Precision Cooling
For *Business-Critical Continuity™*

Liebert® XDH™

User Manual - 50 & 60Hz

EMERSON
Network Power

GENERAL SAFETY GUIDELINES

WARNING

Risk of top-heavy unit falling over. Can cause death or injury.

Improper handling can cause equipment damage, injury, or death. Read all of the following instructions before attempting to move, lift, remove packaging from the unit, or preparing unit for installation.

WARNING

Risk of explosive discharge. Can cause death or injury.

This unit contains fluids and/or gases under high pressure. Relieve system pressure before cutting into or disconnecting piping or piping components.

WARNING

Risk of high-speed moving parts. Can cause death or injury.

Disconnect all local and remote electric power supplies before working in the unit.

WARNING

Risk of electric shock. Can cause death or injury.

Disconnect both power cords from the electrical supply outlets or from the receptacles on the back of the unit before working within.

CAUTION

Risk of overhead interference. Can damage unit or structure.

The unit may be too tall to fit through a doorway while on the skid. Measure the unit and doorway heights and refer to the installation plans before moving the unit to verify clearances.

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 unit for installation.

CAUTION

Risk of improper operation and overpressurization. Can result in injury or property damage.

Only qualified personnel trained in HVAC installation or service should install or service this equipment.

Read all installation, operating and safety instructions before proceeding.

Fluorinated Greenhouse Gas Requirements—European Union

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 also requires operators to use 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.

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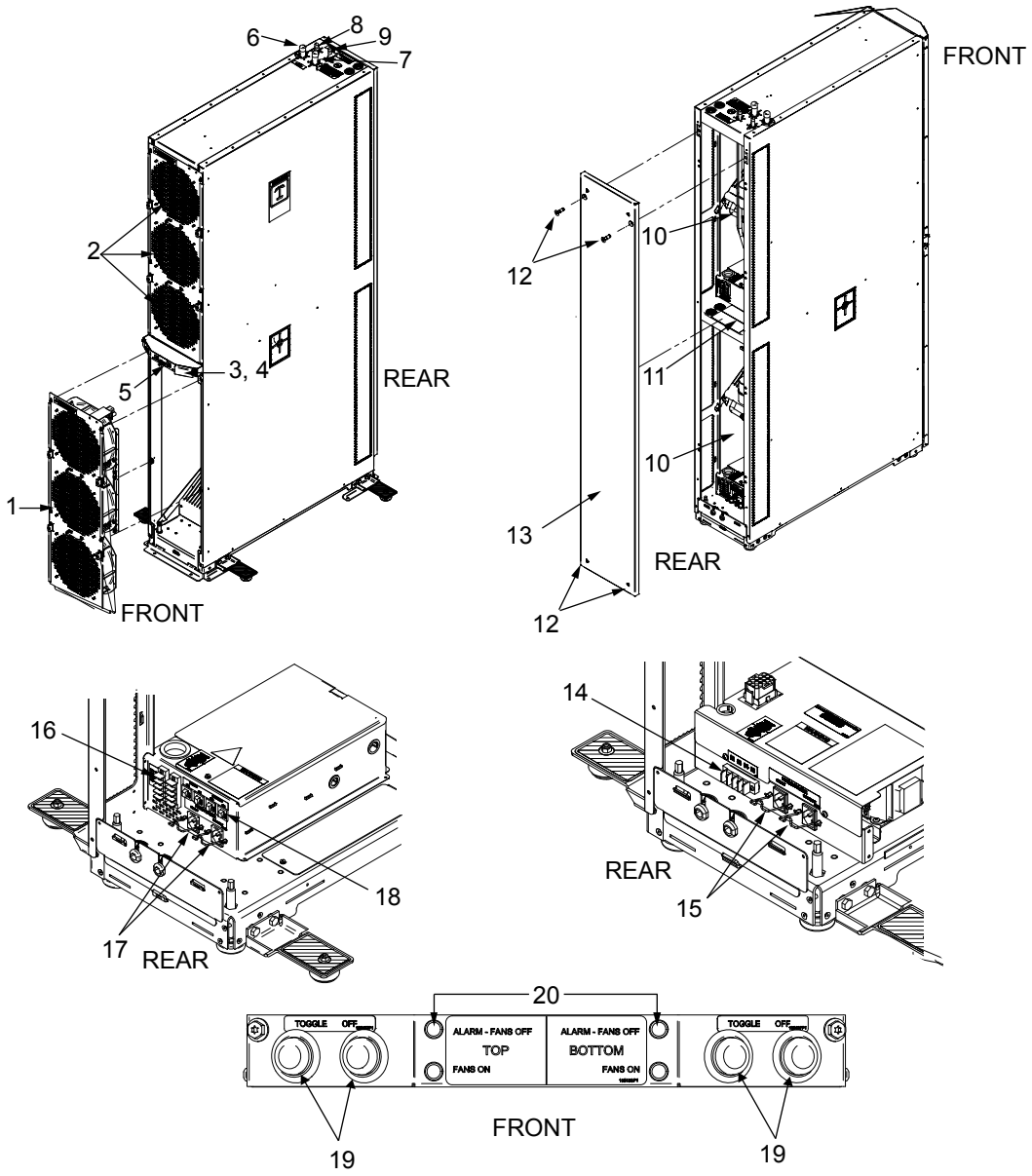
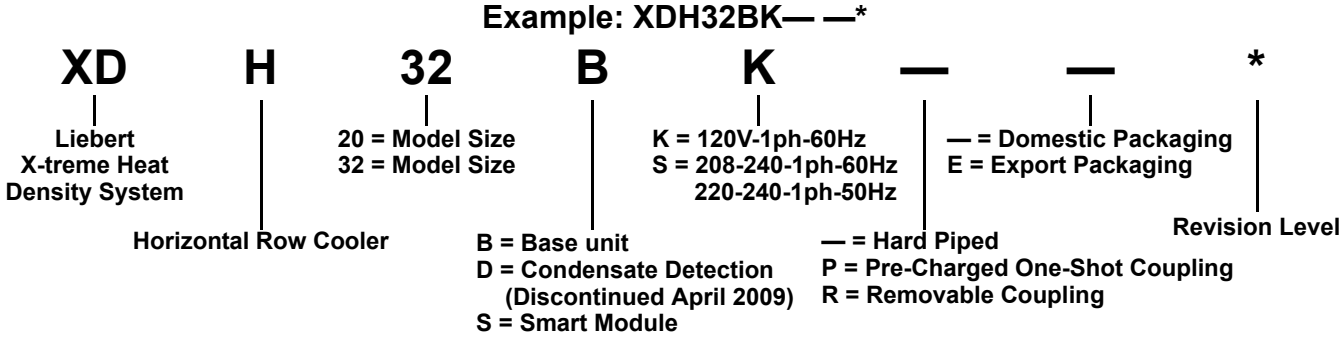
Figure 1 Liebert XDH component locations



