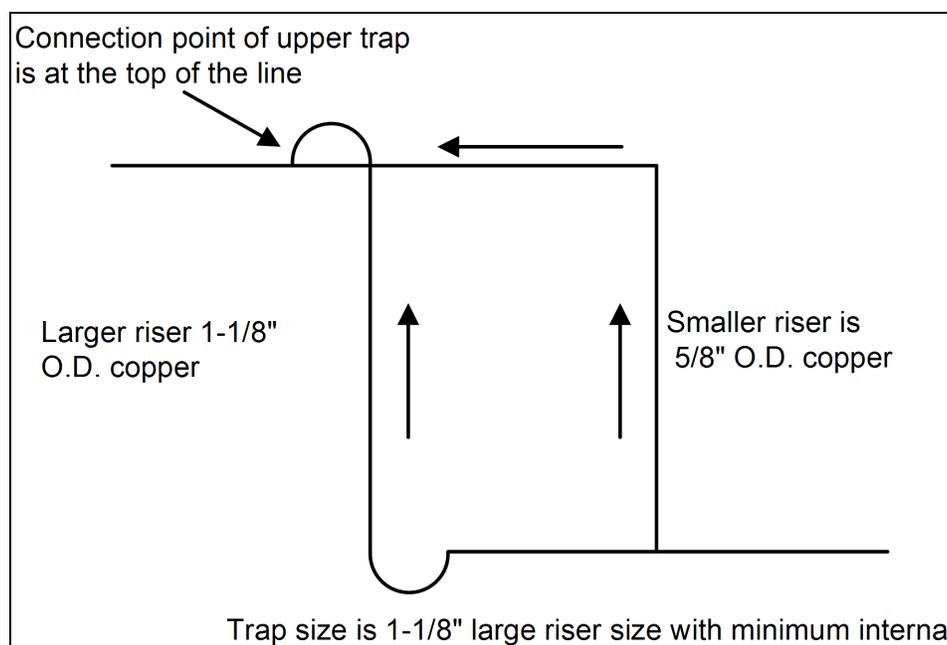
For air-cooled systems, double discharge risers must be installed in the hot gas lines that have vertical heights of 15 feet (4.6m) or more (see Figure 4.6 below). This will allow proper oil return to the compressors when the system is running at low loads. A double riser system is constructed of a large diameter riser with a trap at the base and a riser with a smaller diameter in parallel.

At full-load operation, the refrigerant vapor flows up both risers at velocities that are adequate to carry the oil. At low loads, refrigerant vapor velocities are lower and the trap at the bottom of the riser becomes filled with oil. When this happens, refrigerant flows up only the smaller riser.

The trap at the top of the riser must be tied into the top of the line to prevent oil from filling the larger riser. For each double riser used, the maximum height of the riser must not exceed 15 feet (4.6m). Multiple risers must be installed in series as the height of the hot gas line increases. Total maximum height of the hot gas line must not exceed 60 feet (18.3m).

Horizontal discharge lines should be pitched downward in the direction of flow to aid in oil drainage with downward pitch of at least 1/2 inch in 10 feet (13mm in 3m).

Figure 4.6 Double discharge riser layout



Contact your local Liebert representative for factory approval whenever a refrigerant piping run exceeds 200 feet (60m) equivalent length or when condensers must be installed below the level of the cooling coil.

For Air-Cooled Liebert Lee-Temp / Flood Back Head Pressure Control Units Only



WARNING! Risk of explosive discharge from high-pressure refrigerant. Can cause injury or death.

**This unit contains fluids and/or gases under high pressure.
Relieve pressure before working with piping.**

NOTICE

Risk of refrigerant contamination. Can cause equipment damage and operational problems.

Refrigerant R-407C is a blend of three components and must be introduced and charged from the cylinder only as a liquid.

Refrigerant R-407C uses a POE (polyolester) lubricant. Do not open the compressor unit piping to the atmosphere for more than 15 minutes. The compressors contain POE oil that is very hygroscopic; it quickly absorbs water from the atmosphere. The longer the compressor piping is open to the atmosphere, the harder it will be to fully evacuate. If left open too long, the POE oil may need to be replaced before achieving the required vacuum level.

POE oils also have a property that makes them act as a solvent in a refrigeration system. Maintaining system cleanliness is extremely important because the oil will tend to bring any foreign matter back to the compressor. Refer to the ASHRAE refrigeration handbook for general good-practice refrigeration piping.

Table 4.9

Receivers and head pressure kits for Liebert Lee-Temp condensers

Outdoor Ambient °F (°C)	Condenser Model 50/60Hz	Condenser Qty	Receiver Part #	Receiver Qty	Head Pressure Kit	Head Pressure Kit Qty
-30 to 100 (-34 to 38)	DCSL415	2	185010G2 ¹ /G4 ²	2	179711G1	2
-30 to 105 (-34 to 41)	DCSL616	2	179713G1 ¹ /G2 ²	1	179711G2	2
35 to 105 (2 to 41)	DCSL616	2	181610G2 ¹ /G4 ²	2	179711G1	2
1. 120V heater 2. 230V heater						

Figure 4.7 Installation data—Liebert Lee-Temp, one-circuit, four-fan model

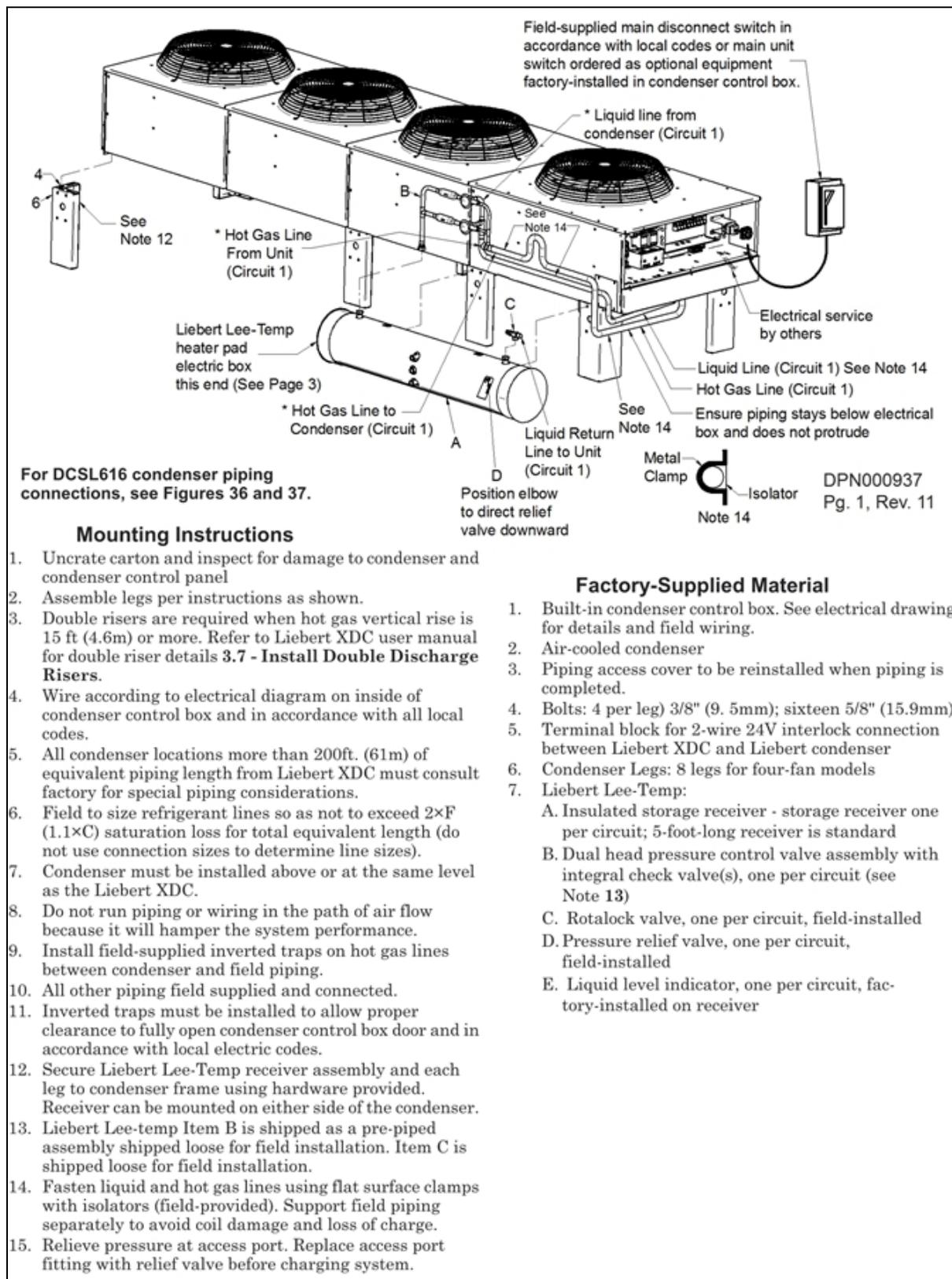


Figure 4.8 Installation data—Liebert Lee-Temp, one-circuit, high ambient six-fan model

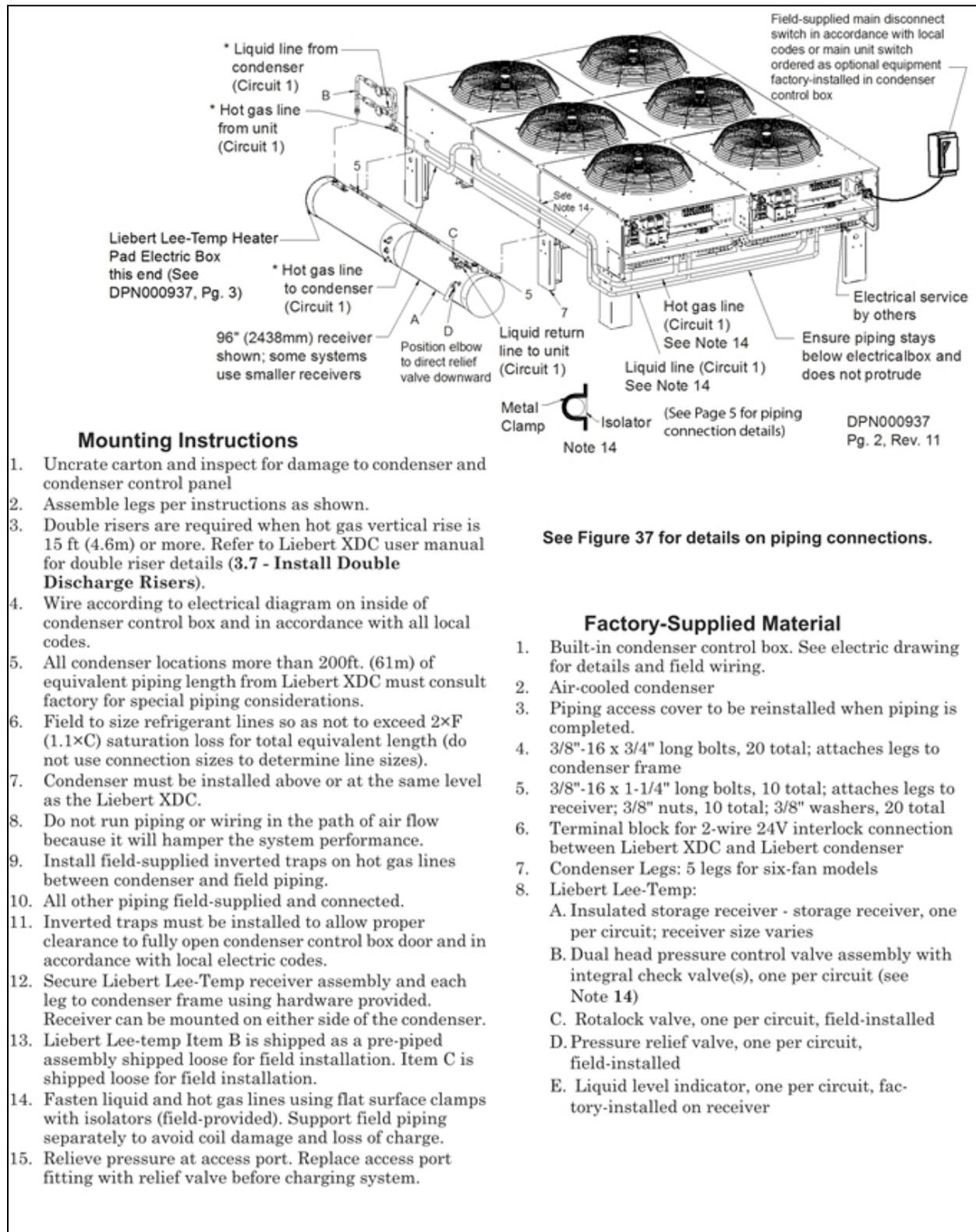


Figure 4.9 Liebert XDC piping schematic and Liebert Lee-Temp heater pad wiring

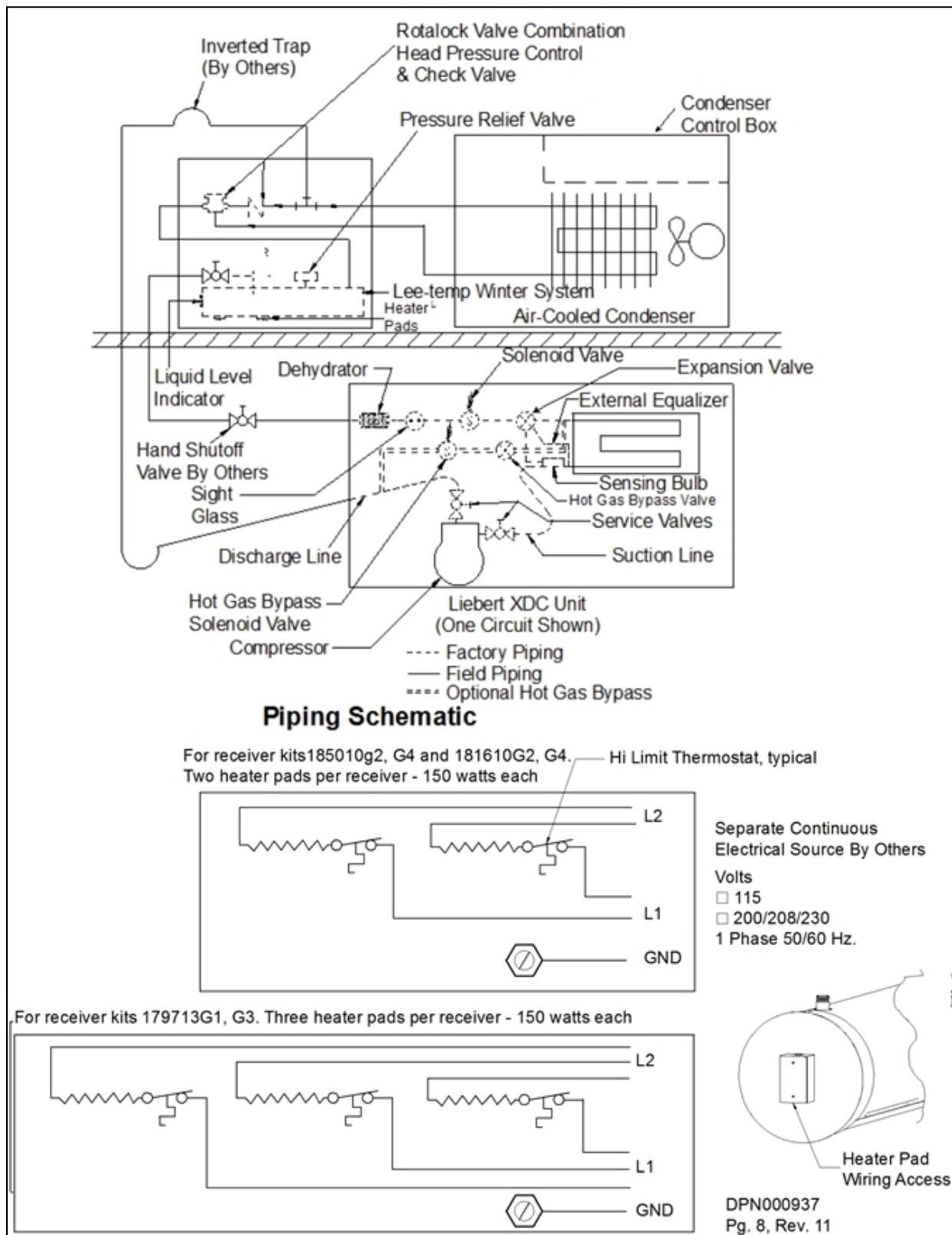


Figure 4.10 General arrangement air-cooled Liebert XDC Liebert Lee-Temp Control

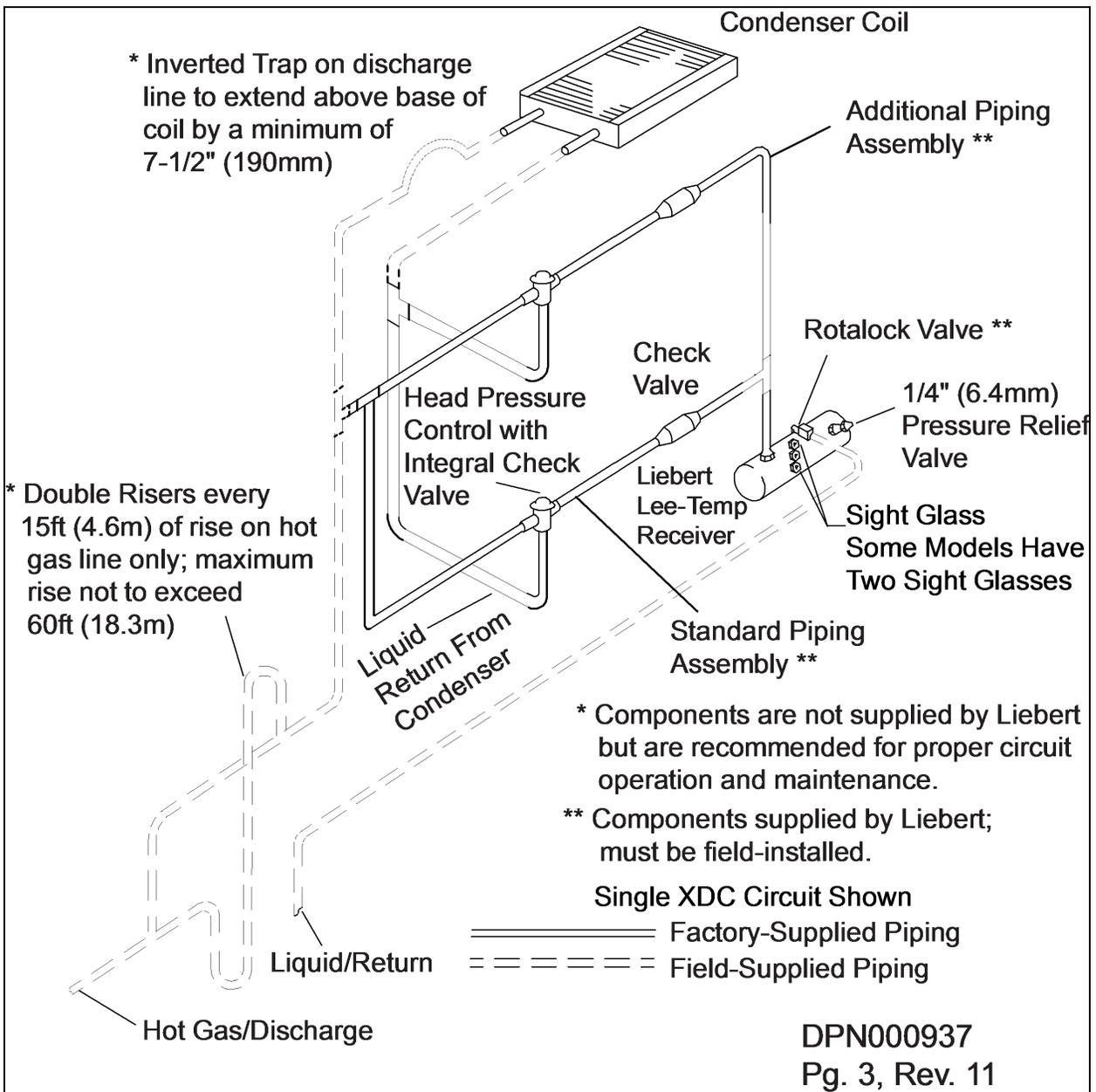


Table 4.10

Recommended refrigerant line sizes, DX R-407C, OD copper

Liebert XDC 160		
Equivalent Length, ft., (m)	*Hot Gas Line, in.	Liquid Line, in.
50 (15)	1-1/8	7/8
100 (30)	1-1/8	1-1/8
150 (45)	1-3/8	1-1/8
200 (60)	1-3/8	1-1/8

* Double risers are required when hot gas vertical rise is 15ft. (4.6m) or more (see [Install Double Discharge Risers](#) on page 45).
 Source: DPN000937, Pg. 3, Rev. 11

Figure 4.11 DCSL616 piping connections—two refrigerant circuits connected for parallel flow

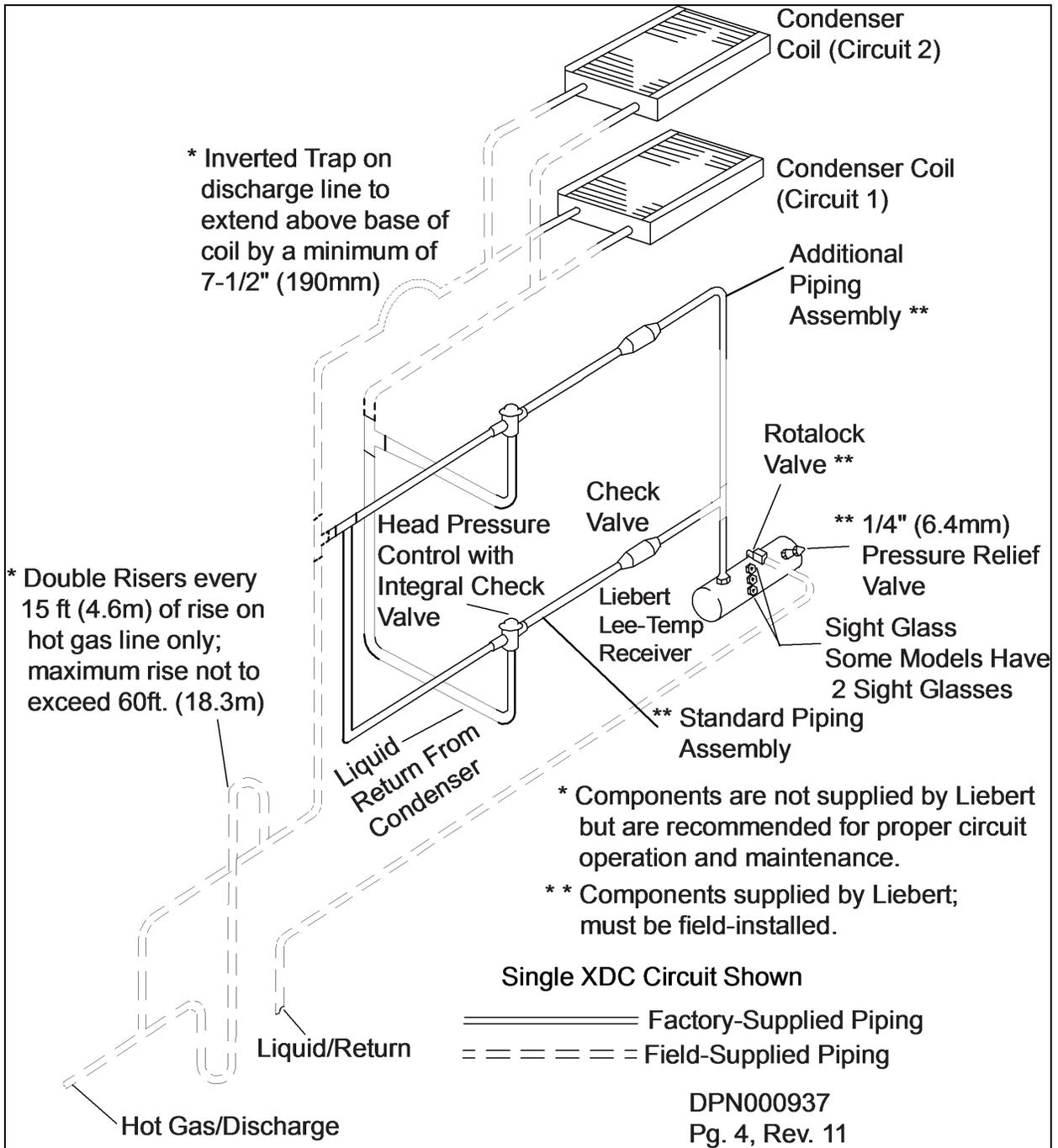


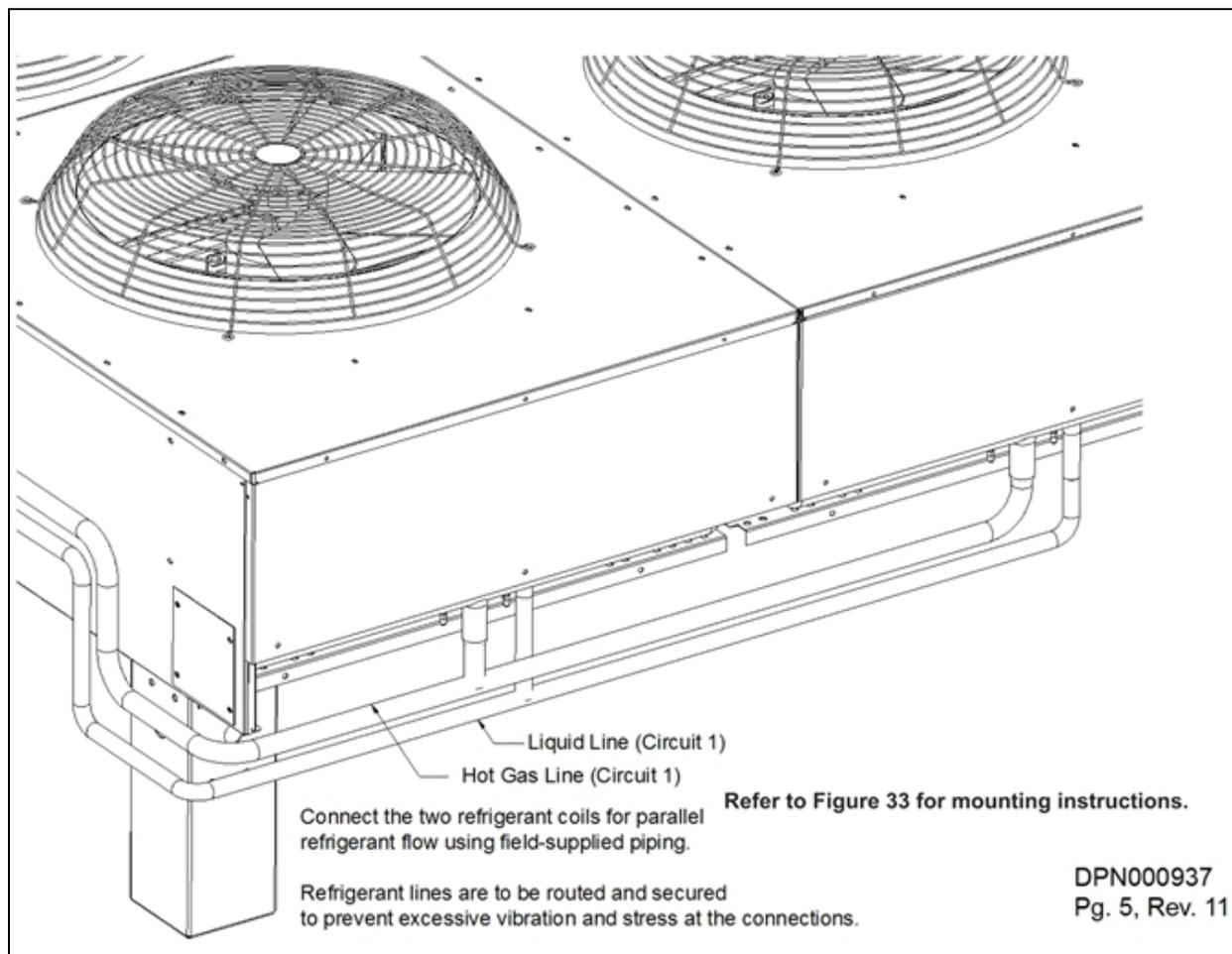
Table 4.11

Recommended refrigerant line sizes for DCSL616

Liebert XDC 160		
Equivalent Length, ft., (m)	*Hot Gas Line, in.	Liquid Line, in.
50 (15)	1-1/8	7/8
100 (30)	1-1/8	1-1/8
150 (45)	1-3/8	1-1/8
200 (60)	1-3/8	1-1/8

* Double risers are required when hot gas vertical rise is 15 feet or more (see [Install Double Discharge Risers](#) on page 45).
Source: DPN000937, Pg. 4, Rev. 11

Figure 4.12 DCSL616 piping connections—two refrigerant circuits connected for parallel refrigerant flow



4.7.1 Air-Cooled Condenser with Liebert Lee-Temp “Flooded Condenser” Head Pressure Control System—R-407C (DX) Circuit

The Liebert Lee-Temp system consists of a modulating type head pressure control valves and insulated receivers with heater pads to ensure operation at ambient temperatures as low as -30°F (-34.4°C).

Liebert Lee-Temp Piping

Two discharge lines and two liquid lines must be field-installed between the indoor unit and the outdoor condenser. See 4.6.2 on page 45 and 4.6.2 on page 45 for details.

Liebert Lee-Temp Control Materials Supplied

- Built-in, pre-wired condenser control box
- Air-cooled condenser
- Piping access cover to be reinstalled when piping is complete
- Bolts—four per leg (3/8" x 5/8")
- Terminal block for two-wire, 24V interlock connection between unit and condenser
- Condensate legs—four with one-fan, six on two-and three-fan models and eight on four-fan models
- Bolts—used to mount receiver (3/8" x 1-1/4")
- Liebert Lee-Temp system:
 - Insulated storage receiver—one per circuit
 - Head pressure control assembly (head pressure valves and check valves) - one per circuit
 - Service valve—one per circuit
 - Pressure relief valve—one per circuit
 - Liquid level sight glasses

NOTE: Liebert Lee-Temp heater pads require a separate, continuous electrical source. See nameplate on unit for proper voltage.

Evacuation and Leak Check—R-407C (DX) Circuit (Air and Water/Glycol Systems)

1. If unit power is available, open the unit's liquid line and hot gas valve solenoid valves using the Tandem Bank 1 and Tandem Bank 2 evacuation function in the Liebert iCOM's Service Menu. If power is not available to the unit, a field-supplied 24VAC/75VA power source must be directly connected to each of the unit's solenoid valves.

NOTE: The procedures above allow the technician to use 24VAC power and controls to open liquid line solenoid valve(s) for the dehydration process. If no power is at the unit disconnect, the technician is to use a separate 24VAC source rated at 75 VA and connect to the system liquid line solenoid valve(s) directly.

2. Attach refrigerant gauges to the suction and discharge service valves of the compressor.
3. Open all compressor service valves, including those located outside the Liebert XDC.
4. Connect the tank of dry nitrogen to the Schrader valves on the liquid lines and the hot gas lines.
5. Pressurize the system circuit(s) to 150 PSIG (1034 kPa; 10.34 bars) with dry nitrogen with a trace of refrigerant. Check the system for leaks with a suitable leak finder.

6. After completion of leak testing, release the test pressure (per local code) and connect to vacuum pump(s) at the Schrader valves on the liquid lines and on the hot gas lines.

NOTE: There is a check valve in the discharge line and Liebert Lee-Temp piping assembly of each circuit. Ensure that all pressure has been relieved before starting the vacuum pump.

7. Place a jumper hose from the service valve fitting on the outlet of the receiver and the schrader fitting on the discharge header of the condenser. Front-seat the service valve two (2) turns.
8. After 4 hours of pulling a deep vacuum, check the vacuum levels and, if they have not changed, break the vacuum with dry nitrogen.
9. Pull a second and third vacuum to 500 microns or less. Recheck the vacuum level after 2 hours.
10. Once a system has achieved 500 microns, turn off evacuation, close the receiver service valve and remove the jumper hose.

4.8 Filling the Direct Expansion (DX) Circuit—R-407C

NOTE: If necessary, refer to [Installation Checklist](#) on page 59 to ensure that the system has been properly checked out and is ready to be filled with refrigerant.

Any recommended volumes will be approximate. The user must verify that all circuits of the system have been adequately filled.

For Air-Cooled Liebert Lee-Temp / Flood Back Head Pressure Control Units Only

NOTE: Proper safety equipment and proper refrigeration tools are required. Check unit nameplate for correct refrigerant type before topping off or recharging a system.

NOTE: Refrigerant R-407C is a blend of three components, and must be introduced and charged from the cylinder only as a liquid.

Refrigerant R-407C uses a POE (polyolester) lubricant. Do not open the compressor unit piping to the atmosphere for more than 15 minutes. The compressors contain POE oil that is very hygroscopic; it quickly absorbs water from the atmosphere. The longer the compressor piping is left open to the atmosphere, the harder it will be to fully evacuate. If left open too long, the POE oil may need to be replaced before achieving the required vacuum level.

Refrigerant charging requires unit operation. Refer to [Checklist for Liebert XDC Startup](#) on page 111.

1. Calculate the amount of charge for the R-407C side of the system. Refer to Table 4.13 on the next page, Table 4.14 on the next page, Table 4.15 on page 57 and Figure 4.13 on page 57.
2. Weigh in as much of the calculated R-407C charge as possible by utilizing tank heaters on the refrigerant bottles before starting the unit.

NOTICE

Risk of improper operation. Can cause equipment damage.

Before proceeding to step [Turn Off the main power to the unit](#). below, the R-134A side must be charged with the calculated refrigerant charge.

There also must be enough room heat to start the system the system (64kW minimum). If not, running the compressors alone could cause the heat exchanger to freeze and burst.

3. Turn Off the main power to the unit.
4. Disconnect either the low-voltage wires from the #2 compressor contactors holding coils or remove the high-voltage fuses for the #2 compressor bank.

5. Turn On the Liebert iCOM controller by pressing the On/Off push button on the front of the Liebert iCOM display (see Figure 6.1 on page 61).
6. Set the Min Room Temperature Setpoint to a minimum value of 50°F (10°C) (see Figure 6.7 on page 70).

NOTE: The pumps must establish flow before the compressors will start. If the pumps lose flow, the compressors will turn Off. The pressure in the system must be at or above 65psig (448kPa) for the compressor(s) to start. A minimum of 30psig (207kPa) must be maintained for the compressor(s) to continue to operate. The compressor(s) will shut off if the pressure drops to 20psig (138kPa) or lower.

7. Weigh in the rest of the calculated charge.
8. Once Tandem Bank 1 is completely charged, repeat steps [Turn Off the main power to the unit.](#) on the previous page through 7. above for Tandem Bank 2.

Table 4.12
Indoor unit refrigerant
charge—R-407C

Model 50/60 Hz	Charge/Circuit, lb. (kg)
Liebert XDC160	17.5 (8.0)

Table 4.13
Outdoor air condenser charge—R-407C

Outdoor Ambient, °F (°C)	Model 50/60 Hz	Receiver Part #	Charge / Circuit, lb. (kg)
-30 to 100 (-34 to 38)	DCSL415	185010G2 ¹ /G4 ²	200 (91)
-30 to 105 (-34 to 41)	DCSL616	179713G1 ¹ /G2 ²	254 (115)
35 to 105 (2 to 41)	DCSL616	181610G2 ¹ /G4 ²	164 (75)
1. 120V 2. 230V			

Table 4.14
Air-cooled systems - liquid line charge - R-407C refrigerant per 100ft
(30m) of Type ACR copper tube

O.D., inches	Liquid Line, lb. (kg)	Hot Gas Line, lb. (kg)
3/8	3.7 (1.7)	-
1/2	6.9 (3.1)	-
5/8	11.0 (5.0)	2.2 (1.0)
3/4	15.7 (7.1)	3.1 (1.4)
7/8	23.0 (10.4)	4.5 (2.0)
1-1/8	39.3 (17.8)	7.8 (3.5)
1-3/8	59.8 (27.1)	11.8 (5.4)
1-5/8	—	16.7 (7.6)

Table 4.15

Indoor water/glycol-cooled module – R-407C refrigerant charge

Model 60 Hz	Charge / Circuit, lb. (kg)
Liebert XDC 160	30.0 (13.2) per circuit

4.9 System Refrigerant Charges Over 55lb. (24.9kg) Require Additional Oil

4.9.1 Liebert XDC DX R-407C Circuit Volume

NOTICE

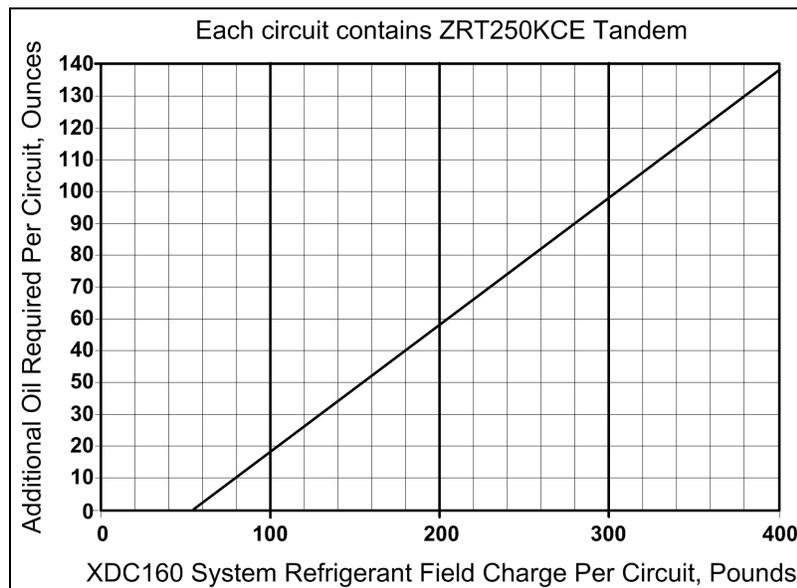
Risk of improper lubrication. May cause equipment damage.

Liebert XDCs refrigerant R-407C circuits with refrigerant charges over 55lb. (24.9kg) require additional oil. See Figure 4.13 below for the amount required for various charge levels.

Once the system has been fully charged with refrigerant, use a hand pump to add the additional oil at the suction side of the system while the system is running.

The amount of oil added by field service must be recorded on a tag attached at the tandem, (the amount added along with the date it was added). This will be documented on a tag located at the tandem compressor and marked “Oil Added Field Service Record.” Refer to the Liebert XDC user manual, SL-16673, available at www.VertivCo.com.

Figure 4.13 Additional oil requirements for refrigerant charge



To calculate the oil required, use the following formula:

$$\text{Additional Oil Required per Circuit} = (\text{Refrigerant Charge} * 0.4 - 22)$$

Enter the refrigerant charge in pounds to determine the oil required in ounces

NOTICE

Risk of improper compressor lubrication. Can cause compressor and refrigerant system damage.

Failure to use oil types, viscosities and quantities recommended by the compressor manufacturer may reduce compressor life and void the compressor warranty. See oil types specified in Table 4.16 below.

- Do not mix polyol ester (POE) and mineral-based oils.
- Do not mix oils of different viscosities.

Consult Vertiv or the compressor manufacturer if questions arise.

Table 4.16
Compressor oil types

Compressor Type	Refrigerant Type
	R-407C
Copeland Scroll and Digital Scroll	POE OIL - ISO 32 Viscosity
Use Copeland® POE Oil ULTRA 22 CC, Mobil EAL Arctic 22 CC, Copeland brand Ultra 22 CC, Copeland brand Ultra 32 CC, Copeland brand Ultra 32-3MAF, Mobil EAL™ Arctic 22 CC or Uniqema RL32-3MAF or other Copeland-approved oil.	

5 INSTALLATION CHECKLIST

1. Unpack and check received material.
2. Position Liebert XDC and secure to floor.
3. Wire high voltage connections.
4. Wire low voltage connections.

NOTE: Risk of unintended pump start. Can cause equipment damage.

Do not install the pump fuses for 60Hz until the system is fully charged with refrigerant. Do not remove the locking mechanisms from 50Hz circuit breakers until the system is fully charged with refrigerant.

Operating the pumps without a full refrigerant charge can result in equipment damage.

5. Connect Liebert XD cooling module piping to Liebert XDC.
6. Check all circuits of the system for leaks.
7. Hold a vacuum on all circuits of the system.
8. Charge the system with refrigerant.
9. Make sure that all piping has proper insulation.
10. Use double risers in DX hot gas lines that are 15 feet (4.6m) or more in height.

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6 LIEBERT ICOM CONTROL—FIRMWARE VERSION XP1.00.009.STD

6.1 Liebert iCOM Components and Functions

The Liebert iCOM controller layout is shown in Figure 6.1 below; the keyboard functions are defined in Table 6.1 on the next page. The Liebert iCOM controller on the Liebert XDC displays the Unit View only.

Figure 6.1 Liebert iCOM display components

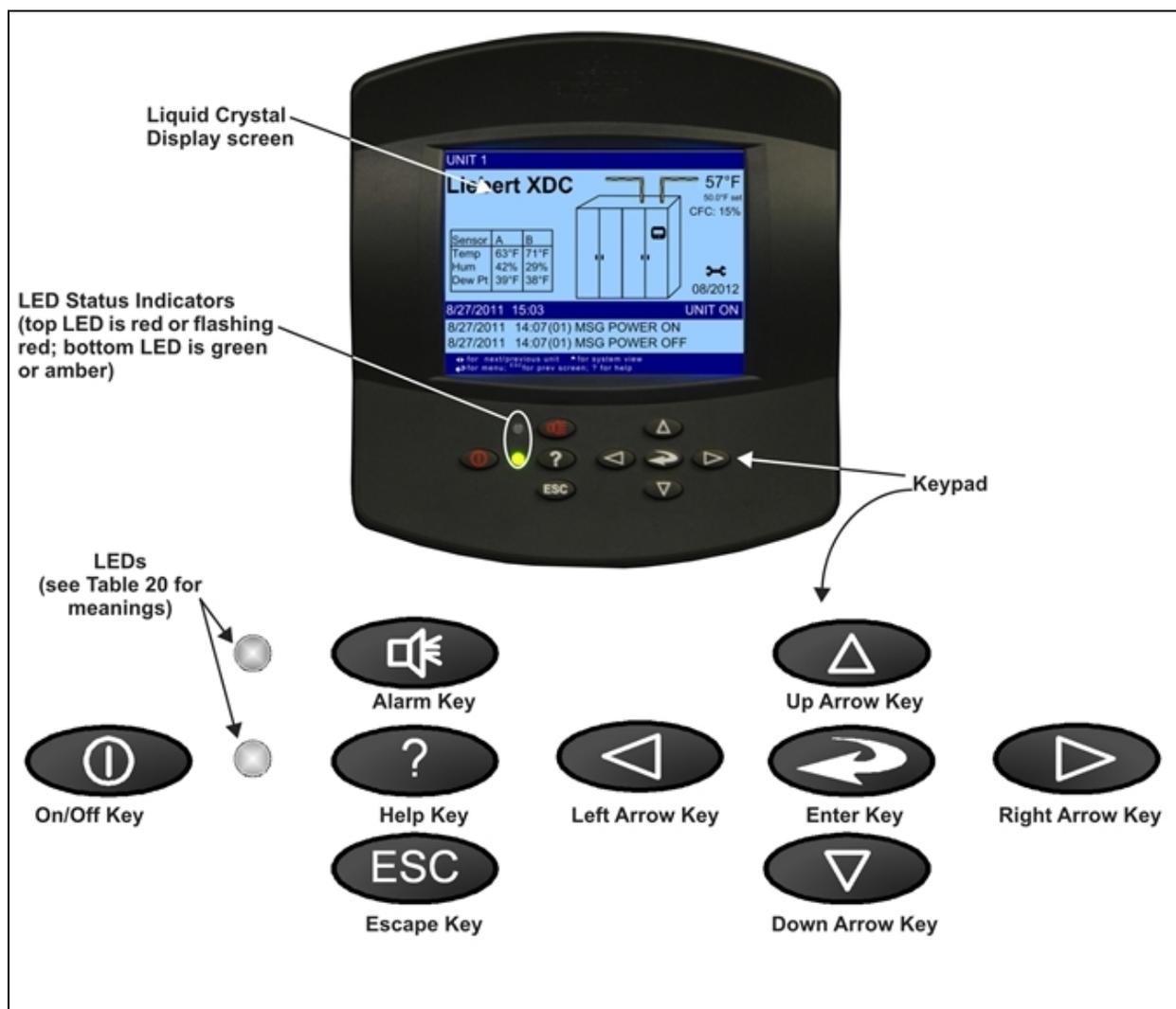


Table 6.1
Keyboard icons and functions

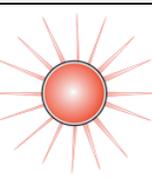
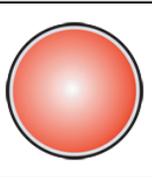
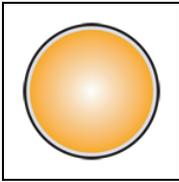
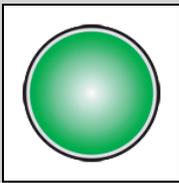
Icon	Key Name	Function
	On/Off Key	Controls the operational state of the cooling unit.
	Alarm Key	Silences an alarm.
	Help Key	Accesses integrated Help menus.
	ESCape Key	Returns to the previous display view.
	Enter Key	Confirms all selections and selects icons or text.
	Increase Key (Up Arrow)	Moves upward in a menu or increases the value of a selected parameter.
	Decrease Key (Down Arrow)	Moves downward in a menu or reduces the value of a selected parameter.
	Left and Right Arrow Keys	Navigates through text and sections of the display.
	Upper LED	Blinking Red—Active, unacknowledged alarm exists
	Upper LED	Solid Red—Active, acknowledged alarm exists

Table 6.1 Keyboard icons and functions (continued)

Icon	Key Name	Function
	Lower LED	Amber—Power is available to the unit; unit is NOT operating
		Green—Unit is operating with no alarms

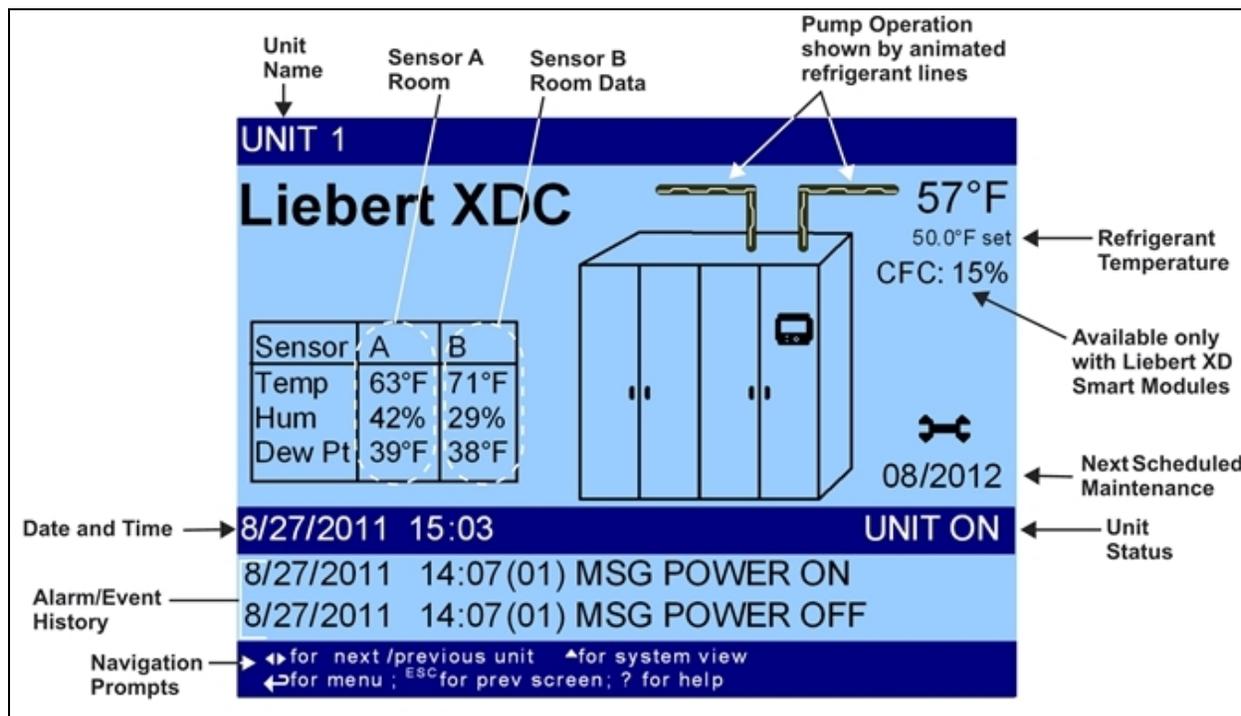
6.2 Display Lamp Indicators

- The Green lamp will be On only when the Liebert XDC is On and running with no alarms.
- The Red lamp will be On if the unit is On and running with an active alarm, or if the unit is shut down because of a certain alarm.
- The Red lamp will flash while an alarm is being annunciated. The Red lamp will stop flashing and the beeper in the display will stop beeping when the ALARM SILENCE / ? key is pressed.
- The Amber lamp will be On if the Liebert XDC has been shut down at the I/O switch or if the unit has been shut down by an alarm condition.