1. Removable Fan Tray
2. Evaporator Fans
3. Switch Cover
4. On/Off Switch - Liebert XDH Standard
5. Circuit Breaker - Liebert XDH Standard
6. Return Line - Bottom Circuit
7. Return Line - Top Circuit
8. Supply Line - Bottom Circuit
9. Supply Line - Top Circuit
10. Evaporator Coils
11. Serial Tag
12. Quarter-Turn Fasteners
13. Rear Panel
14. Optional Condensate Detection - Liebert XDH Standard (Discontinued April 2009)
15. IEC Primary and Secondary Power Inlets - Liebert XDH Standard
16. Low-Voltage Terminal Block - Liebert XDH Standard Module
    - Condensate Detection
    - Remote Shutdown
    - Fan Failure Alarm
17. IEC Primary and Secondary Power Inlets - Liebert XDH Smart Module
18. Circuit Breakers - Liebert XDH Smart Modules
19. On/Off Push Button Switch - Liebert XDH Smart Modules
20. LEDs - Liebert XDH Smart Modules

Figure 2 Liebert XDH model number nomenclature



2.0 INTRODUCTION

2.1 References

This document must be used together with site specific documentation and documentation for other parts of the system.

2.2 Pre-Installation Checks

- Verify that the Liebert XDH voltage matches the available utility power. The serial tag with this information is accessible by removing the Liebert XDH's rear panel. The tag is on a shelf near the Liebert XDH's midline.
- Check the received materials to be sure all required assemblies and parts have been received. If you discover any external damage, report it to the shipping company and your local Emerson representative.

2.3 Packing List

- User manual (this document)
- Liebert XDH module
- Power cords
- Shipping/floor mounting brackets
- Tie-down bracket assembly
- Diffusers (top and bottom)

2.4 Installation Considerations

The Liebert XDH is designed for placement within a row of computer cabinets in the data center in a hot-aisle-cold-aisle arrangement. The Liebert XDH is 12" (305mm) wide, so it takes up little space. For installation arrangement, see **4.3 - Installing the Liebert XDH Within the Enclosure Row**. Be sure to follow all applicable codes.

Determine whether the Liebert XDH includes the condensate detection option (factory-installed; discontinued April 2009) or the smart module control board (factory-installed). Each of these options requires separate low-voltage connections to a monitoring unit. To minimize the possibility of condensation, insulate all piping between the Liebert XDH and the Liebert XDP or Liebert XDC.

If the Liebert XDH is installed at the end of a row, Emerson recommends using uni-directional air diffusers to direct cooling air into the cold aisle, toward the equipment racks. If the Liebert XDH is installed between racks within a row, Emerson recommends using bi-directional air diffusers, directing the cooling air toward the equipment racks on either side of the Liebert XDH.

Table 1 Application limits

Input Voltage		Range of Return Air Conditions to Unit	
Minimum	Maximum	Dry Bulb Temperature	Relative Humidity
-10%	+10%	60° to 100°F (16° to 38°C)	20% to 80%

2.4.1 Room Preparation

The room should be well-insulated and must have a sealed vapor barrier. The vapor barrier in the ceiling and walls can be a polyethylene film. Paint on concrete walls and floors should contain either rubber or plastic.

NOTE

The vapor barrier is the single most important requirement for maintaining environmental control in the conditioned space.

Outside or fresh air should be kept to a minimum when temperature and humidity must be tightly controlled. Outside air adds to the cooling, heating, dehumidifying and humidifying loads of the site. Doors should be properly sealed to minimize leaks and should not contain ventilation grilles.

3.0 GENERAL PRODUCT INFORMATION

3.1 Product/System Description

The Liebert XDH is designed for placement within a row of computer cabinets in the data center in a hot-aisle-cold-aisle arrangement to maximize the Liebert XDH's cooling. The Liebert XDH, available in a half-rack-width unit, is intended for use with a Liebert XD pumped refrigerant cooling system, supplied by either a Liebert XDP or Liebert XDC. The unit takes in hot air through the rear from the hot aisle, cools the air by air-to-fluid heat exchangers and discharges the air through the front of the unit into the cold aisle in a diffuse pattern. The cooling air is then drawn into the enclosures to cool the equipment.

Replaceable front panels on the Liebert XDH may be customized to match the appearance of various computer manufacturer's equipment, allowing the Liebert XDH to blend in with adjacent server equipment and enclosures. Unidirectional and bidirectional diffusers are available to direct cooling air for more efficient cooling, depending on the Liebert XDH's positioning in a row or at the end of a row.

Chilled R-134a refrigerant is provided to the Liebert XDH by a Liebert XD Pumping unit (Liebert XDP) or by a Liebert XD Chiller (Liebert XDC). The Liebert XDH has dual refrigeration circuits, one in the upper half of the unit and the other in the lower half. This permits increasing and decreasing cooling levels in response to server room conditions. The dual refrigeration circuits permits interlaced connection of two Liebert XD refrigerant sources to enhance system reliability. The Liebert XDH may be installed in a Liebert XD piping system that includes other Liebert XD cooling modules.

Controls on the front of the Liebert XDH permit independent operation of the two banks of fans. Dual power connections ensure continued fan operation if one of two electrical sources fails.