6.3 Navigating Through the Liebert iCOM Display

The Liebert iCOM displays icons and text for monitoring and controlling your Liebert cooling unit. Figure 6.2 on the next page shows the Liebert iCOM’s home screen for the Liebert XDC.

Figure 6.2 Liebert iCOM default home screen for Liebert XDC



6.3.1 Accessing Menus and Settings

Viewing Data

No password is required to view data or settings.

To view data:

1. From the home screen, press the **Enter** key to view the User Menu (see 6.7 on page 68).
2. Press **Enter** again to highlight the first icon.
3. Use the keyboard's arrow keys to move to the icon for the data you wish to view.
4. Once that icon is highlighted, press **Enter** again to open that menu.
 - If a password is required, see [Entering the Password](#) on the facing page.
 - If a menu has more than one screen, the Liebert iCOM display will have text at the top similar to this: *(page 1 of 2)*.
5. Press **Enter** to select the first line of data.
6. Use the **Up** and **Down** arrow keys to scroll to the desired data point.
7. Press **ESC** to move back to higher level menus.

6.3.2 Cooling Module Overview

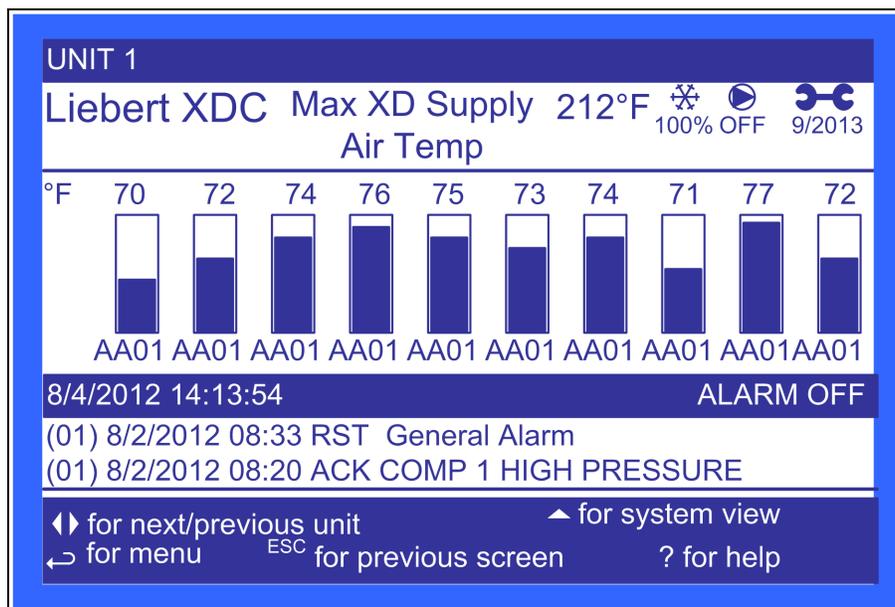
The Liebert iCOM will display an overview of all connected cooling modules. It does not display a system view, which would include units other than the cooling modules.

NOTE: The Liebert iCOM control screens display a setting to select a system view, but the Liebert XDC does not support a system view.

To display an overview of all connected cooling modules:

1. At the default home screen on the Liebert iCOM, press the down arrow. This will display the first 10 modules' outlet temperature and capacity levels. Press ESC to return to the unit view.

Figure 6.3 Cooling module overview, first 10 modules



2. Press the down arrow button again to display the next 10 modules' outlet temperature and capacity levels.
3. Press ESC to return to the default home screen.

6.3.3 Entering the Password

Most settings in the Liebert iCOM are protected by factory-set passwords. The User Menu password is 1490. The Service Menu password is 5010. To enter the password:

1. From the home screen, press the **Enter** key to view the User Menu (see 6.7 on page 68).
2. Press **Enter** again to highlight the first icon.
3. Use the keyboard's arrow keys to move to the icon for the data you wish to change.
4. Once that icon is highlighted, press **Enter** again to open that menu.
5. Press **Enter** to highlight the Password line.
6. With the Password line highlighted, press **Enter** to highlight the first digit in the password.
7. Enter the password, 1490.

Use the **Up** and **Down** arrow keys to select a numeral for the first digit of the password.

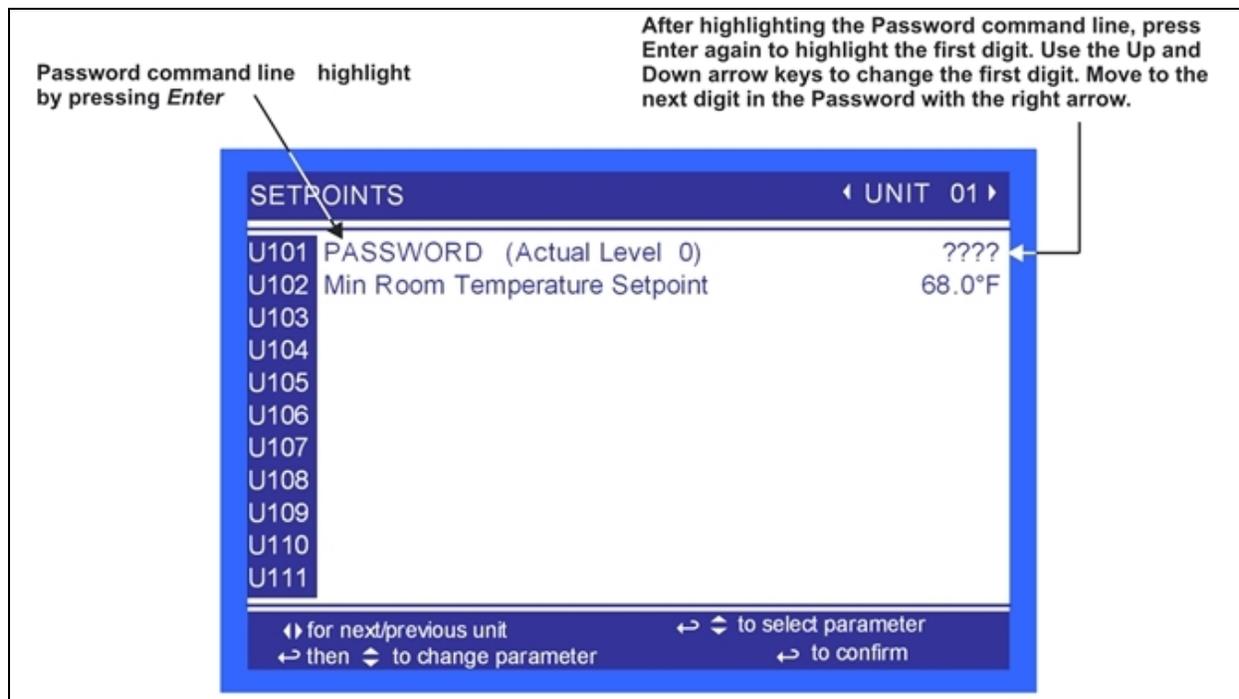
Move to the next digit of the password with the **Right** arrow key.

Select the numerals for all four digits with the same process.

8. After all four digits of the password have been entered, press the **Enter** key.

NOTE: Do not press the ESC key or the Liebert iCOM will move to the previous screen and the password must be re-entered before changes may be made.

Figure 6.4 Entering the password



6.4 Changing Liebert iCOM's Display Settings

No password is required to change the way Liebert iCOM displays data. The Display Setup controls how the unit shows data, such as temperature, date and time.

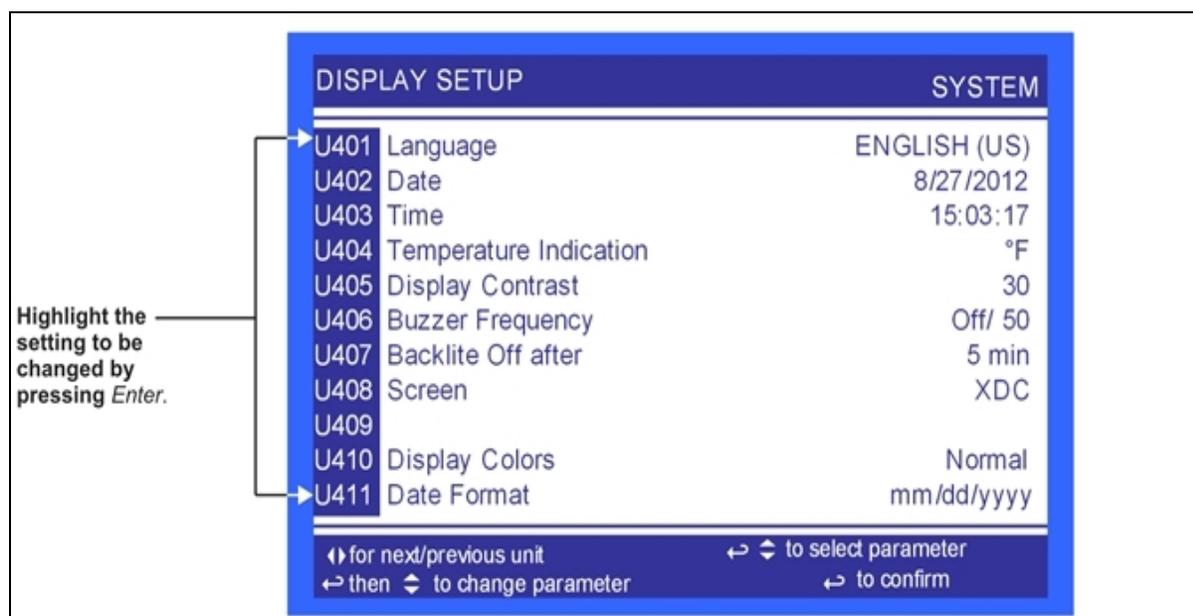
To change the display settings:

1. From the home screen, press the **Enter** key to view the User Menu (see 6.7 on page 68).
2. Press **Enter** again to highlight the first icon.
3. Use the keyboard's arrow keys to move to the Display Setup icon.
4. Once that icon is highlighted, press **Enter** again to open that menu.
5. Press the **Enter** key to select the first setting.

Either change that setting or navigate to another setting with the **Up** and **Down** arrow keys.

6. Once the desired setting is highlighted, press the **Enter** key to access that parameter's display setting options.
7. Use the **Up** and **Down** arrow keys to make changes.
8. Press the **Enter** key to accept the changes.
9. Press the **ESC** key twice to return to Liebert iCOM's user menu.

Figure 6.5 Display setup screen



6.5 Changing Operational Settings

Changes to the Liebert XDC's operation settings in the **Set Alarms** and **Setpoints** menus require a password. The User Menu password is 1490. The Service Menu password is 5010.

1. From the home screen, press the **Enter** key to view the User Menu (see 6.7 on the next page).
2. Press **Enter** again to highlight the first icon.
3. Use the keyboard's arrow keys to move to the icon for the data you wish to change.
4. Once that icon is highlighted, press **Enter** again to open that menu.

If a password is required, see [Entering the Password](#) on page 65.

5. After entering the password, use the **Up** and **Down** arrow keys to scroll to and highlight the operational setting to be changed.
6. Press **Enter** to highlight the values for that setting.
7. Use the **Up** and **Down** arrow keys to change the value.
8. Press **Enter** to accept the change. (The value will no longer be highlighted.)
9. Press **ESC** to deselect the operational setting. (The setting will no longer be highlighted.)
10. Press **ESC** again to move to previous screens.

6.6 Graphical Data Record

The Graphical Data Record charts the average temperature from Sensors A and B, the average dew point from Sensors A and B, the supply refrigerant temperature and the supply refrigerant control point.

The temperature scales can be changed to expand or compress the data.

The time scale also can be altered to any of several selectable values.

NOTE: Changing the time scale eliminates all previous graphical data and the unit will begin recording new data.

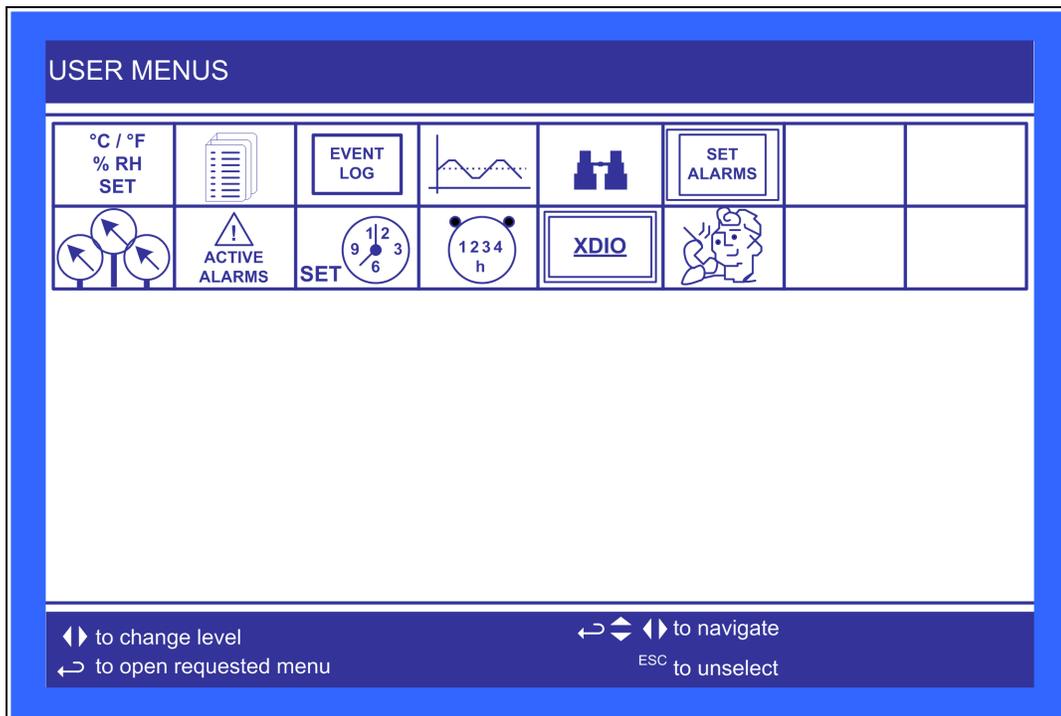
6.7 Liebert iCOM User Menu Icons and Legend

Table 6.2 Liebert iCOM User Menu Icons Descriptions

Item	description	Item	description
	Setpoints - View and change operational setpoints		Set Alarms - Allows user to change settings for alarms
	Spare Parts List - Contains spare parts available on site		Sensor Data - Shows readings of sensors; View Only
	Event Log - Lists last 400 events and alarms. View Only		Active Alarms - Lists all current alarms; View Only
	Graphic Data Record - Displays average temperature from Sensors A and B, the average dewpoint from Sensors A and B, the supply refrigerant temperature and the supply refrigerant control point graphs; Data is View Only; Display scale is adjustable		Display Setup - Change settings for display: language and time
	View Network - Shows status of all connected units; View Only		Total Run Hours - Records the run time of all components and allows setting of limits on run time; View Only
	XDIO - Displays readings for the individual smart modules; View Only		Service Contacts - Contains key contact information for service

NOTE: Menu shows icons only; text is explanatory and does not appear on the Liebert iCOM display.

Figure 6.6 Liebert XDC User Menu screen

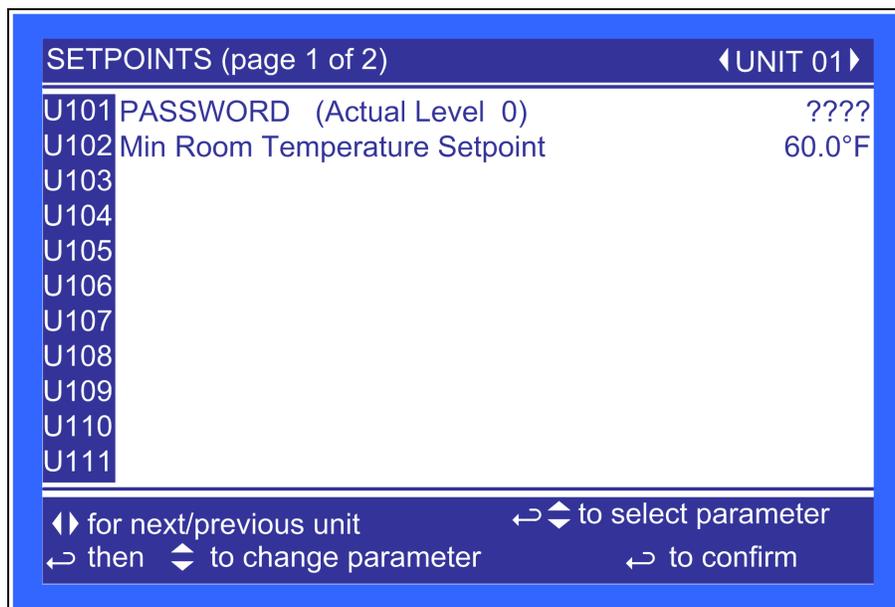


6.8 Liebert iCOM User Menu Screens

User menus report general cooling unit operations and status. User Menu screens employ a coding that begins in “U” and is followed by parameters and information, such as settings. Gaining access to some User Menu screens requires entering a password; the User Menu password is 1490.

Check www.VertivCo.com for the latest Liebert iCOM user manual updates, SL-18835.

Figure 6.7 Setpoints, page 1 of 2



Min Room Temperature Setpoint—Sets the minimum room temperature the unit will attempt to maintain. If the temperature falls below this point, unit will raise the refrigerant temperature to reduce the amount of cooling.

The setting is intended to keep the room temperature above the setpoint. Without a proper setpoint, the Liebert XDC can lower the room temperature too much, depending on the room dew point and load. This setpoint will reduce the cooling to keep the room temperature above this desired temperature.

NOTE: This is not a true room temperature setpoint. The Liebert XDC has no heaters; it will try to cool as much as possible. If the Liebert XDC is able to cool the room to this setpoint, it will reduce its cooling action to try to keep the room temperature at or above this setpoint.

The default setting is 60°F (15.6°C). The range is 50-80°F (10-27°C).

For optimal cooling performance, the minimum temperature setpoint should be at least 1-2° below the expected temperature at the remote sensors, which may affect placement of the remote sensors. If the minimum temperature setpoint is set above the typical remote temperature sensor reading, it will reduce the Liebert XD cooling output and, in extreme cases, cause erratic Liebert XD performance.

Spare Parts

Spare Parts—The spare parts lists contains a detailed description and part number that can be used to order parts for the unit. These part numbers are specific to each model and option installed on the unit.

Event Log

Event Log—The event log displays all events and actions that have been generated by the unit. When multiple units are networked you will see the event log of the whole system. Each event shows the unit that generated the alarm, time and date stamp, a description and the event type.

Figure 6.8 Set alarms

SET ALARMS		◀ UNIT 01 ▶
U201	PASSWORD (Actual Level 0)	????
U202	High Room Air Temperature	90.0°F
U203	Low Room Air Temperature	55.0°F
U204	High Room Dewpoint	65.0°F
U205	High Refrigerant Temperature	80.0°F
U206		
U207		
U208		
U209		
U210		
U211		

⬅➡ for next/previous unit ⬅↕ to select parameter
 ⬅➡ then ↕ to change parameter ⬅➡ to confirm

High Room Air Temperature—Sets the threshold where a high room temperature alarm will occur, based on the actual reading from either remote Sensor A or B. The range for the high room air temperature alarm is 33.8-95°F (1-35°C); the default is 80.0°F (26.7°C).

Low Room Air Temperature—Sets the threshold where a low room temperature alarm will occur, based on the actual reading from either remote Sensor A or B. The range for the high room air temperature alarm is from 33.8 to 95°F (1 to 35°C); the default is 55.0°F (12.8°C).

High Room Dewpoint—Sets the threshold where a high room dew point alarm will occur, based on the calculated values from either remote Sensor A or remote Sensor B. The range for the high room dew point alarm is from 33.8 to 95°F (1 to 35°C); the default is 65°F (18.3°C).

High Refrigerant Temperature—Sets the threshold where a high refrigerant temperature alarm will occur based on the actual reading from the supply refrigerant sensor. The supply refrigerant temperature is from the Liebert XDC to the modules. The range for the high supply refrigerant temperature alarm is from 33.8 to 95°F (1 to 35°C); the default is 80°F (26.7°C).

Figure 6.9 Sensor data, page 1 of 2

SENSOR DATA (page 1 of 2)		◀UNIT 01▶
U301	Sensor A Temperature	62.8°F
U302	Sensor A Humidity	42.20%
U303	Sensor A Dew Point	39.4°F
U304	Sensor B Temperature	71.2°F
U305	Sensor B Humidity	29.60%
U306	Sensor B Dew Point	37.8°F
U307	Supply Refrigerant Temperature	55.0°F
U308		
U309		
U310		
U311		
U312		

This window is READ ONLY

Sensor A Temperature—Displays the temperature of the remote CAN Temp Humidity sensor designated at Sensor A.

Sensor A Humidity—Displays the humidity of the remote CAN Temp Humidity sensor designated at Sensor A.

Sensor A Dew Point—Displays the dew point of the remote CAN Temp Humidity sensor designated at Sensor A.

Sensor B Temperature—Displays the temperature of the remote CAN Temp Humidity sensor designated at Sensor B.

Sensor B Humidity—Displays the humidity of the remote CAN Temp Humidity sensor designated at Sensor B.

Sensor B Dew Point—Displays the dew point of the remote CAN Temp Humidity sensor designated at Sensor B.

Supply Refrigerant Temperature—Displays the actual supply refrigerant temperature from the Liebert XDC to the modules.

Figure 6.10 Sensor data, page 2 of 2

SENSOR DATA (page 2 of 2)			◀UNIT 01▶
U313	Daily High Temperature	07:49:57	72°F
U314	Daily Low Temperature	07:11:30	64°F
U315	Daily High Humidity	11:31:46	45%
U316	Daily Low Humidity	07:56:18	34%
U317	Daily High Dew Point	07:47:26	45°F
U318	Daily Low Dew Point	08:02:20	37°F
U319	Daily High Refrigerant Temp	13:01:25	69°F
U320	Daily Low Refrigerant Temp	13:01:11	69°F
U321			
U322			
U323			
U324			

This window is READ ONLY

Daily High Temperature—Shows the highest temperature in a rolling 24 hour period for either remote Sensor A or remote Sensor B.

Daily Low Temperature—Shows the lowest temperature in a rolling 24 hour period for either remote Sensor A or remote Sensor B.

Daily High Humidity—Shows the highest humidity in a rolling 24 hour period for either remote Sensor A or remote Sensor B.

Daily Low Humidity—Shows the lowest humidity in a rolling 24 period for either remote Sensor A or remote Sensor B.

Daily High Dewpoint—Shows the highest dew point in a rolling 24 hour period for either remote Sensor A or remote Sensor B.

Daily Low Dewpoint—Shows the lowest dew point in a 24 hour period for either remote Sensor A or remote Sensor B.

Daily High Refrigerant Temperature—Shows the highest supply refrigerant temperature in a rolling 24 hour period from the Liebert XDC to the modules

Daily Low Refrigerant Temperature—Shows the lowest supply refrigerant temperature in a rolling 24 hour period from the Liebert XDC to the modules.

Figure 6.11 Display setup

DISPLAY SETUP		SYSTEM
U401	Language	ENGLISH (US)
U402	Date	8/27/2012
U403	Time	15:03:17
U404	Temperature Indication	°F
U405	Display Contrast	30
U406	Buzzer Frequency	Off/ 50
U407	Backlite Off after	5 min
U408	Screen	XDC
U409		
U410	Display Colors	Normal
U411	Date Format	mm/dd/yyyy

⬅️ ➡️ for next/previous unit ⬅️ ⇅️ ➡️ to select parameter
 ⬅️ ➡️ then ⇅️ to change parameter ⬅️ to confirm

Language—Sets the language on the display. Changing this setting changes all menu parameters to the selected language.

Date—Sets the internal date of the unit. If this unit is connected to other units with the unit-to-unit network connection, each unit will reflect the last date set.

Time—Sets the internal time of the unit. If this unit is connected to other units with the unit-to-unit network connection each unit will reflect the last time set.

Temperature Indication—Selects the actual and setpoint temperature scale. Selecting C will set the unit to display in Celsius and F will set the unit to display in Fahrenheit.

Display Contrast—Changes the contrast of the display to adjust for different viewing angles, low light and bright light conditions. As the display ages, the contrast may require adjustment for viewing.

Buzzer Frequency—Changes the audible noise frequency of the built-in buzzer. The buzzer will sound when its frequency is being adjusted, easing selection of a frequency easily detected when an alarm occurs.

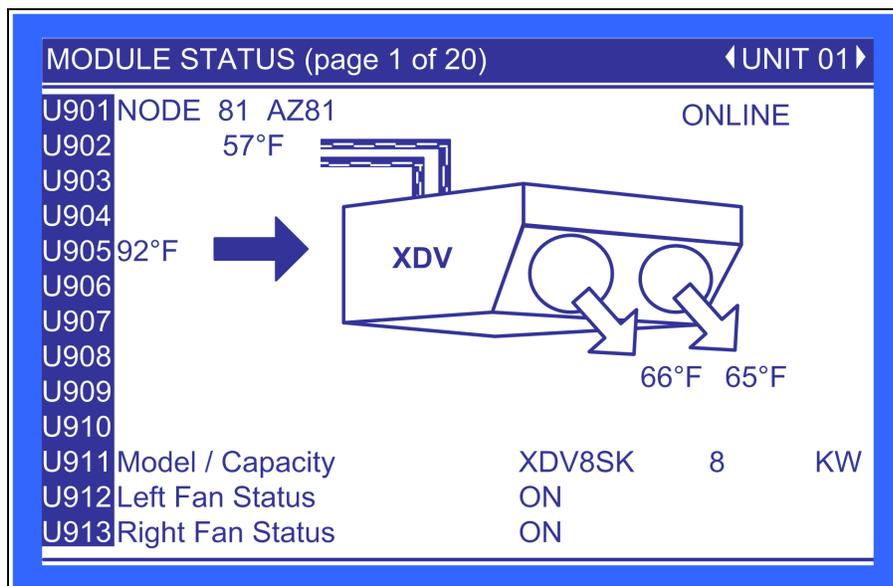
Backlite Off After—Controls how long the backlight remains active when the display is unused. When the buttons on the front display have not been pressed for the time selected in this parameter, the backlight will turn Off, extending the life of the display and saving energy.

Screen—Controls the screen layout. The Liebert XDC has one view, Unit View.

Display Colors—Selects the background color. *Inverted* sets the display to show white font with blue background and *Normal* sets a white background with blue font.

Date Format—Date format changes the month, day and year arrangement shown on the front display and on event time stamps.

Figure 6.12 Module status, page 1 of 20



Module Node ID—The location within the CANbus. Each module’s ID is factory-set to 80 and is automatically changed during setup; requires no user action.

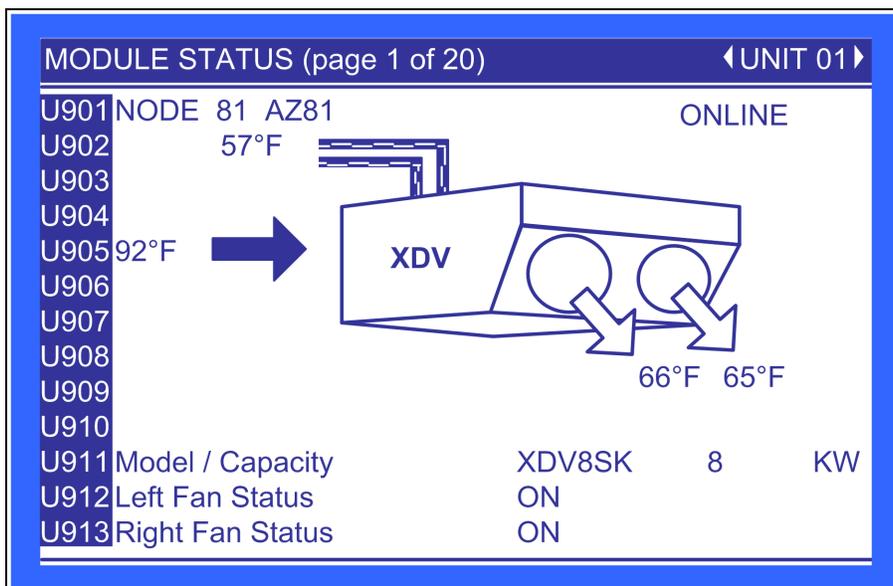
Module Labels—A four-character label consisting of two letters and two numerals. This is the standard nomenclature for Data Center Grid assignment of racks. Additionally, the module’s location can be denoted with 10 characters, either letters or non-alphanumeric characters from a built-in list. Either or both labels can be used and are entered using the Module Setup found in the Service menu (S910).

Module Status—Indicates whether the smart module is connected to the CANbus.

U901—Module Node ID/Label/Status.

U902: **Refrigerant Temperature**—The temperature of the refrigerant entering the Liebert XD smart module.

Figure 6.13 Liebert XDV smart module



U908—Displays the temperature of the air leaving the right and left fan of the Liebert XDV.

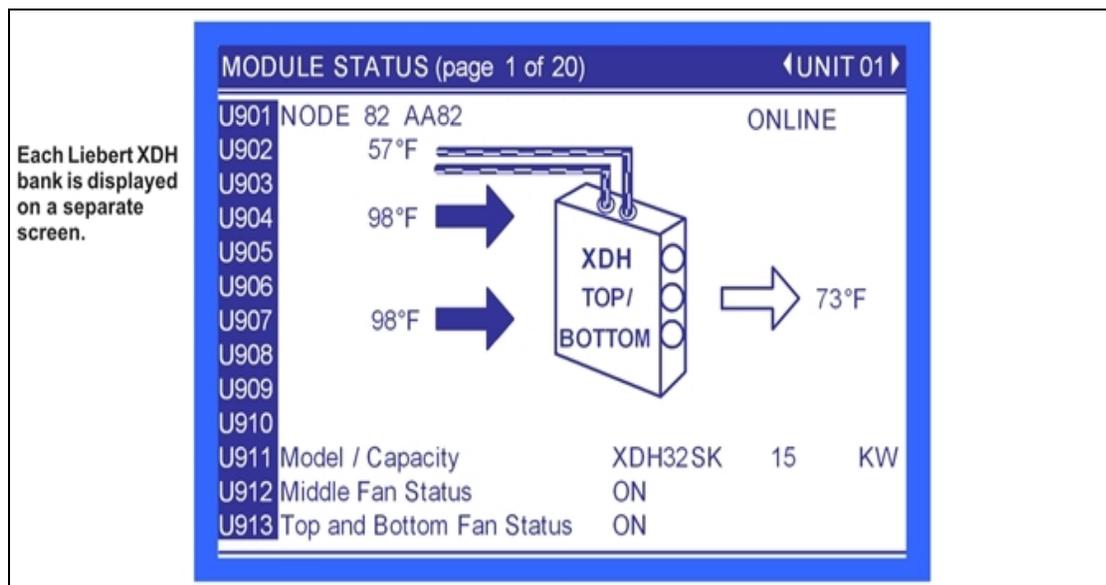
U905—Displays the temperature of the air entering the Liebert XDV.

U911—Displays the module type and calculated local module capacity; possible module types are XDV8SK, XDV8SS, XDV8ST, XDV10SK, XDV10SS and XDV10ST.

U912—Displays the left fan status; possible values are ON and OFF.

U913—Displays the right fan status; possible values are ON, OFF and ON ECON. *ON ECON* indicates that only one fan is On.

Figure 6.14 Liebert XDH smart module—each bank shown separately



U905—Displays the temperature of the air leaving the Liebert XDH.

U904—Displays the temperature of the air entering the top of the bank of the Liebert XDH.

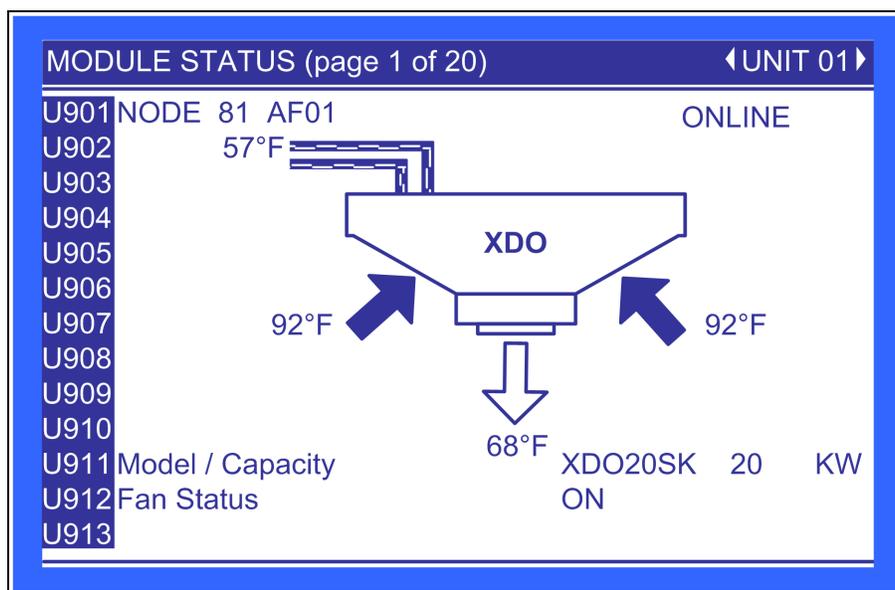
U907—Displays the temperature of the air entering the bottom of the bank of the Liebert XDH.

U911—Displays the module type and calculated local module capacity; possible module types are XDH20SK, XDH20SS, XDH32SK and XDH32SS.

U912—Displays the middle fan status; possible values are ON and OFF.

U913—Displays the top and bottom fans' status; possible values are ON, OFF and ON ECON. (ON ECON indicates that two fans have been turned On.)

Figure 6.15 Liebert XDO smart module



U907—Displays the temperature of the air entering from the right and left of the Liebert XDO.

U910—Displays the temperature of the air leaving the Liebert XDO.

U911—Displays the module type and calculated local module capacity; possible module types XDO16SK, XDO16SS and XDO20SS.

U912—Displays the fan status; possible values are ON and OFF.

Figure 6.16 Total run hours

TOTAL RUN HOURS		◀UNIT 01▶	
U501		Actual Hours	Limit
U502	Pump 1	454	0
U503	Pump 2	0	0
U504	Compressor 1A	0	0
U505	Compressor 1B	0	0
U506	Compressor 2A	0	0
U507	Compressor 2B	0	0
U508			
U509			
U510			
U511			

◀▶ for next/previous unit ↵ to select parameter
 ↵ then ◀▶ to change parameter ↵ to confirm

Each parameter shows a component, the hours that component has operated and the maximum time the component can operate before the next maintenance.

U502—Pump 1

U503—Pump 2

U504—Compressor 1A

U505—Compressor 1B

U506—Compressor 2A

U507—Compressor 2B

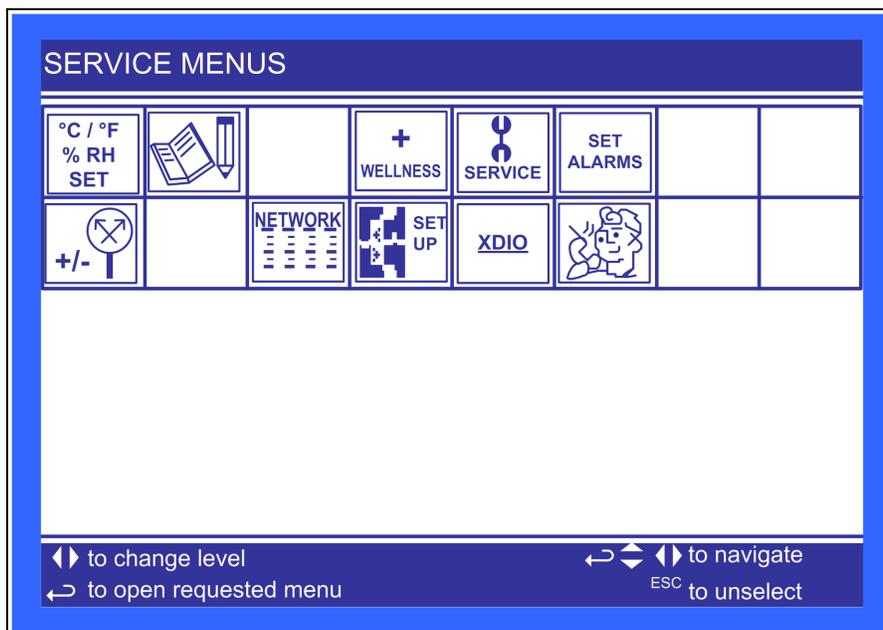
6.9 Liebert iCOM Service Menu Icons and Legend

Table 6.3 Liebert iCOM Service Menu Icons Descriptions

Icon	description	icon	description
	Setpoints - View and change operational setpoints		Sensor Calibration/Setup - Set up and calibrate sensors for site
	Unit Diary - Shows all program changes and maintenance performed,		Network - Set up or alter network setting
	Maintenance/Wellness Settings - Shows all maintenance records, calculates next maintenance date		Options Setup - Enter specific settings for various options
	Diagnostics/Service Mode - Enter Diagnostics/Service Mode for troubleshooting and repair		Smart Module - Setup of alarms and events. Set temperature limits for supply and return sensors. Label smart modules, view firmware version
	Set Alarms - Change settings for alarms		Service Contacts - Contains key contact information for service

NOTE: Menu shows icons only; text is explanatory and does not appear on the Liebert iCOM display.

Figure 6.17 Liebert XDC Service Menu screen



6.10 Liebert iCOM Service Menu Screens

Service menus allow customized settings for site operations. Service Menu screens employ a coding that begins in “S” and is followed by parameters and information, such as settings. Gaining access to most Service Menus requires entering a password; the Service Menu password is **5010**; see [Entering the Password](#) on page 65 for assistance.

The Liebert iCOM control firmware is being updated constantly. As a result, the Service Menu parameters in this manual may be slightly different than what is shown on a cooling unit’s display. Check www.VertivCo.com for the latest Liebert iCOM User manual updates.

Figure 6.18 Setpoints

SETPOINTS		◀UNIT 01▶
S101	PASSWORD (Actual Level 0)	????
S102	Min Room Temperature Setpoint	60.0°F
S103	Temperature Control Type	Intelligent
S104	Temperature Proportional Band	7.0°F
S105	Temperature Integration Time	min
S106	Temperature Derivative	sec
S107	Dewpoint Margin	4.0°F
S108	Minimum Control Point	50.0°F
S109	Min Percent Cooling Setpoint	10%
S110		
S111		

◀▶ for next/previous unit ↵ to select parameter
 ↵ then ⬆ to change parameter ↵ to confirm

Min Room Temperature Setpoint—Sets the minimum room temperature the unit will attempt to maintain. If the temperature falls below this point, unit will raise the refrigerant temperature to reduce the amount of cooling. Adjustable from 50 to 80°F (10.0 to 26.7°C), the factory default setting is 60°F (15.6°C).

Temperature Control Type—Selects the type of control the system will use to activate cooling. The Liebert iCOM control has three temperature control types: Proportional, PI and Intelligent.

Proportional—If Proportional Control is selected, the percent cooling requirement is determined by the difference between the air temperature sensor reading and the temperature setpoint. As the air temperature rises above the temperature setpoint, the percent cooling required increases proportionally (from 0 to 100%) over half the programmable temperature proportional band. The percent heating requirement (0 to 100%) is determined the same way when the air temperature falls below the setpoint.

PI—If PI Control is selected, the percent cooling requirement is calculated by adding together two individual terms, proportional and integral. The proportional term is calculated in a manner similar to the previously described Proportional control. The integral term (sometimes called *reset action*) is calculated by measuring how much and for how long the air temperature has been above or below the setpoint. If the actual air temperature is above the setpoint, the percent requirement is slowly but continuously increased until the total is sufficient to bring the return room air back to the setpoint.

Intelligent—If Intelligent Control is selected, the air temperature is controlled at or near the setpoint. The percent temperature adjustment required is calculated based on logic that is programmed into the control. These rules simulate the actions that would be taken by a human operator manually controlling the system.

Temperature Proportional Band—Adjusts the activation points of compressors or rate of change based on the actual sensor values deviation from setpoint. The smaller this number the faster the compressors and valve(s) will increase capacity. Too small of a number may cause the unit to short cycle the compressors or excessively reposition the valve. This parameter is adjustable from 1.8 to 54.0°F (1.0 to 30.0°C). The factory default setting is 7.0°F (3.9°C).

Temperature Integration Time—Temperature integration takes into consideration the amount of time the actual temperature has deviated from the setpoint. The larger this deviation is the longer the unit will wait before corrective action is taken to achieve the setpoint. This parameter is adjustable from 0 to 15 minutes. The factory default is 0.

Temperature Derivative Time—Monitors the rate of change and will reduce or increase the amount of corrective action based on the actual temperature increasing or decreasing toward the temperature setpoint. This parameter is adjustable from 0-900 seconds. The factory default is 0.

Dewpoint Margin—Selects the difference between the room dew point and the refrigerant temperature control point. This parameter is adjustable from 4.0 to 10.0°F (2.2 to 6.0°C). The factory default setting is 4.0°F (2.2°C).

Minimum Control Point—Sets the minimum supply refrigerant temperature the Liebert XDC will maintain. This parameter is adjustable from 10 to 80°F (5.0 to 27.0°C). The factory default is 55°F (12.8°C).

Min Percent Cooling Setpoint—Selects the lowest percent call for cooling during normal operations. Whenever the unit is not in startup mode or OFF, the percent call for cooling cannot go below this value. The parameter is adjustable from 5 to 30%. The factory default is 5%.

Figure 6.19 Maintenance

Basic Settings (page 1 of 7)		SYSTEM
S001	PASSWORD (Actual Level 0)	????
S002	Maintenance Frequency Per Year	1
S003	Max Bonus	0
S004	Max Penalty	0
S005	Last Maintenance	08/25/2011
S006	Service Engineer	NOBODY
S007	Confirm PM	No
S008	Calculated Next Maintenance	08/2014
S009		
S010		
S011		

⏪ for next/previous unit ⏩ to select parameter
 ⏪ then ⏩ to change parameter ⏩ to confirm

Maintenance Frequency Per Year—Sets the number of expected maintenance visits in a one year time span.

Max Bonus—Increases the time until the next required maintenance. A bonus should be assigned when a service visit finds that all components are working optimally.

Max Penalty—Decreases the time until the next maintenance cycle. A penalty should be used when a service visit finds excessive wear on components.

Last Maintenance—Date set during the service call. It also indicates to other service personnel the date of the last visit.

Service Engineer—Provides a label for the service representative to list either the company name or representative's name.

Confirm PM—Confirms that the service representative has completed the preventive maintenance and resets the next maintenance date.

Calculated Next Maintenance—Provides a date to for the next expected maintenance based on the last preventive maintenance performed (Confirm PM), component starts, run hours and the penalty or bonus set in the Liebert iCOM control.

Figure 6.20 Pump 1 settings, page 2 of 7

Pump 1 Settings (page 2 of 7)		◀ UNIT 1 ▶
S012	PASSWORD (Actual Level 0)	????
S013	Number of Starts	31
S014	Run Hours	453hrs
S015	Average Run Time	876min
S016	Starts per Day Best	1
S017	Starts per Day Worst	24
S018	Number of Alarms	1
S019	Actual Bonus	0
S020		
S021		
S022		

◀▶ for next/previous unit ↵↔ to select parameter
 ↵ then ↕ to change parameter ↵ to confirm

Number of Starts—Shows the number of starts for the unit's Pump 1.

Run Hours—Shows the number of run hours for the unit's Pump 1.

Average Run Time—Shows the average run time of the unit's Pump 1.

Starts per Day Best—Displays the lowest number of starts in a rolling 24 hour period for Pump 1

Starts per Day Worst—Displays the highest number of starts in a rolling 24 hour period for Pump 1

Number of Alarms—Displays the number of alarms that have occurred with the unit's Pump 1

Actual Bonus—Displays the actual calculation of wellness for the unit's Pump 1. The unit will always take the value from the worst component for the next maintenance indication.

Figure 6.21 Pump 2 settings, page 3 of 7

Pump 2 Settings (page 3 of 7)		◀ UNIT 1 ▶
S023	PASSWORD (Actual Level 0)	????
S024	Number of Starts	2
S025	Run Hours	0hrs
S026	Average Run Time	0min
S027	Starts per Day Best	1
S028	Starts per Day Worst	24
S029	Number of Alarms	1
S030	Actual Bonus	0
S031		
S032		
S033		

◀▶ for next/previous unit ↵↔ to select parameter
 ↵ then ↔ to change parameter ↵ to confirm

Number of Starts—Displays the number of starts for the unit’s Pump 2.

Run Hours—Displays the number of run hours for the unit’s Pump 2.

Average Run Time—Displays the average run time of the unit’s Pump 2.

Starts per Day Best—Displays the lowest number of starts in a rolling 24 hour period for Pump 2

Starts per Day Worst—Displays the highest number of starts in a rolling 24 hour period for Pump 2

Number of Alarms—Displays the number of alarms that have occurred with the unit’s Pump 2

Actual Bonus—Displays the actual calculation of wellness for the unit’s Pump 2. The unit will always take the value from the worst component for the next maintenance indication.

Figure 6.22 Compressor 1A settings

Compressor 1A Settings (page 4 of 7)		◀UNIT 1▶
S034	PASSWORD (Actual Level 0)	????
S035	Number of Starts	0
S036	Run Hours	0hrs
S037	Average Run Time	0min
S038	Starts Per Day Best	3
S039	Starts Per Day Worst	12
S040	Number of HP Alarms	0
S041	Number of LP Alarms	0
S042	Actual Bonus	0
S043		
S044		

◀▶ for next/previous unit	↔ to select parameter
↔ then ⬆ to change parameter	↔ to confirm

Number of Starts—Displays the number of starts for the unit’s Compressor 1A.

Run Hours—Displays the number of run hours for the unit’s Compressor 1A.

Average Run Time—Displays the average run time of the unit’s Compressor 1A.

Starts per Day Best—Displays the lowest number of starts in a rolling 24 hour period for Compressor 1A.

Starts per Day Worst—Displays the highest number of starts in a rolling 24 hour period for Compressor 1A.

Number of HP Alarms—Displays the number of high pressure alarms that have occurred with the unit’s Compressor 1A.

Number of LP Alarms—Displays the number of low pressure alarms that have occurred with the unit’s Compressor 1A.

Actual Bonus—Displays the actual calculation of wellness for the unit’s Compressor 1A. The unit will always take the value from the worst component for the next maintenance indication.

Figure 6.23 Compressor 1B settings

Compressor 1B Settings (page 5 of 7)		◀ UNIT 1 ▶
S045	PASSWORD (Actual Level 0)	????
S046	Number of Starts	0
S047	Run Hours	0hrs
S048	Average Run Time	0min
S049	Starts Per Day Best	3
S050	Starts Per Day Worst	12
S051	Number of HP Alarms	0
S052	Number of LP Alarms	0
S053	Actual Bonus	0
S054		
S055		

◀▶ for next/previous unit ↵↻ to select parameter
 ↵ then ↻ to change parameter ↵ to confirm

Number of Starts—Displays the number of starts for the unit’s Compressor 1B.

Run Hours—Displays the number of run hours for the unit’s Compressor 1B.

Average Run Time—Displays the average run time of the unit’s Compressor 1B.

Starts per Day Best—Displays the lowest number of starts in a rolling 24 hour period for Compressor 1B.

Starts per Day Worst—Displays the highest number of starts in a rolling 24 hour period for Compressor 1B.

Number of HP Alarms—Displays the number of high pressure alarms that have occurred with the unit’s Compressor 1B.

Number of LP Alarms—Displays the number of low pressure alarms that have occurred with the unit’s Compressor 1B.

Actual Bonus—Displays the actual calculation of wellness for the unit’s Compressor 1B. The unit will always take the value from the worst component for the next maintenance indication.

Figure 6.24 Compressor 2A settings

Compressor 2A Settings (page 6 of 7)		◀ UNIT 1 ▶
S056	PASSWORD (Actual Level 0)	????
S057	Number of Starts	0
S058	Run Hours	0hrs
S059	Average Run Time	0min
S060	Starts Per Day Best	12
S061	Starts Per Day Worst	240
S062	Number of HP Alarms	0
S063	Number of LP Alarms	0
S064	Actual Bonus	0
S065		
S066		

◀▶ for next/previous unit	↔ to select parameter
↔ then ⬆ to change parameter	↔ to confirm

Number of Starts—Displays the number of starts for the unit’s Compressor 2A.

Run Hours—Displays the number of run hours for the unit’s Compressor 2A.

Average Run Time—Displays the average run time of the unit’s Compressor 2A.

Starts per Day Best—Displays the lowest number of starts in a rolling 24 hour period for Compressor 2A.

Starts per Day Worst—Displays the highest number of starts in a rolling 24 hour period for Compressor 2A.

Number of HP Alarms—Displays the number of high pressure alarms that have occurred with the unit’s Compressor 2A.

Number of LP Alarms—Displays the number of low pressure alarms that have occurred with the unit’s Compressor 2A.

Actual Bonus—Displays the actual calculation of wellness for the unit’s Compressor 2A. The unit will always take the value from the worst component for the next maintenance indication.

Figure 6.25 Compressor 2B settings

Compressor 2B Settings (page 7 of 7)		◀UNIT 1▶
S067	PASSWORD (Actual Level 0)	????
S068	Number of Starts	0
S069	Run Hours	0hrs
S070	Average Run Time	0min
S071	Starts Per Day Best	12
S072	Starts Per Day Worst	240
S073	Number of HP Alarms	0
S074	Number of LP Alarms	0
S075	Actual Bonus	0
S076		
S077		

◀▶ for next/previous unit	↔ to select parameter
↔ then ⬆ to change parameter	↩ to confirm

Number of Starts—Displays the number of starts for the unit’s Compressor 2B.

Run Hours—Displays the number of run hours for the unit’s Compressor 2B.

Average Run Time—Displays the average run time of the unit’s Compressor 2B.

Starts per Day Best—Displays the lowest number of starts in a rolling 24 hour period for Compressor 2B.

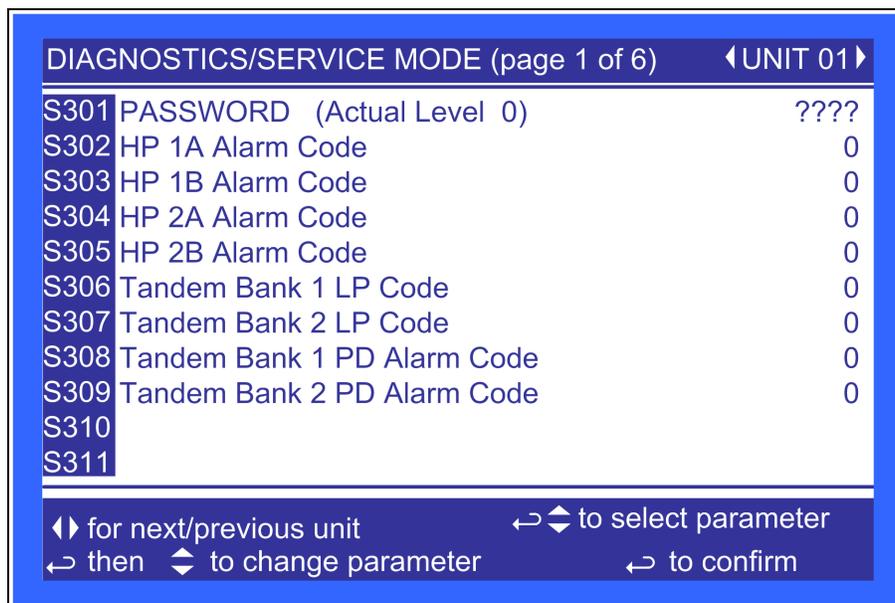
Starts per Day Worst—Displays the highest number of starts in a rolling 24 hour period for Compressor 2B.

Number of HP Alarms—Displays the number of high pressure alarms that have occurred with the unit’s Compressor 2B.

Number of LP Alarms—Displays the number of low pressure alarms that have occurred with the unit’s Compressor 2B.

Actual Bonus—Displays the actual calculation of wellness for the unit’s Compressor 2B. The unit will always take the value from the worst component for the next maintenance indication.

Figure 6.26 Diagnostics/Service mode, page 1 of 6



HP 1A Alarm Code—Compressor 1A high-pressure alarm code. Values can be 0, 2, 4 or 5. 0 indicates no alarms or the alarm counter has been reset. 2 indicates the high-pressure input has been continuously activated for 30 seconds. 4 indicates there have been four high-pressure situations within 10 minutes. 5 indicates there have been three high-pressure instances within a rolling 12-hour period.

HP 1B Alarm Code—Compressor 1B high pressure alarm code. Values can be 0, 2, 4 or 5. 0 indicates no alarms or the alarm counter has been reset. 2 indicates the high pressure input has been continuously activate for 30 seconds. 4 indicates there have been four high pressure situations within 10 minutes. 5 indicates there have been three high-pressure instances within a rolling 12-hour period.

HP 2A Alarm Code—Compressor 2A high pressure alarm code. Values can be 0, 2, 4, or 5. 0 indicates no alarms or the alarm counter has been reset. 2 indicates the high pressure input has been continuously activate for 30 seconds. 4 indicates there have been four high pressure situations within 10 minutes. 5 indicates there have been three high-pressure instances within a rolling 12-hour period.

HP 2B Alarm Code—Compressor 2B high-pressure alarm code. Values can be 0, 2, 4 or 5. 0 indicates no alarms or the alarm counter has been reset. 2 indicates the high-pressure input has been continuously activate for 30 seconds. 4 indicates there have been four high-pressure situations within 10 minutes. 5 indicates there have been three high-pressure instances within a rolling 12-hour period.

Tandem Bank 1 LP Code—Compressor Circuit 1 low-pressure alarm code. Values can be 0, 1 or 3. 0 indicates no alarms. 1 indicates upon startup of a tandem bank of compressors pressure was not established for the compressors to be able to continue to run. 3 indicates that after operating normally, the low-pressure switch opened and the tandem bank of compressors was unable to establish pressure.

Tandem Bank 2 LP Code—Compressor Circuit 2 low pressure alarm code. Values can be 0,1 or 3. 0 indicates no alarms. 1 indicates upon startup of a tandem bank of compressors pressure was not established for the compressors to be able to continue to run. 3 indicates that after operating normally the low-pressure switch opened and the tandem bank of compressors was unable to establish pressure.

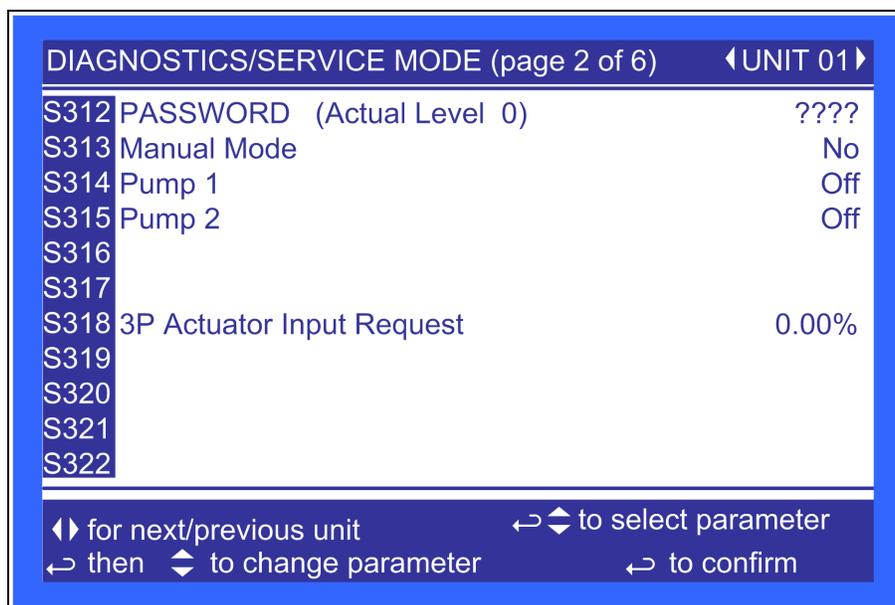
Pumpdown Alarms—If a compressor is unable to pump down the circuit within one minute, the liquid line solenoid valve will be toggled ON, then OFF. This is done because the liquid line solenoid valve could be stuck and this could fix it. If, after another minute, the compressor is unable to pump down the circuit, the liquid line solenoid valve will be toggled again. This will continue until either the compressor is able to pump down the circuit or the liquid line solenoid valve is toggled three times. If, after three times of toggling the liquid line solenoid valve and waiting 1 minute, the compressor is still unable to pump down the circuit, the compressor will be turned Off, a pump down failure alarm will be activated for that circuit and the Pump Down Alarm Code for that tandem compressor bank will be set to 1.

There is a re-pump down if the Low Pressure Switch closes again after the compressor has been pumped down; six re-pump down cycles per hour are allowed. At the seventh request of a re-pump-down, the compressor will not be started to re-pump down the circuit again, a pump down failure alarm is activated for that circuit and the Pump Down Alarm Code for that tandem compressor bank is set to 2.

Tandem Bank 1 PD Alarm Code—Compressor Circuit 1 is pump down alarm code; possible values are 0, 1 and 2.

Tandem Bank 2 PD Alarm Code—Compressor Circuit 2 is pump down alarm code; possible values are 0, 1 and 2.

Figure 6.27 Diagnostics/Service mode, page 2 of 6



Manual Mode—Used to place the Liebert iCOM control in manual mode. This is the initial setting necessary to activate any of the following items. When the Liebert iCOM is not in manual mode, each service menu item shows the current status of each parameter.

Pump 1—Used to start the unit’s Pump 1.

Pump 2—Used to start the unit’s Pump 2.

3P Actuator Input Request—A service tool to view the % call for cooling.

Figure 6.28 Diagnostics/Service mode, page 3 of 6

DIAGNOSTICS/SERVICE MODE (page 3 of 6)		◀UNIT 01▶
S323	PASSWORD (Actual Level 0)	????
S324	Tandem Bank 1LLSV	Off
S325	Tandem Bank 2LLSV	Off
S326	Compressor 1A	Off
S327	Compressor 1B	Off
S328	Compressor 2A	Off
S329	Compressor 2B	Off
S330	Hot Gas Valve 1 On/Off	Off
S331	Hot Gas Valve 1 Analog	0.0%
S332	Hot Gas Valve 2 On/Off	Off
S333	Hot Gas Valve 1 Analog	0.0%

◀▶ for next/previous unit	↔ to select parameter
↔ then ▶ to change parameter	↔ to confirm

Tandem Bank 1LLSV—Controls the liquid line solenoid valve for Compressor Circuit 1. Valves are ON or OFF.

Tandem Bank 2LLSV—Controls the liquid line solenoid valve for Compressor Circuit 2. Valves are ON or OFF.

Compressor 1A—Turns on Compressor 1A and selects the mode of compressor operation. The operation selections are RUN and EVACUATE.

Compressor 1B—Turns on Compressor 1B and selects the mode of compressor operation. The operation selections are RUN and EVACUATE.

Compressor 2A—Turns on Compressor 2A and selects the mode of compressor operation. The operation selections are RUN and EVACUATE.

Compressor 2B—Turns on Compressor 2B and selects the mode of compressor operation. The operation selections are RUN and EVACUATE.

Hot Gas Valve 1 On/Off—Turns on the hot gas solenoid valve for Compressor Circuit 1.

Hot Gas Valve 1 Analog—Sets the hot gas valve % open for Compressor Circuit 1.

Hot Gas Valve 2 On/Off—Turns on the hot gas solenoid valve for Compressor Circuit 2.

Hot Gas Valve 2 Analog—Sets the hot gas valve % open for Compressor Circuit 2.

Figure 6.29 Diagnostics/Service mode, page 4 of 6

DIAGNOSTICS/SERVICE MODE (page 4 of 6)		◀UNIT 01▶
S334	PASSWORD (Actual Level 0)	????
S335	Tandem Bank 1 Mode	Run
S336	Tandem Bank 2 Mode	Run
S337	Manual Mode Control Type	Full
S338	Manual Deviation	10%
S339	Analog Output Ramp 1	0%
S340	Analog Output Ramp 2	0%
S341	Analog Output Ramp 3	0%
S342	Analog Output Ramp 4	55%
S343	Alarm Relay	Off
S344	Warning Relay	Off

◀▶ for next/previous unit	↔ to select parameter
↔ then ▶ to change parameter	↔ to confirm

Tandem Bank 1 Mode—A settable parameter via the service Diagnostics/Service menu. When set to **Run**, this parameter will allow the user to turn On or Off any single or multiple digital output or set any single or multiple analog output to a specific output setting.

Tandem Bank 2 Mode—A settable parameter via the service Diagnostics / Service menu. When this parameter is set to **Run**, the control will allow the user to turn ON / OFF any single or multiple digital output or set any single or multiple analog output to a specific output setting.

Manual Mode Control Type—Not currently used.

Manual Deviation—Not currently used.

Analog Output Ramp 1—Sets the value of Analog Output 1 value as a percentage. The factory default for the Liebert XDC is the hot gas valve 1.

Analog Output Ramp 2—Sets the value of Analog Output 2 value as a percentage. The factory default for the Liebert XDC is the Call for Cooling.

Analog Output Ramp 3—Sets the value of Analog Output 3 value as a percentage. The factory default for the Liebert XDC is the hot gas valve 2.

Analog Output Ramp 4—Sets the value of Analog Output 4 value as a percentage. The factory default for the Liebert XDC is the refrigerant temperature.

Alarm Relay—Used to activate the Liebert iCOM control's common alarm relay output.

Warning Relay—Used to activate the Liebert iCOM control's warning relay output.

Figure 6.30 Diagnostics/Service mode, page 5 of 6

DIAGNOSTICS/SERVICE MODE (page 5 of 6)		◀UNIT 01▶	
S345	PASSWORD (Actual Level 0)		????
S346	Status Remote Shutdown	o-o	On
S347	Status Fan Failure	o/o	Ok
S348	Status Diff Press Switch 1	o/o	Act
S349			
S350			
S351			
S352	Status Customer Input 1	o/o	Ok
S353	Status Condensation Detect	o/o	Ok
S354	Status Unit Ready	o-o	No
S355			

◀▶ for next/previous unit	↔ to select parameter
↔ then ▶ to change parameter	↔ to confirm

Status Remote Shutdown—Displays the status of the unit’s remote shutdown input.

Status Fan Failure—Displays the status of the dry contact to communicate fan failure at a module. (The dry contacts are not used to communicate a fan failure alarm when using CANbus.)

Status Diff Press Switch 1—Displays the status of the differential pressure switch.

Status Customer Input 1—Displays the status of the customer input 1 alarm.

Status Condensation Detect—Displays the status of the dry contact to communicate condensate detection at a module.

Status Unit Ready—Shows unit status when a secondary device, such as a fire detection system, is employed.

Figure 6.31 Diagnostics/Service mode, page 6 of 6

DIAGNOSTICS/SERVICE MODE (page 6 of 6)		◀UNIT 01▶	
S356	PASSWORD (Actual Level 0)		????
S357	Status HP1A	o/o	Act
S358	Status HP1B	o/o	Act
S359	Status HP2A	o/o	Act
S360	Status HP2B	o/o	Act
S361	Status LP1	o/o	Act
S362	Status LP2	o/o	Act
S363			
S364			
S365			
S366			

◀▶ for next/previous unit ↵↻ to select parameter
 ↵ then ↻ to change parameter ↵ to confirm

Status HP1A—Shows the status of the unit’s Compressor 1A high pressure switch input.

Status HP1B—Shows the status of the unit’s Compressor 1B high pressure switch input.

Status HP2A—Shows the status of the unit’s Compressor 2A high pressure switch input.

Status HP2B—Shows the status of the unit’s Compressor 2B high pressure switch input.

Status LP1—Shows the status of the unit’s Compressor Circuit 1 low pressure switch input.

Status LP2—Shows the status of the unit’s Compressor Circuit 2 low pressure switch input.

Figure 6.32 Set alarms, page 1 of 7

SET ALARMS (page 1 of 7)		◀UNIT 01▶	
S201	PASSWORD (Actual Level 0)		????
S202	High Room Air Temperature	90.0°F	
S203	Low Room Air Temperature	55.0°F	
S204	High Room Dewpoint	65.0°F	
S205	High Refrigerant Temperature	80.0°F	
S206			
S207			
S208			
S209			
S210			
S211			

◀▶ for next/previous unit ↵↻ to select parameter
 ↵ then ↻ to change parameter ↵ to confirm

High Room Air Temperature—Sets the threshold for a high room air temperature alarm. The range for the high room air temperature alarm is from 33.8 to 95°F (1 to 35°C); the default is 80°F (26.7°C).

Low Room Air Temperature—Sets the threshold for a low room air temperature alarm. The range for the low room air temperature alarm is from 33.8 to 95°F (1 to 35°C); the default is 55°F (12.8°C).

High Room Dewpoint—Sets the threshold for a return high dew point alarm. The range for the high room dewpoint alarm is from 33.8 to 95°F (1 to 35°C); the default is 65°F (18.3°C).

High Refrigerant Temperature—Sets the threshold for a high a refrigerant temperature alarm. The range for the high supply refrigerant temperature alarm is from 33.8 to 95°F (1 to 35°C); the default is 80°F (26.7°C).

Figure 6.33 Set alarms, page 2 of 7

SET ALARMS (page 2 of 7)		◀UNIT 01▶
S212	PASSWORD (Actual Level 0)	????
S213	Customer Input 1	Water Alarm
S214	Customer Input 1 active when	Closed
S215		
S216		
S217		
S218		
S219		
S220		
S221	WARNING ACTIVATES ALARM RELAY	Yes
S222	Reset Disabled Alarms	No

◀▶ for next/previous unit	↔ to select parameter
↔ then ⬆ to change parameter	↔ to confirm

Customer Input 1—Selects the device and operation of the customer input. Each event reflects a different alarm and possible action to the unit. Selectable options are:

- Comp Lock PD—This parameter will lockout and pump down the compressor
- Call Service
- C-Input
- Water
- Smoke

Customer Input 1 active when—Selects whether the input is normally closed or normally open.

WARNING ACTIVATES ALARM RELAY—Sets the alarm relay (K3) to activate when a warning occurs.

Reset Disabled Alarms—Resets disabled events.

Set Alarm Screens, Pages 3-7

The Set Alarm Screens, pages 3 through 7 (Figure 6.34 below through Figure 6.38 on page 100) permit setting the operation of an active alarm. Each event can be enabled or disabled and can be set to operate as an alarm, warning or message. The delay is the time the control waits before reporting the event.

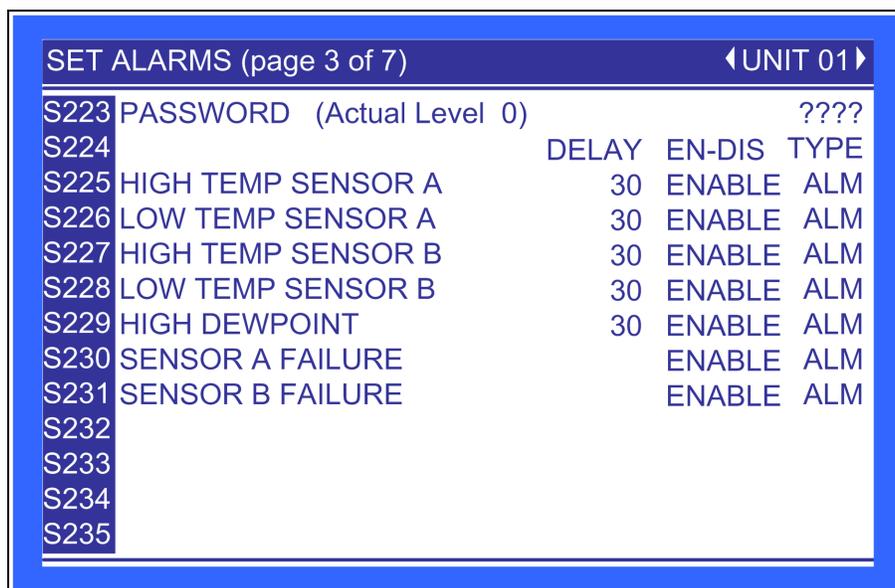
Alarm: Annunciates the buzzer, triggers a monitoring event, triggers the alarm relay and flashes

the red LED on the display

Warning: Annunciates the buzzer, triggers a monitoring event, shows the event in the event viewer / front display and flashes the red LED on the display.

Message: Shows the event in the event viewer and on the front display.

Figure 6.34 Set alarms, page 3 of 7



SET ALARMS (page 3 of 7)		◀UNIT 01▶		
S223	PASSWORD (Actual Level 0)			???
S224		DELAY	EN-DIS	TYPE
S225	HIGH TEMP SENSOR A	30	ENABLE	ALM
S226	LOW TEMP SENSOR A	30	ENABLE	ALM
S227	HIGH TEMP SENSOR B	30	ENABLE	ALM
S228	LOW TEMP SENSOR B	30	ENABLE	ALM
S229	HIGH DEWPOINT	30	ENABLE	ALM
S230	SENSOR A FAILURE		ENABLE	ALM
S231	SENSOR B FAILURE		ENABLE	ALM
S232				
S233				
S234				
S235				

High Temp Sensor A—Enables or disables the High Temperature Sensor A event, which occurs when the reading from Sensor A is above the user-specified alarm setpoint. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Low Temp Sensor A—Enables or disables the Low Temperature Sensor A event, which occurs when the reading from Sensor A is below the user-specified alarm setpoint. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

High Temp Sensor B—Enables or disables the High Temperature Sensor B event, which occurs when the reading from Sensor B is above the user-specified alarm setpoint. Sets how the event is reported as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Low Temp Sensor B—Enables or disables the Low Temperature Sensor B event, which occurs when the reading from Sensor B is below the user-specified alarm setpoint. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

High Dewpoint—Enables or disables the High Dewpoint event, which occurs when the calculated dewpoint at Sensor A or Sensor B is above the user-specified alarm setpoint. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Sensor A Failure—Enables or disables the Sensor A Failure event, which occurs when the control no longer senses a signal from Sensor A. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Sensor B Failure—Enables or disables the Sensor B Failure event, which occurs when the control no longer senses a signal from Sensor B. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Figure 6.35 Set alarms, page 4 of 7

SET ALARMS (page 4 of 7)		◀UNIT 01▶		
S236	PASSWORD (Actual Level 0)			????
S237		DELAY	EN-DIS	TYPE
S238	HIGH REFRIGERANT TEMP	30	ENABLE	ALM
S239	LOW REFRIGERANT TEMP	30	ENABLE	ALM
S240	SUPPLY REFRIGERANT SENSOR		ENABLE	ALM
S241	LOSS OF FLOW PUMP 1		ENABLE	ALM
S242	LOSS OF FLOW PUMP 2		ENABLE	ALM
S243	PUMP SHORT CYCLE		ENABLE	ALM
S244				
S245				
S246				
S247				
S248	COMPRESSOR(S) LOCKOUT	5	ENABLE	WRN

High Refrigerant Temp—Enables or disables the High Refrigerant Temp event, which occurs when the reading from supply refrigerant temperature sensor is above the user-specified alarm setpoint. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Low Refrigerant Temp—Enables or disables the Low Refrigerant Temp event, which occurs when the reading from supply refrigerant temperature sensor is below the user-specified alarm setpoint. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Supply Refrigerant Sensor—Enables or disables the Supply Refrigerant Sensor event, which occurs when the control no longer senses a signal from the Supply Refrigerant Sensor. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

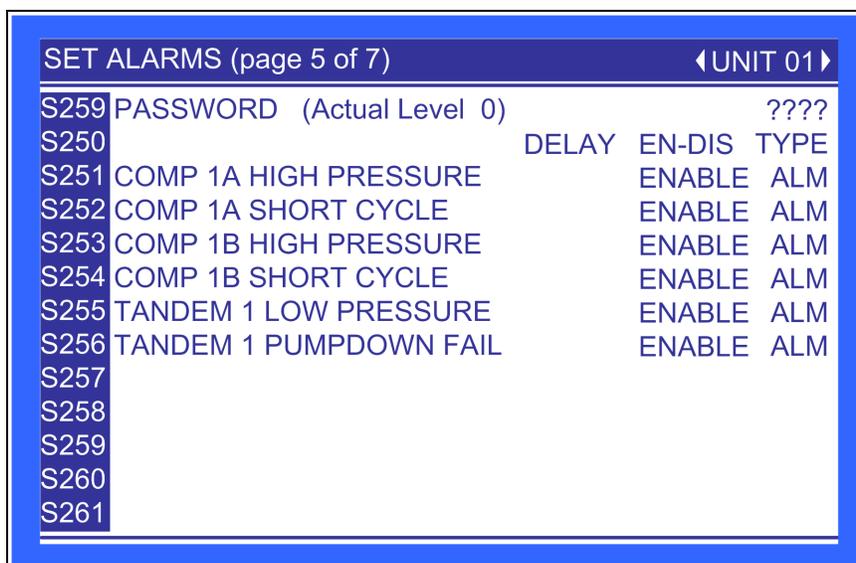
Loss of Flow Pump 1—Enables or disables the Loss of Flow Pump 1 event, which occurs when Pump 1 is commanded to run and the differential pressure switch does not sense differential pressure. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Loss of Flow Pump 2—Enables or disables the Loss of Flow Pump 2 event, which occurs when Pump 2 is commanded to run and the differential pressure switch does not sense differential pressure. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Pump Short Cycle—Enables or disables the Pump Short Cycle event, which occurs when flow is not established by either pump for 30 minutes. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Compressor(s) Lockout—Enables or disables the Compressor(s) Lockout event, which occurs when the Customer Input 1 is configured for “Comp Lock PD” and 24VAC is applied to the input. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Figure 6.36 Set alarms, page 5 of 7



SET ALARMS (page 5 of 7)		◀UNIT 01▶	
S259	PASSWORD (Actual Level 0)	????	
S250		DELAY	EN-DIS TYPE
S251	COMP 1A HIGH PRESSURE	ENABLE	ALM
S252	COMP 1A SHORT CYCLE	ENABLE	ALM
S253	COMP 1B HIGH PRESSURE	ENABLE	ALM
S254	COMP 1B SHORT CYCLE	ENABLE	ALM
S255	TANDEM 1 LOW PRESSURE	ENABLE	ALM
S256	TANDEM 1 PUMPDOWN FAIL	ENABLE	ALM
S257			
S258			
S259			
S260			
S261			

Comp 1A High Pressure—Enables or disables the Comp 1A High Pressure event, which occurs when the controls senses a high-pressure signal from Compressor 1 A. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Comp 1A Short Cycle—Enables the Comp 1A Short Cycle event, which occurs when Compressor 1A turns On, Off, then back On 10 times within 1 hour. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Comp 1B High Pressure—Enables or disables the Comp 1B High Pressure event, which occurs when the controls senses a high-pressure signal from Compressor 1 B. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Comp 1B Short Cycle—Enables or disables the Comp 1B Short Cycle event, which occurs when Compressor 1B turns On, Off, then back On 10 times within 1 hour. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Tandem 1 Low Pressure—Enables or disables the Tandem 1 Low Pressure event, which occurs when the low-pressure switch for Tandem Compressor Bank 1 does not send the proper signal during normal operation or during pump-down. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Tandem 1 Pumpdown Fail—Enables or disables the Tandem 1 Pumpdown event, which occurs when the Tandem Compressor Bank 1 suction pressure cannot be pumped down below the threshold during compressor shutdown. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Figure 6.37 Set alarms, page 6 of 7

SET ALARMS (page 6 of 7)		◀UNIT 01▶		
S262	PASSWORD (Actual Level 0)		????	
S263		DELAY	EN-DIS	TYPE
S264	COMP 2A HIGH PRESSURE		ENABLE	ALM
S265	COMP 2A SHORT CYCLE	3	ENABLE	ALM
S266	COMP 2B HIGH PRESSURE	3	ENABLE	ALM
S267	COMP 2B SHORT CYCLE	5	ENABLE	ALM
S268	TANDEM 2 LOW PRESSURE	5	ENABLE	ALM
S269	TANDEM 2 PUMPDOWN FAIL	5	ENABLE	WRN
S270				
S271				
S272				
S273				
S274				

Comp 2A High Pressure—Enables or disables the Comp 2A High Pressure event, which occurs when the controls senses a high-pressure signal from Compressor 2A. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Comp 2A Short Cycle—Enables or disables the Comp 1B Short Cycle event, which occurs when Compressor 1B turns On, Off, then back On 10 times within 1 hour. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Comp 2B High Pressure—Enables or disables the Comp 2B High Pressure event, which occurs when the controls senses a high-pressure signal from Compressor 2B. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Comp 2B Short Cycle—Enables or disables the Comp 2B Short Cycle event, which occurs when Compressor 2B turns On, Off, then back On 10 times within 1 hour. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Tandem 2 Low Pressure—Enables or disables the Tandem 2 Low Pressure event, which occurs when the low-pressure switch for Tandem Compressor Bank 2 does not send the proper signal during normal operation or during pump-down. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Tandem 2 Pumpdown Fail—Enables or disables the Tandem 2 Pumdown event, which occurs when the Tandem Compressor Bank 2 suction pressure cannot be pumped down below the threshold during compressor shutdown. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Figure 6.38 Set alarms, page 7 of 7

SET ALARMS (page 7 of 7)		◀UNIT 01▶		
S275	PASSWORD (Actual Level 0)			????
S276		DELAY	EN-DIS	TYPE
S277				
S278	CONDENSATION DETECTED	3	ENABLE	ALM
S279	FAN FAILURE	3	ENABLE	ALM
S280	CUSTOMER INPUT 1	5	ENABLE	ALM
S281	SMOKE DETECTED	5	ENABLE	ALM
S282	WATER UNDER FLOOR	5	ENABLE	ALM
S283	UNIT X DISCONNECTED		ENABLE	WRN
S284	WORKING HRS EXCEEDED		ENABLE	WRN
S285	CALL SERVICE	5	ENABLE	ALM
S286	LOSS OF POWER		ENABLE	WRN
S287				

Condensation Detection—Enables or disables the Condensation Detected event, which occurs when water is detected at the Liebert XD cooling module. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Fan Failure—Enables or disables the Fan Failure event, which occurs when a fan failure occurs at the Liebert XD cooling module. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Customer Input 1—Enable or disables the Customer Input 1 event, which occurs when 24VAC is applied to the input. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Smoke Detected—Enable or disables the Smoke Detected event, which occurs when the Customer Input 1 is configured for “Smoke Detected” and 24VAC is applied to the input. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Water Under Floor—Enable or disables the Water Under Floor event, which occurs when the Customer Input 1 is configured for “Water Under Floor” and 24VAC is applied to the input. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Unit X disconnected—Not currently used.

Working Hours Exceeded—Enables or disables the Working Hrs Exceeded event, which occurs when a component has exceeded the user-specified limit. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Call Service—Enable or disables the Call Service event, which occurs when the Customer Input 1 is configured for “Call Service” and 24VAC is applied to the input. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Loss of Power—Enables or disables the Loss of Power event, which occurs when the unit is On and operational and the 24VAC power to the control is lost. Sets how the event is reported: as an alarm, a warning or a message. Specifies how long the control waits before reporting the event.

Figure 6.39 Sensor calibration/Setup, page 1 of 3

SENSOR CALIBRATION/SETUP (page 1 of 3)		◀UNIT 01▶
S601	PASSWORD (Actual Level 0)	????
S602	Temperature Sensor A	+0.0°F
S603	Calibrated Temperature Sensor A	70.3°F
S604	Humidity Sensor A	+0.0°F
S605	Calibrated Humidity Sensor A	38.3%
S606	Temperature Sensor B	+0.0°F
S607	Calibrated Temperature Sensor B	72.3°F
S608	Humidity Sensor B	+0.0°F
S609	Calibrated Humidity Sensor B	35.6%
S610		
S611		

◀▶ for next/previous unit ↵↔ to select parameter
 ↵ then ↕ to change parameter ↵ to confirm

Temperature Sensor A—Adjusts the temperature reading from the actual remote CAN Temp Humidity sensor designated as Sensor A to compensate for any error of the sensor or to match other sensors in the room.

Calibrated Temperature Sensor A—Displays the adjusted temperature value of the remote CAN Temp Humidity sensor designated as Sensor A. This value is the actual sensor reading plus or minus the offset Temperature Sensor A.

Humidity Sensor A—Adjusts the humidity reading from the actual remote CAN Temp Humidity sensor designated Sensor A to compensate for any error of the sensor or to match other sensors in the room

Calibrated Humidity Sensor A—Displays the adjusted humidity value of the remote CAN Temp Humidity sensor designated as Sensor A. This value is the actual sensor reading plus or minus the offset Humidity Sensor A.

Temperature Sensor B—Adjusts the temperature reading from the actual remote CAN Temp Humidity sensor designated as Sensor B to compensate for any error of the sensor or to match other sensors in the room.

Calibrated Temperature Sensor B—Displays the adjusted temperature value of the remote CAN Temp Humidity sensor designated as Sensor B. This value is the actual sensor reading plus or minus the offset Temperature Sensor B.

Humidity Sensor B—Adjusts the humidity reading from the actual remote sensor designated Sensor B to compensate for any error of the sensor or to match other sensors in the room.

Calibrated Humidity Sensor B—Displays the adjusted humidity value of the remote CAN Temp Humidity sensor designated as Sensor B. This value is the actual sensor reading plus or minus the offset Humidity Sensor B.

Figure 6.40 Sensor calibration/Setup, page 2 of 3

SENSOR CALIBRATION/SETUP (page 2 of 3)		◀UNIT 01▶
S612	PASSWORD (Actual Level 0)	????
S613	Supply Refrigerant Sensor	+0.0°F
S614	Calibrated Supply Refrigerant Sensor	55.0°F
S615		
S616		
S617		
S618		
S619		
S620		
S621		
S622		

◀▶ for next/previous unit ↵↔ to select parameter
 ↵ then ⬆ to change parameter ↵ to confirm

Supply Refrigerant Sensor—Adjusts the temperature reading from the actual supply refrigerant sensor to compensate for any error of the sensor.

Calibrated Supply Refrigerant Sensor—Displays the adjusted temperature value of the supply refrigerant sensor. This value is the actual sensor reading plus or minus the offset Supply Refrigerant Sensor.

Figure 6.41 Sensor calibration/Setup, page 3 of 3

SENSOR CALIBRATION/SETUP (page 3 of 3)		◀UNIT 01▶
S623	PASSWORD (Actual Level 0)	????
S624	Supply Refrigerant Sensor 0%	30.0°F
S625	Supply Refrigerant Sensor 100%	90.0°F
S626		
S627		
S628		
S629		
S630		
S631		
S632		
S633		

◀▶ for next/previous unit	↔ to select parameter
↔ then ⬆ to change parameter	↔ to confirm

Supply Refrigerant Sensor 0%—Allows the sensor reading to be calibrated at the lowest reading of the sensor. This calibration changes the start point of the sensor reading.

Supply Refrigerant Sensor 100%—Allows the sensor reading to be calibrated at the highest reading of the sensor. This calibration changes the end point of the sensor reading.

Figure 6.42 Network setup display—System/Network setup, page 1 of 2

SYSTEM/NETWORK SETUP (page 1 of 2)		SYSTEM	
S801	PASSWORD (Actual Level 0)	????	
S802	Number of Connected Units	1	
S803			
S804			
S805			
S806			
S807			
S808			
S809	Configuration Safe	OK	No
S810	Network Safe	OK	No
S811	SW Verson	XP1.00.008.STD	

◀▶ for next/previous unit	↔ to select parameter
↔ then ⬆ to change parameter	↔ to confirm

Number of Connected Units—Shows the number of displays connected. This is always 1.

Configuration Safe—Saves or loads configuration settings for the display that have been modified from the factory defaults to an internal file that can be downloaded/uploaded using the Liebert iCOM Service Tool. Selecting **Save** will write the settings to the internal storage file and selecting **Load** will write the settings from the internal storage file to the application software. The internal file is updated automatically every 12 hours.

Network Safe—Saves or loads network settings for the display that have been modified from the factory defaults to an internal file that can be downloaded/uploaded using the Liebert iCOM Service Tool. Selecting **Save** will write the settings to the internal storage file and selecting **Load** will write the settings from the internal storage file to the application software.

SW Version—Contains the application software version loaded onto the Liebert iCOM display.

Figure 6.43 Network setup display—System/Network setup, page 2 of 2

SYSTEM/NETWORK SETUP (page 2 of 2)		SYSTEM
S812	PASSWORD (Actual Level 0)	????
S813	IP Address	192.168.254.003
S814	Netmask	255.255.255.000
S815	Gateway	0.000.000.000
S816	MAC	00:00:68:19:40:C7
S817	U2U Protocol	GBP
S818	U2U Address	33
S819	U2U Group	1
S820		
S821	Bootloader Variables	OK No
S822		

Attention: any changes done on these parameters must be followed by a 'Save+Reboot' command.

IP Address—Contains the network address of the display. This address must be unique on the network. The factory default is 192.168.254.003.

Netmask—Defines which part of the IP address is used for the network. The factory default is 255.255.255.000.

Gateway—A network point that acts as an entrance to another network. The factory default is 0.000.000.000.

MAC—A unique hardware identifier for the Ethernet device.

The following parameters (U2U Protocol, U2U Address and U2U Group) are for displaying other networked Liebert XDCs. The Liebert XDC does not perform Team Work Operations.

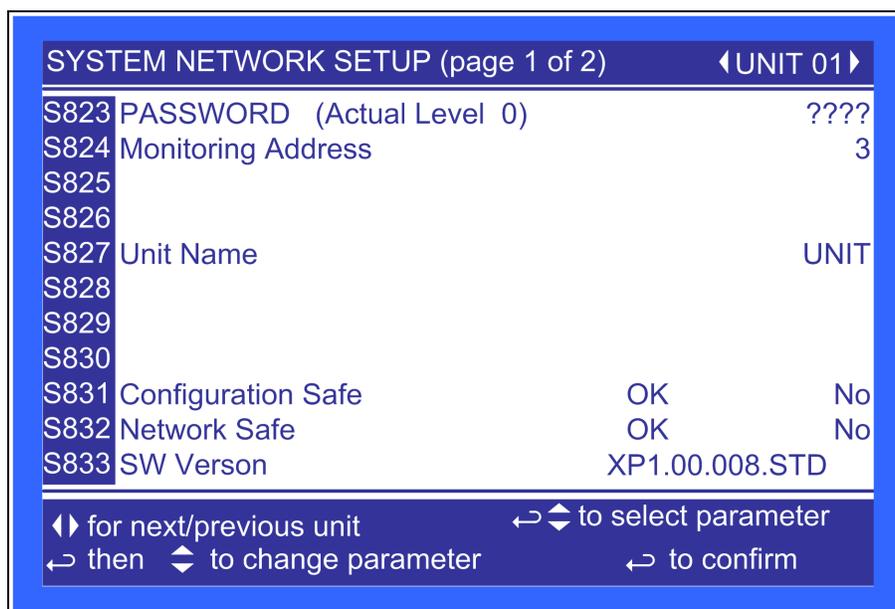
U2U Protocol—This is always set to GBP.

U2U Address—A unique identifier for each display on the network. Display addresses range from 33 to 64. Each display on the U2U network must have a different U2U address. Not currently used.

U2U Group—Used to create zones or groups within a U2U network. Once a group number is selected, the display will see only other devices with the same group number. The group number can be changed to view other devices in different groups. Not currently used.

Bootloader Variables—Indicates the bootloader has changed since it was last loaded. This parameter should only be activated by an authorized service person.

Figure 6.44 Network setup unit—System/Network setup, page 1 of 2



Monitoring Address—Sets the address used by Liebert IntelliSlot cards. This is set to 3 at the factory and should not be changed.

Unit Name—A label to identify the unit from the local or remote display. This label will show at the top right of every screen that has monitoring or configuration of that unit.

Configuration Safe—Saves or loads configuration settings for the control board that have been modified from the factory defaults to an internal file that can be downloaded/uploaded using the Liebert iCOM Service Tool. Selecting Save will write the settings to the internal storage file and selecting Load will write the settings from the internal storage file to the application software. The internal file is updated automatically every 12 hours.

Network Safe—Saves or loads network settings for the control board that have been modified from the factory defaults to an internal file that can be downloaded/uploaded using the Liebert iCOM Service Tool. Selecting Save will write the settings to the internal storage file and selecting Load will write the settings from the internal storage file to the application software.

SW Version—Contains the application software version loaded onto the Liebert iCOM control board.

Figure 6.45 Network setup unit—System/Network setup, page 2 of 2

SYSTEM/NETWORK SETUP (page 1 of 2)		◀ UNIT 01 ▶	
S834	PASSWORD (Actual Level 0)		????
S835	Monitoring Protocol		Velocity V4
S836	IP Address		192.168.254.003
S837	Netmask		255.255.255.000
S838	Gateway		0.000.000.000
S839	MAC		00:00:68:19:9B:42
S840	U2U Protocol		GBP
S841	U2U Address		1
S842	U2U Group		1
S843	Bootloader Variables	OK	No
S844	Static RAM	OK	No

Attention: any changes done on these parameters must be followed by a 'Save+Reboot' command.

Monitoring Protocol—Selects the monitoring protocol. Velocity V4 is the factory default that will provide communications to the Liebert IntelliSlot housing. iGMNet will activate the 77/78 terminals for communication to the Liebert SiteLink(-E). Hironet is used only on HPM units.

IP Address—Contains the network address of the display. This address must be unique on the network. The factory default is 192.168.254.003.

Netmask—Defines which part of the IP address is used for the network. The factory default is 255.255.255.000.

Gateway—A network point that acts as an entrance to another network. The factory default is 0.000.000.000.

MAC—A unique hardware identifier of the Ethernet device.

The following parameters—U2U Protocol, U2U Address and U2U Group—are for displaying other networked Liebert XDCs. The Liebert XDC does not perform Team Work operations.

U2U Protocol—Always set to GBP.

U2U Address—A unique identifier for each display on the network. Display addresses range from 1 to 32. Each display on the U2U network must have a different U2U address. Not currently used.

U2U Group—Used to create zones or groups within a U2U network. Once a group number is selected, the display will see only other devices with the same group number. The group number can be changed to view other devices in different groups. Not currently used.

Bootloader Variables—Indicates whether the bootloader has changed since it was last loaded. This parameter should be activated only by an authorized service person.

Static RAM—Allows service personnel to clear and reboot the control board's RAM. This should be performed only by Vertiv or Liebert Service personnel.

Figure 6.46 Options setup, page 1 of 2

OPTIONS SETUP (page 1 of 2)		◀UNIT 01▶
S401	PASSWORD (Actual Level 0)	????
S402	Autorestart Enabled	Yes
S403	Single Unit Auto Restart	5sec
S404	Unit Start Sequence Delay	1sec
S405	Control Delay Time	1sec
S406	Pump Start Time Delay	10sec
S407	Pump Wait Time Delay	10sec
S408	Pump Off Time Delay	5sec
S409	Lead Pump	1
S410	Pump Short Cycle Delay	30min
S411		

◀▶ for next/previous unit	↔ to select parameter
↔ then ⬆ to change parameter	↔ to confirm

Autorestart Enabled—Restarts the unit after a power cycle when set to **Yes**. When this parameter is set to **No**, the unit will not restart after a power cycle.

Single Unit Auto Restart—Sets a time delay for the unit to restart when the Auto Restart Enabled is set to **Yes**. The delay begins once the boot process has completed. This parameter allows units to be staggered On to reduce the amount of simultaneous power consumption after a loss of power.

Unit Start Sequence Delay—Not currently used.

Control Delay Time—Not currently used.

Pump Start Time Delay—Sets a time delay to ensure that refrigerant begins flowing when the pump starts. If refrigerant does not begin flowing before the user-set delay expires, the pump will be turned Off.

Pump Wait Time Delay—Sets the pump wait time delay to prevent the pump from continuing to run when refrigerant is not flowing. If a pump is running normally and refrigerant flow is lost, the pump will stay On for the specified time trying to re-establish refrigerant flow. If refrigerant flow resumes during the specified interval, the pump will continue operating. If the wait time expires and refrigerant flow has not resumed, the pump will shut down.

Pump Off Time Delay—Sets the length of time a pump will remain off when refrigerant flow is interrupted or stops. After the time delay has expired, the control will try to restart the pump.

Lead Pump—Sets which pump is the active pump. It can be set to PUMP 1 or PUMP 2. The control will operate the respective pump unless a loss of flow condition occurs. On a LOSS OF FLOW condition, the control will switch to the standby pump after the LOSS OF FLOW alarm time delay has elapsed and the LOSS OF FLOW alarm has been annunciated. The default is PUMP 1.

Pump Short Cycle Delay—Sets the time to lock Off the unit if it is unable to establish refrigerant flow within this set amount of time.

Figure 6.47 Options setup, page 2 of 2

OPTIONS SETUP (page 2 of 2)		◀UNIT 01▶
S412	PASSWORD (Actual Level 0)	????
S413		
S414		
S415		
S416		
S417		
S418	Low Pressure Alarm Delay	3sec
S419	Compressor Sequence ON TD	30sec
S420	Compressor All ON TD	30sec
S421	Comp Next Start Delay	5sec
S422	Lead Tandem	Tandem 1

◀▶ for next/previous unit	↔ to select parameter
↔ then ⬆ to change parameter	↔ to confirm

Low Pressure Alarm Delay—Sets how long a Low Pressure alarm will be delayed when any compressor starts. This is also known as the *Winter Start Delay Timer*.

Compressor Sequence ON TD—Sets the time delay between each compressor’s activation during startup.

Compressor All ON TD—Sets the time delay for all compressors to continue to run once all four compressors have started during the startup sequence.

Comp Next Start Delay—Sets the time delay between each compressor’s activation during normal operation.

Lead Tandem—Sets the lead tandem compressor bank when the unit is activated. Can be set for Tandem 1 or Tandem 2.

Figure 6.48 Module setup, page 1 of 20

MODULE SETUP (page 1 of 20)		◀UNIT 01▶		
S901	PASSWORD (Actual Level 0)			????
S902	NODE ID 81	DELAY	EN-DIS	TYPE
S903	CONDENSATION DETECTED	15	ENABLE	
S904	LOCAL MODULE SHUTDOWN	15	ENABLE	ALM
S905	SENSOR FAILURE	30	ENABLE	ALM
S906	FAN FAILURE	30	ENABLE	ALM
S907	FAN CONTROL MODE		OFF	
S908	DISABLE LOCAL BUTTON		NO	
S909	FLASH LED AT MODULE		NO	
S910	SET MODULE LABEL		A Z 81	
S911	SUPPLY AIR TEMP LIMITS	High 80	Low 50	°F
S912	RETURN AIR TEMP LIMITS	High 120	Low 60	°F
S913	FIRMWARE VERSION			999.99.999

This screen selects the operation of an active alarm for each smart module. Each event can be enabled or disabled and can be set to operate as an alarm, a warning or a message. The delay is the time the control waits before reporting the event.

Alarm: Annunciates the buzzer, triggers a monitoring event, triggers the alarm relay and flashes the red LED on the display.

Warning: Annunciates the buzzer, triggers a monitoring event, shows the event in the event viewer/front display and flashes the red LED on the display.

Message: Shows the event in the event viewer and on the front display.

Fan Control Type—Sets the fan control mode. Values can be OFF, ON, ON ALL and TEMP CNTL.

Disable Local Button—Disables the push button on the front of the smart module. To disable the push button, set the parameter to YES. To re-enable the push button, set the parameter to NO.

Flash LED at Module—Flashes the LED on the smart module when set to Yes.

Set Module Label—A four-character label consisting of two letters and two numerals. This is the standard nomenclature for Data Center Grid assignment of racks. Additionally, the module's location can be denoted with 10 characters, either letters or non-alphanumeric characters from a built-in list. Either or both labels can be used and are entered using this screen.

Supply Air Temp Limit—Sets the high and low supply air temperature to from the module. An alarm will occur if the temperature falls outside the limits.

Return Air Temp Limit—Sets the high and low return air temperature to from the module. An alarm will occur if the temperature falls outside the limits.

Firmware Version—Displays the firmware version installed on the smart module.

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7 START THE LIEBERT XDC WITH LIEBERT ICOM

7.1 Checklist for Liebert XDC Startup



CAUTION: Risk of piping and component rupture. Can cause injury or equipment damage. Closing service valves may isolate liquid refrigerant, causing high pressure and rupture of piping. Do not close valves without following recommended procedures for repair, maintenance and replacement of components. Install pressure relief valves in field piping that may become isolated by service valves.

NOTICE

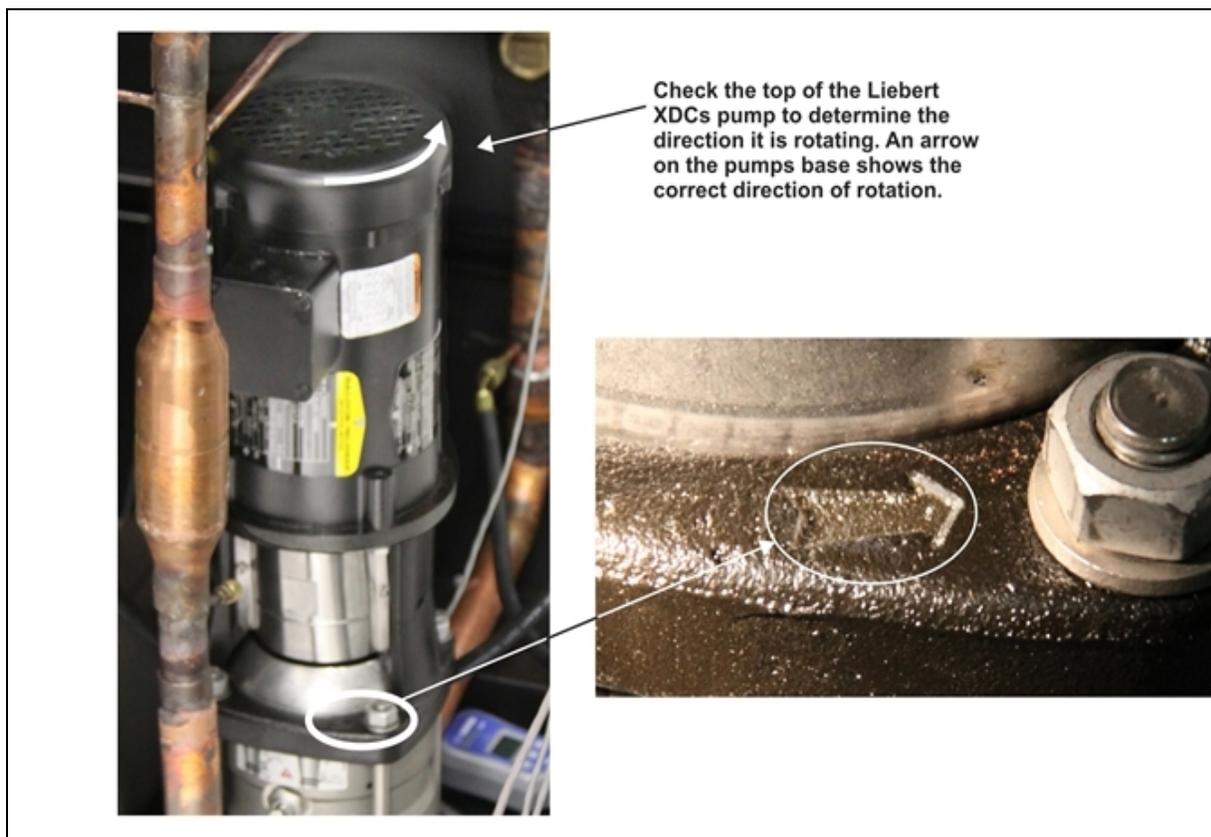
Risk of unintended pump start. Can cause equipment damage.

Do not install the pump fuses for 60Hz until the system is fully charged with refrigerant. Do not remove the locking mechanisms from 50Hz circuit breakers or place in the On position until the system is fully charged with refrigerant. Operating the pumps without a full refrigerant charge can result in equipment damage.

NOTE: Before any action that could cause a disturbance in the Liebert XD system's cooling function is begun, the facility manager **MUST** be informed. In addition, after the action is taken and the work is finished, the facility manager **MUST** be informed

1. Verify that bypass flow controllers were installed (if applicable), see Table 4.2 on page 39:
2. Check all isolation ball valves in the Liebert XDC and Liebert XD cooling module and verify that all are open.
3. Check rotation of Liebert XDC pumps. Rotation should be counterclockwise and in the same direction as the arrow. See Figure 7.1 on the next page for arrow location on the pump.

Figure 7.1 Liebert XDC pump rotation determination



4. Check rotation of fans on Liebert XD cooling modules.
5. Verify that air is being discharged in the “cold aisle.”
6. Check rotation of fans on condenser(s) of Liebert XDC (air-cooled units only)—Verify that air is being discharged out to the atmosphere.
7. Confirm that the total calculated refrigerant R-134a amount has been properly charged into the system [see [Filling the Pumped Circuit—R-134a](#) on page 41].
8. Confirm that the total calculated refrigerant R-407C amount has been properly charged into the system (see [Filling the Direct Expansion \(DX\) Circuit—R-407C](#) on page 55).
9. Confirm that the remote temperature/humidity sensor provided has been installed in the correct location.

The correct location is near the return side of a main air mover such as a Liebert DS. If more than one Liebert XDC is installed, use a different location for each remote sensor for best temperature/humidity calculation.

The Liebert XDC system is now ready to be turned ON.

1. Turn the Liebert XDC On via the user interface (I/O button). The factory-setting defaults Liebert XD module fans to On. When the unit is turned On, the modules’ fans will turn On. Allow the system to attempt to start for at least 2 minutes.

If the Liebert XDC pump cannot maintain flow and continues to switch over due to starting difficulties, proceed to [Check pressure differential functionality](#); below and refer to [Troubleshooting](#) on page 121.

2. If constant flow is established, wait until the Liebert XDC has been operating 10-15 minutes, then verify that the refrigerant level in the receiver sight glass is between the second and third level (see Figure 7.2 below). Add or remove charge as indicated by sight glass level.
3. Check pressure differential functionality:

The Liebert XDC system should be On. If it is Off:

- a. Turn the Liebert XDC On via user interface (I/O button). The factory-setting defaults Liebert XD module fans to ON. When the unit is turned ON, the modules fans will turn On.

If there is no “Loss of Flow” alarm present—This suggests that there is flow. Test the pressure differential by closing the ball valve on either the suction line or discharge line to stop the flow.

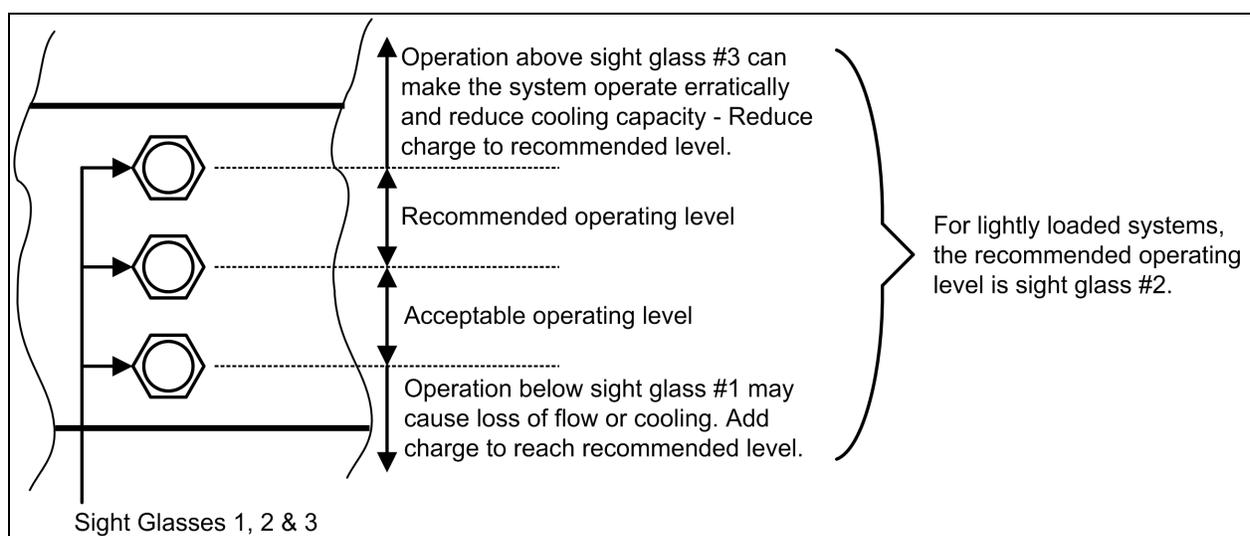
This should prompt an alarm for “loss of flow on P1.” This alarm confirms that the switch has opened on low pressure (below 6 psi; 41 kPa; 0.41 bars).

If there is a “Loss of Flow” alarm present—This suggests that there is no flow. Verify that this is correctly annunciated by looking at the sight glass in the receiver. If a true no-flow condition exists, the level will not move.

However, **if there is flow, but the differential reading is faulty**, the level will slowly drop, indicating flow, while the loss of flow alarm is annunciated.

Check the pressure differential physically by making sure that the electrical connections are properly connected. Then check the pressure differential electrically by making sure that the unit has 24VAC across it.

Figure 7.2 System R-134a liquid level



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8 ALARM DESCRIPTIONS AND SOLUTIONS

8.1 Alarm Descriptions

NOTE: Alarms must be acknowledged before they can be reset. To acknowledge or silence an alarm, press the ALARM key one time. This will silence the alarm; the red LED will remain illuminated until the alarm is reset.

- **CALL SERVICE**—Activated when Customer Input 1 is configured for “Call Service” and 24VAC is applied to the input. This alarm is reset when the 24VAC is removed.
- **COMP 1A HIGH PRESSURE**—Activated when the control senses a high head pressure signal from Compressor 1A. This alarm will reset when the main power is cycled or the HP 1A Alarm Code variable in the Service Diagnostics menu is reset to 0.
- **COMP 1B HIGH PRESSURE**—Activated when the control senses a high head pressure signal from Compressor 1B. This alarm will reset when the main power is cycled or the HP 1B Alarm Code variable in the Service Diagnostics menu is reset to 0.
- **COMP 2A HIGH PRESSURE**—Activated when the control senses a high head pressure signal from Compressor 2A. This alarm will reset when the control power is cycled or the HP 2A Alarm Code variable in the Service Diagnostics menu is reset to 0.
- **COMP 2B HIGH PRESSURE**—Activated when the control senses a high head pressure signal from Compressor 2B by the control. This alarm will reset when the main power is cycled or the HP 2B Alarm Code variable in the Service Diagnostics menu is reset to 0.
- **COMP 1A SHORT CYCLE**—Activated when Compressor 1A turns On, Off, then back On, 10 times within 1 hour. The alarm will reset itself when the control turns Compressor 1A On, then Off fewer than 10 times within 1 hour of operating time for 1.5 hours.
- **COMP 1B SHORT CYCLE**—Activated when Compressor 1B turns On, Off, then back On, 10 times within 1 hour. The alarm will reset itself when the control turns Compressor 1B On, then Off fewer than 10 times within 1 hour of operating time for 1.5 hours.
- **COMP 2A SHORT CYCLE**—Activated when Compressor 2A turns On, Off, then back On, five times within 10 minutes or 10 times within 1 hour. The alarm will reset itself when the control turns Compressor 2A On, then Off fewer than 10 times within 1 hour of operating time for 1.5 hours.
- **COMP 2B SHORT CYCLE**—Activated when Compressor 2B turns On, Off, then back On, five times within 10 minutes or 10 times within 1 hour. The alarm will reset itself when the control turns Compressor 2B On, then Off fewer than 10 times within 1 hour of operating time for 1.5 hours.
- **COMPRESSOR(S) LOCKOUT**—Activated when Customer Input 1 is configured for “Comp Lock PD” and 24VAC is applied to the input. This alarm is reset when the 24VAC is removed.
- **CONDENSATION DETECTED (optional)**—Activated when water is detected at a cooling module. A 24VAC signal is applied to the condensation input on the control board using a twisted pair of wires or the alarm is sent via CANbus communication. When this alarm is active, the control will raise its refrigerant control point by 4°F (2.2°C). This alarm will reset when the alarms is acknowledged and the signal stops being sent from CANbus or condensation input. The alarm can also be reset by cycling the power. The main power must be cycled to remove the 4°F (2.2°C) offset.

- **CUSTOMER INPUT 1**—Activated when a 24VAC signal is applied to the customer alarm input on the control board. This alarm will reset when the 24VAC signal stops being sent from the customer alarm input. WATER UNDER FLOOR, SMOKE DETECTED, CALL SERVICE and COMP LOCK PD are possible designations for this alarm; they are set with the Unit Code.
- **FAN FAILURE** (optional)—Activated when a 24VAC signal is applied to the fan failure input on the control board using a twisted pair of wires or the alarm is sent via CANbus communication. This alarm will reset when the alarm is acknowledged and the signal stops being sent from CANbus or fan failure input. The alarm can also be reset by cycling the power.
- **HIGH DEW POINT**—Activates when the calculated dew point at either Sensor A or B exceeds the user-specified alarm setpoint. The alarm will reset when the calculated room dew point from both Sensor A and Sensor B is 2°F (1.1°C) below the setpoint and the alarm has been acknowledged.
- **HIGH REFRIGERANT TEMP**—Activated when the refrigerant temperature sensor reads the refrigerant temperature above the user-specified alarm setpoint. This alarm will reset when the reading from the refrigerant temperature sensor drops 2°F (1.1°C) below the user-specified setpoint and the alarm has been acknowledged.
- **HIGH TEMP SENSOR A**—Activated when the reading from Sensor A is above the user-specified alarm setpoint. The alarm will reset when the reading from Sensor A drops 2°F (1.1°C) below the setpoint and the alarm has been acknowledged.
- **HIGH TEMP SENSOR B**—Activated when the reading from Sensor B is above the user-specified alarm setpoint. The alarm will reset when the reading from Sensor B drops 2°F (1.1°C) below the setpoint and the alarm has been acknowledged.
- **LOSS OF FLOW PUMP 1**—Activated when Pump 1 is commanded to run and the differential pressure switch does not sense differential pressure (set at 6 psi; 41kPa; 0.41 bars). After attempting to start Pump 1 three times, the Liebert XDC will automatically switch to the other pump to establish flow. This alarm will reset when flow has been established on Pump 1 and the alarm has been acknowledged.
- **LOSS OF FLOW PUMP 2**—Activated when Pump 2 is commanded to run and the differential pressure switch does not sense differential pressure (set at 6 psi; 41kPa; 0.41 bars). After attempting to start Pump 2 three times, the Liebert XDC will automatically switch to the other pump to establish flow. This alarm will reset when flow has been established on Pump 2 and the alarm has been acknowledged.
- **LOW MEMORY**—Activated when the control board is low in memory resources. This alarm rests automatically as soon as memory consumption falls below the threshold.
- **LOW REFRIGERANT TEMP**—Activated when the supply refrigerant temperature sensor temperature reading drops below the higher of the two calculated dew points, assuming that neither Sensor A or Sensor B has a sensor failure alarm. This alarm will reset when the refrigerant temperature sensor reads the refrigerant temperature above both of the two calculated dewpoints and the alarm has been acknowledged. This alarm can lock the unit Off. If this occurs, the main power must be cycled, or the Low Refrig Temp Alarm Code in the Service Diagnostics menu must be reset to 0.
- **LOW TEMP SENSOR A**—Activates when the reading from Sensor A drops below the user-specified alarm setpoint. The alarm will reset when the reading from Sensor A rises 2°F (1.1°C) above the setpoint and the alarm has been acknowledged.
- **LOW TEMP SENSOR B**—Activates when the reading from Sensor B drops below the user-specified alarm setpoint. The alarm will reset when the reading from Sensor B rises 2°F (1.1°C) above the setpoint and the alarm has been acknowledged.

- **NODEX CONDENSATION DETEC**—Activated when condensation is detected on a smart module at CAN node ID X, where X is a value ranging from 81 to 100. This alarm resets when condensate is no longer detected. The main power must be cycled off to remove the 4°F (2.2°C) offset value.
- **NODEX FAN FAILURE**—Activated when a fan failure occurs on a smart module at CAN node ID X, where X is a value ranging from 81 to 100. The alarm will rest when the fan returns to normal operation.
- **NODEX LOCAL SHUT DOWN**—Activated when a smart module at CAN node ID X, where X is a value ranging from 81 to 100, has been shut down by an external signal. This alarm will reset when the remote shutdown input is deactivated.
- **NODEX RETURNAIR TEMPLIMIT**—Activated when the return air temperature (entering air temperature to the module) exceeds the user-specified return air temperature range on a smart module at CAN node ID X, where X is a value ranging from 81 to 100. This alarm will reset when the return air temperature return to with the user-specified range.
- **NODEX SENSOR FAILURE**—Activated when a smart module at CAN node ID X, where X is a value ranging from 81 to 100, stops receiving a signal from one or more of its supply air, return air, or refrigerant temperature sensors. This alarm will reset when signals are detected from the module's sensors.
- **NODEX SUPPLYAIR TEMPLIMIT**—Activated when the supply air temperature (temperature of the air leaving the module) exceeds the user-specified supply air temperature range on a smart module at CAN node ID X, where X is a value ranging from 81 to 100. This alarm will reset when the return air temperature return to with the user-specified range.
- **PUMP SHORT CYCLE**—Activated when the Liebert XDC is trying to establish flow (differential pressure) and is unable to do so. The Liebert XDC will attempt three times to establish flow on a pump before trying the other pump. The control will keep cycling three times on one pump, then three times on the other pump until it is able to establish flow (differential pressure). If this cycling occurs for 30 minutes and the Liebert XDC still does not establish flow, a PUMP SHORT CYCLE alarm will be present. This alarm will shut down the Liebert XDC. To reset this alarm, the main power must be cycled.
- **RAM/BATTERY FAIL**—Activated when the RAM backup battery or the RAM itself has failed. This requires a hardware replacement.
- **SENSOR A FAILURE**—Activated when the controls no longer senses a signal from Sensor A. This alarm will reset when the signal is returned and the alarms has been acknowledged.
- **SENSOR B FAILURE**— Activated when the controls no longer senses a signal from Sensor B. This alarm will reset when the signal is returned and the alarm has been acknowledged.
- **SMOKE DETECTED**—Activated when the Customer Input 1 is configured for “Smoke” and 24VAC is applied to the input. This alarm is reset when the 24VAC is removed.

NOTE: This is not a room smoke detector and is not intended to replace external smoke detectors.

- **SUPPLY REFRIGERANT SENSOR FAILURE**—Activated when the control no longer senses a signal from the supply refrigerant sensor. This alarm will reset when the signal is returned.
- **TANDEM BANK 1 LP**—Activated when the low-pressure switch for Tandem Compressor Bank 1 doesn't send the proper signal during normal operation, or during pump-down. This alarm will reset when the main power is cycled or the Tandem Bank 1 LP Code variable in the Service Diagnostics menu is reset to 0.

- **TANDEM BANK 2 LP**—Activated when the low-pressure switch for Tandem Compressor Bank 2 doesn't send the proper signal during normal operation, or during pump-down. This alarm will reset when the main power is cycled or the Tandem Bank 2 LP Code variable in the Service Diagnostics menu is reset to 0.
- **TANDEM BANK 1 PD**—Activated when Tandem Compressor Bank 1 suction pressure cannot be pumped down below the threshold during compressor shutdown. This alarm will reset when the main power is cycled or the Tandem Bank 1 PD Alarm Code variable in the Service Diagnostics menu is reset to 0.
- **TANDEM BANK 2 PD**—Activated when Tandem Compressor Bank 2 suction pressure cannot be pumped down below the threshold during compressor shutdown. This alarm will reset when the main power is cycled or the Tandem Bank 2 PD Alarm Code variable in the Service Diagnostics menu is reset to 0.
- **UNIT CODE MISSING**—Activated when a valid unit code has not been entered and saved. To reset, enter valid unit code, save and execute.
- **WATER UNDER FLOOR**—Activated when Customer Input 1 is configured for “Water Alarm” and 24VAC is applied to the input. This alarm is reset when the 24VAC is removed.

8.2 Warning Descriptions

- **COMPRESSOR 1A HRS EXCEED**—Activated when the Compressor 1A Actual Hours exceeds the user-specified limit. To reset, Actual Hours must be reset to 0.
- **COMPRESSOR 1B HRS EXCEED**—Activated when the Compressor 1B Actual Hours exceeds the user-specified limit. To reset, Actual Hours must be reset to 0.
- **COMPRESSOR 2A HRS EXCEED**—Activated when the Compressor 2A Actual Hours exceeds the user-specified limit. To reset, Actual Hours must be reset to 0.
- **COMPRESSOR 2B HRS EXCEED**—Activated when the Compressor 2B Actual Hours exceeds the user-specified limit. To reset, Actual Hours must be reset to 0.
- **PUMP 1 HRS EXCEED**—Activated when the Pump 1 Actual Hours exceeds the user-specified limit. To reset, Actual Hours must be reset to 0.
- **PUMP 2 HRS EXCEED**—Activated when the Pump 2 Actual Hours exceeds the user-specified limit. To reset, Actual Hours must be reset to 0.
- **LOSS OF POWER**—Activated when the unit is On and operational and 24VAC power to the control is lost. This alarm will be emitted when power is restored to the control. The Liebert XDC will restart at a user-defined time delay after power is restored. Once activated, the alarm will remain activated for 30 minutes.

8.3 System Shutdown Causes

Unit Is Off By Refrig Sens Fail

The control has lost its signal from the refrigerant temperature sensor. The control has no way of controlling the refrigerant temperature, so the unit is shut off. Main power (disconnect switch) must be turned Off, then back On to clear this alarm.

Unit Is Off By Pump Short Cycle

The control was unable to get a pump started upon startup or after a loss of differential pressure. The control looks at the **SHORT CYCLE** time delay. If it cannot establish differential pressure within that amount of time, the unit is shut down. Main power (disconnect switch) must be turned Off, then back On to clear this alarm.

Unit Is Off By Low Refrig Temp

The control was unable to raise the refrigerant temperature to the calculated refrigerant temperature control point. The unit is shut down because if the control cannot raise the refrigerant temperature to the calculated refrigerant temperature control point, water may condense on the refrigerant piping and receiving coils. Main power (disconnect switch) must be turned Off, then back On to clear this alarm.

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9 TROUBLESHOOTING

Table 9.1
Liebert XDC troubleshooting

Symptom	Possible Cause	Check or Remedy
Pump/compressor will not energize	No main power	Check L1, L2, and L3 for rated voltage.
	Loose electrical connections	Tighten connections.
	Overloads tripped	Allow pump to cool. Check amp draw.
	Tripped circuit breaker	Check circuit breaker to pump(s).
	Incorrect phase wiring	See Checklist for Liebert XDC Startup on page 111 .
Pump will not run	Isolation valve(s) on pump suction and/or discharge is closed.	Open all isolation valves completely during normal operation.
	Liebert XD cooling modules are Off.	Check Liebert XD cooling modules to make sure that they are ON prior to starting the Liebert XDC
	Low Refrigerant Temperature (high dew point)	Check alarm(s) history on Liebert XDC. The Liebert XDC was operating below the dew point for a significant amount of time. Check humidity in conditioned space; lower humidity if necessary to allow Liebert XDC to operate at a lower temperature. (Disconnect must be switched to Off then back to On to allow Liebert XDC to reset.)
	Incorrect location of temperature-humidity sensors	Place the sensor on the return air side of the primary air mover (i.e., Liebert Deluxe System 3). Do not install the sensor near unsealed doors, windows and similar areas.
	Pressure switch not making contact	Check both differential pressure settings. If not within 6 psi, ±1 psi (41 kPa, ±7kPa; 0.41 bars, ±0.07 bars) then manually change accordingly.
	Not enough charge	See Filling the Direct Expansion (DX) Circuit—R-407C on page 55 .
Pump noisy	Cavitation due to vapor in pump	Check for adequate charge in system, refer to the user manual. Filling the Direct Expansion (DX) Circuit—R-407C on page 55
	Pump is rotating in reverse	See Checklist for Liebert XDC Startup on page 111 .
	Worn motor bearings	Replace pump
Liebert XDC (Pump) suddenly stops	Low Refrigerant Temperature (high dew point)	Check humidity of room along with location of remote sensors. Make sure that the sensors are not located in a cold area where there is a lack of sufficient air flow.
	Loss of power	When power is restored, the Liebert XDC will automatically restart.
	Clogged filter/dryer and/or impeller	Clean out debris.
	Leak in system - loss of charge	Check the entire system for leaks with a refrigerant sniffer. Repair as necessary.
Room becomes too cold	Lack of load in the room	If there is no cooling required, turn the Liebert XDC off at the I/O button.
	Minimum room temperature setpoint is too low.	Check the setpoint in the User Setpoints menu (see Figure 6.7 on page 70).
	Incorrect location of temperature-humidity sensors.	Place the sensor on the return air side of the primary air mover (i.e., Liebert Deluxe System 3). Do not install the sensor near unsealed doors, windows, and similar areas.
Motor burnout	Check control panel for welded contactor contacts or welded overload contacts	Replace defective components.
Main 24-VAC fuse trips	Shorts or loose connections	Check the wiring connections of the 24-VAC circuit.
	Faulty circuit board	Replace the circuit board.

Table 9.1 Liebert XDC troubleshooting (continued)

Symptom	Possible Cause	Check or Remedy
Unstable pump operation	R-134a pump loop is overcharged	While pump is running R-134a receiver level must be within recommended levels (see Checklist for Liebert XDC Startup on page 111).
Room becomes too warm	Liebert XDC is off.	Check status of the Liebert XDC at the user interface. Turn system On at I/O button if system is Off.
	High dew point	Check temperature and relative humidity (RH) of room. Lower RH setpoint if necessary to lower dew point. At normal room temperature of 68°F (20°C), the RH should be set to 50% or lower.
	Liebert XD cooling modules are Off.	Check Liebert XD cooling modules to make sure that they are On before starting the Liebert XDC.
	Minimum room temperature setpoint is too high.	Check the setpoint in the User Setpoints menu (see Figure 6.7 on page 70).
	Incorrect location of temperature/humidity sensors	Place the sensor on the return air side of the primary air mover (i.e., Liebert DS). Do not install the sensor near unsealed doors, windows, and similar areas.
Pipe rattle	Loose pipe connections	Check pipe connections.
Actuator motors (if applicable)	No 24 VAC power to motor	Check for 24 VAC between P2-1 and P2-4.
	No signal from control	Check 24 VAC at P22-1 (close) or P22-3 (close).
	Motor not operating	Unplug P22 completely off of the board. Jumper P22-5 to P2-4 for grounding, then jumper P22-1 to P2-1 to drive close. Remove jumper to close, and then jumper P22-3 to P2-1 to drive open. If motor fails to work, replace it.

10 MAINTENANCE

The Liebert XD system components require little maintenance when proper fluid levels are maintained and proper startup and operation procedures are followed. The following tasks should be performed at the intervals stated:

1. Check sight glass level of receiver on all circuits every 4-6 weeks. During normal operation, the level should be at or above the first sight glass.
2. Check system for leaks every 4-6 weeks

10.1 Fluorinated Greenhouse Gas Requirements

Stationary air conditioning, refrigeration, heat pump equipments and stationary fire protection systems in the European Community market and operating with fluorinated greenhouse gases (f-gas), such as R407C, R134a, R410A, must comply with the F-Gas Regulation: (EC) No. 842/2006 (F-gas). The regulation prohibits, among other actions, venting fluorinated greenhouse gases to the atmosphere.

The F-Gas Regulation requires operators to use all measures that are technically feasible and do not entail disproportionate cost to prevent leakage of these gases, to test for leakage regularly and to recover f-gas during equipment service and maintenance and before disposing of equipment.

Refer to the full regulation for additional details.

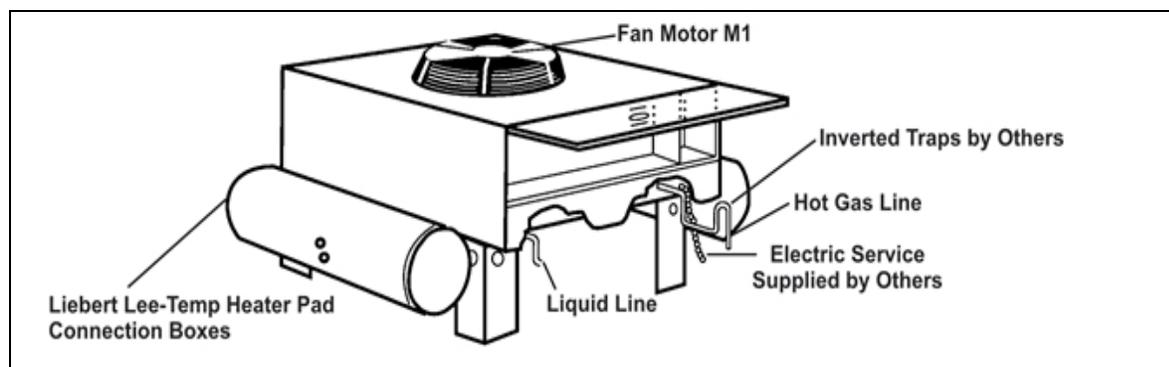
10.2 Air-Cooled Condenser

Restricted airflow through the condenser coil will reduce the operating efficiency of the unit and can result in high compressor head pressure and loss of cooling.

Clean the condenser coil of all debris that will inhibit air flow. This can be done with compressed air or commercial coil cleaner. Check for bent or damaged coil fins and repair as necessary. In winter, do not permit snow to accumulate around the sides or underneath the condenser.

Check all refrigerant lines and capillaries for vibration isolation. Support as necessary. Visually inspect all refrigerant lines for signs of oil leaks.

Figure 10.1 Outdoor fan/condenser configuration



10.3 Water/Glycol Floor Stand Condenser

10.3.1 Shell and Tube Condensers

Each water- or glycol-cooled module has a shell and tube condenser which consists of a shell, removable heads, gaskets and cleanable copper tubes.

It may be necessary to clean the copper tubing periodically to remove any scale or lime that should collect (periods between cleanings will vary with local water conditions). As deposits build up, a cleaning tool, available at any refrigeration supply house, should be used to clean the heat exchanger tubes.

1. Stop the unit (using the start/stop switch) and allow the compressor to pump down.
2. Open the disconnect switch.
3. Shut off the water supply valve to the condenser.
4. Drain the water from condensers and piping.
5. Remove the bolts securing each head and slowly pry them free.
6. Remove old gaskets and inspect sealing surfaces for pits and corrosion.
7. Swab the condenser tubes with a tube-cleaning tool.
8. When the tubes are clean, reinstall the heads using new factory gaskets.
9. Consult factory for specific torque requirements.
10. Reconnect the piping, open the water supply valve, vent the system and check for leaks.

10.3.2 Regulating Valves

The water regulating valves automatically regulate the amount of fluid necessary to remove the heat from the refrigeration system, permitting more water to flow when load conditions are high and less fluid to flow when load conditions are low. The valve consists of a brass body, balance spring, valve seat, valve disc holders, capillary tube to discharge pressure and an adjusting screw.

Testing the Water Regulating Valve Function

1. Turn the refrigeration system Off.
2. Wait 10 to 15 minutes—water should stop flowing.

If the water continues to flow, the valve is either improperly adjusted (with head pressure too low) or the pressure sensing capillary is not connected properly to the condenser. Consult Table 9.1 on page 121.

10.3.3 Glycol Solution Maintenance

Proper rust inhibitor maintenance is necessary to prevent corrosion of the glycol system. Consult the glycol manufacturer for testing and maintenance of inhibitors. Do not mix products from different manufacturers.

Inhibitor maintenance requirements depend on local water conditions. Analyzing water samples before installation and every six months will assist in developing a schedule. Inspect the solution and filter residue to determine whether corrosion is occurring.

A water treatment specialist may be required to set up a treatment program to remedy some water-caused problems.

NOTICE

Risk of frozen fluids. Can cause equipment damage and building damage.

Freezing system fluids can rupture piping. Complete system drain-down cannot be ensured. When the field piping or unit may be exposed to freezing temperatures, charge the system with the proper percentage of glycol and water for the coldest design ambient.

Automotive antifreeze is unacceptable and must NOT be used in any glycol fluid system.

NOTICE

Risk of corrosion. Can cause equipment damage.

Read and follow individual unit installation instructions for precautions regarding fluid system design, material selection and use of field-provided devices. Liebert systems contain iron and copper alloys that require appropriate corrosion protection.

Contact a water consultant about water quality, corrosion and freeze protection requirements.

Water chemistry varies greatly by location, as do the required additives, called inhibitors, that reduce the corrosive effect of the fluids on the piping systems and components. The chemistry of the water used must be considered, because water from some sources may contain corrosive elements that reduce the effectiveness of the inhibited formulation. Preferably, surface waters that are classified as soft and are low in chloride and sulfate ion content should be employed. Proper inhibitor maintenance must be performed to prevent corrosion of system components. Consult glycol manufacturer for testing and maintenance of inhibitors.

Commercial ethylene glycol (Union Carbide Ucartherm, Dow Chemical Dowtherm SR-1 and Texaco E.G. Heat Transfer Fluid 100), when pure, is generally less corrosive to the common metals of construction than water itself. It will, however, assume the corrosivity of the water from which it is prepared and may become increasingly corrosive with use if not properly inhibited.

NOTICE

Risk of fluid leaks from tubing and piping corrosion. Can cause serious equipment and building damage.

Idle fluid allows the collection of sediment that prevents the formation of a protective oxide layer on the inside of tubes. Keep unit switched ON and system pump operating.

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11 SPECIFICATIONS

Table 11.1
Liebert XDC specifications

Models	XDC160 Air		XDC160 Water / Glycol
	XDC160AA	XDC160AM	189192G3 189192G5
Cooling Capacity, tons (kW)	46 (160)	37 (130)	See Table 11.2 on the next page, Table 11.3 on page 129 and Table 11.4 on page 129 for Water/Glycol performance data
Minimum Load	The Liebert XDC's minimum recommended operating load is 40% of system nominal capacity. For example, a Liebert XDC160 60Hz system's minimum load would be 64kW. Loading below this value can unfavorably affect system operation. Consult factory for any loading below this recommendation.		
Electrical Requirements			
Input	460V-3ph-60Hz	380-415V-3ph-50Hz	460V-3ph-60Hz
Full Load Amps	79A		
Minimum supply wire sizing ampacity	84A		
Maximum fuse or circuit breaker size	100A		
Dimensions, inches (mm)			
Height - Main unit only	78 (1981)		
Height - Main unit only, as shipped	83 (2108)		
Width - Main unit	74 (1879)		
Depth - Main unit	34-5/8 (879)		
Height - Water / Glycol-cooled condenser stand	N/A		24 (607)
Width - Water / Glycol-cooled condenser stand	N/A		72 (1829)
Depth - Water / Glycol-cooled condenser stand	N/A		33 (839)
Weight, lb. (kg)			
Main unit only	1830 (831)		
Main unit only, as shipped	Domestic: 1975 (896); Export: 2109 (957)		
Water / Glycol-cooled condenser stand	N/A		1075 (488)
Water / Glycol-cooled condenser stand, as shipped	N/A		1150 (521)
Pipe Connections, inches, O.D., Cu			
Refrigerant supply to Liebert XD cooling modules	1-1/8		
Refrigerant return from Liebert XD cooling modules	2-1/8		
Liquid line, DX circuit	7/8		
Hot gas line, DX circuit	1-3/8		
Heat Rejection Equipment			
95°F ambient air-cooled condenser	2-DCSL415		N/A
100-105°F ambient air-cooled condenser	2-DCSL616		N/A
Number of XD Cooling Units Connected, Maximum (Minimum)			

Table 11.1 Liebert XDC specifications (continued)

Models	XDC160 Air		XDC160 Water / Glycol
	XDC160AA	XDC160AM	189192G3 189192G5
Liebert XDCF10	16 (6)		
Liebert XDH20	8 (4)		
Liebert XDH32	5 (2)		
Liebert XDO16	10 (4)		
Liebert XDO20	8 (4)		
Liebert XDV8	20 (8)		
Liebert XDV10	16 (7)		
Cabinet Exterior Finish	Black, matte finish, heat-fused powder coat		
Maximum Ambient Operating Temperature, °F (°C)	86 (30)		
Agency			
Approvals	CSA	CE	CSA

Table 11.2

Floor stand specifications—water-cooled Liebert XDC

Models - 60 Hz	XDC160 Water Floor Stand - 60Hz				
Entering Fluid Temp °F (C)	65 (18)	70 (21)	75 (24)	85 (29)	95 (35)
Performance Data					
Cooling capacity, tons (kW)	46.1(162.3)	46.1(162.3)	46.1(162.3)	46.1(162.3)	44.5 (156.5)
Flow, GPM	50	58	70	110	142
Pressure Drop, psi (Ft Water)	2.7 (6.2)	4.9 (11.3)	5.4 (12.5)	20.7 (47.8)	27.3 (63.1)
Heat Rejection Equipment					
Water regulating valve size	1"	1"	1"	1"	1"
Piping Connections					
Water / glycol supply and return lines	2-1/8"	2-1/8"	2-1/8"	2-1/8"	2-1/8"

Table 11.3

Floor stand specifications—Liebert XDC with 40% propylene glycol

Models - 60 Hz	XDC160 Glycol Floor Stand - 60Hz - 40% PG		
Outside Ambient °F (°C)	95 (35)	100 (38)	105 (41)
Entering Fluid Temp °F (°C)	110 (43)	110 (43)	110 (43)
Performance Data			
Cooling capacity, tons (kW)	42.5 (149.4)		
Total Heat Rejection, kW	192.6		
Flow, GPM	206		
Pressure Drop, psi (ft water)	37.2 (85.9)		
Heat Rejection Equipment			
Drycooler	DNT 940A	2 x DNT 880A*	
Drycooler Pressure Drop, psi (ft water)	6.7 (15.5)	2.9 (6.6)	
Glycol pump package - 10hp	9A31258G3		
Pump Control Package - 208V	9A34606G47		
Pump Control Package - 460V	9A32114G4		
Pump Total Head @ 204 GPM, ft water	145		
Water regulating valve size	1-1/4"		
Piping Connections			
Water / glycol supply and return lines	2-5/8"		
*When multiple drycoolers are used ensure flow is balanced.			

Table 11.4

Floor stand specifications—Liebert XDC with 40% ethylene glycol

Models - 60 Hz	XDC160 Glycol Floor Stand - 60Hz - 40% EG		
Outside Ambient °F (°C)	95 (35)	100 (38)	105 (41)
Entering Fluid Temp °F (°C)	110 (43)	110 (43)	110 (43)
Performance Data			
Cooling capacity, tons (kW)	42.5 (149.4)		
Total Heat Rejection, (kW)	192.6		
Flow, GPM	204		
Pressure Drop, psi (ft water)	35.9 (82.9)		
Heat Rejection Equipment			
Drycooler	DNT 940A	2 x DNT 880A*	
Drycooler Pressure Drop, psi (ft water)	6.5 (15.1)	2.7 (6.3)	

Table 11.4 Floor stand specifications—Liebert XDC with 40% ethylene glycol (continued)

Models - 60 Hz	XDC160 Glycol Floor Stand - 60Hz - 40% EG
Glycol pump package - 10HP	9A31258G3
Pump Control Package - 208V	9A34606G47
Pump Control Package - 460V	9A32114G4
Pump Total Head @204 GPM, ft water	145
Water regulating valve size	1-1/4"
Piping Connections	
Water / glycol supply and return lines	2-5/8"
*When multiple drycoolers are used ensure flow is balanced.	



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