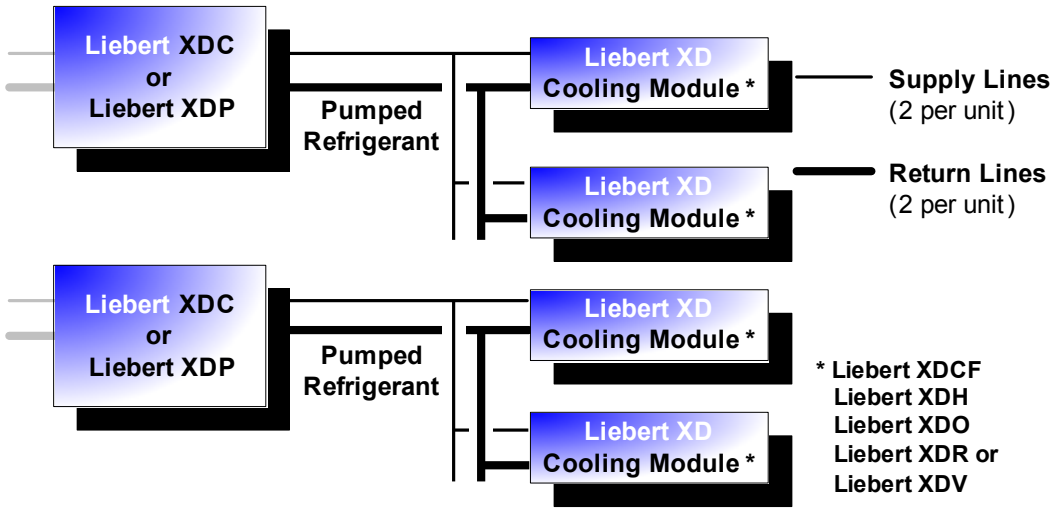
The Liebert XDH is not expected to produce any condensation because of its location, usually in the data center. A condensate pan is provided as a precaution. It does not have a drain fitting or other means of being emptied.

A Liebert Liqui-tect™ moisture detection device and a contact-closure output are no longer available as options (discontinued April 2009). These options detect condensation in the Liebert XDH's catch pan and connect to a monitoring or alarm system. A front panel alarm and indicator alert the user to condensation inside the unit.

Optional smart modules allow remote shutdown, fan failure alarms, condensate detection and switching fan per bank On and Off. This saves energy by permitting the unit to run with two fans per bank and switching on the middle when the temperature requires all fans for cooling.

The complete cooling system consists of Liebert XDH modules, Liebert XDP or Liebert XDC pumped refrigerant distribution units, power and signal cabling and interconnecting piping, see **Figure 3** below.

Figure 3 Generic piping layout



3.2 Checking and Unpacking

Upon arrival of the unit and before unpacking, verify that the labeled equipment matches the bill of lading. Carefully inspect all items for either visible or concealed damage. Damage should be immediately reported to the carrier and a damage claim filed with a copy sent to Emerson or to your sales representative. If you later find any concealed damage, report it to both the shipping company and your local Emerson representative.

Check to be sure all required assemblies and parts have been received.

The Liebert XDH is shipped in protective packaging and secured to a pallet (see **Figure 5**). Do not remove these protective items from the Liebert XDH before it is at the installation location. When unpacking and handling the Liebert XDH, exercise extra care to prevent damage.

3.2.1 Recyclable Packaging

All material used to package this unit is recyclable. Please save for future use or dispose of the material appropriately.

WARNING

Risk of top-heavy unit falling over**.** Can cause death, injury and equipment damage.

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

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 unit for installation.

NOTICE

Risk of overhead interference. Can damage unit or structure.

The unit may be too tall to fit through a doorway while on the skid. Measure the unit and doorway heights and refer to the installation plans before moving the unit to verify clearances.

NOTICE

Risk of damage from forklift. Can cause exterior and/or underside damage.

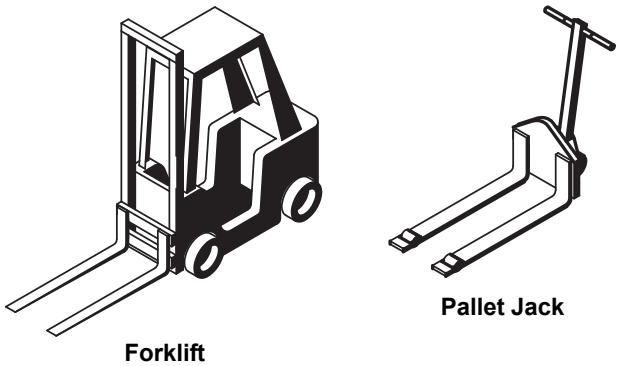
Keep tines of the forklift level and at a height suitable to fit below the skid.

NOTICE

Risk of improper storage. Can cause unit damage.

Keep the unit indoors and protected from dampness, freezing temperatures and contact damage.

Figure 4 Recommended unit handling equipment



Forklift

Pallet Jack

3.2.2 Unit Handling

If possible, transport the unit using a forklift or pallet jack.

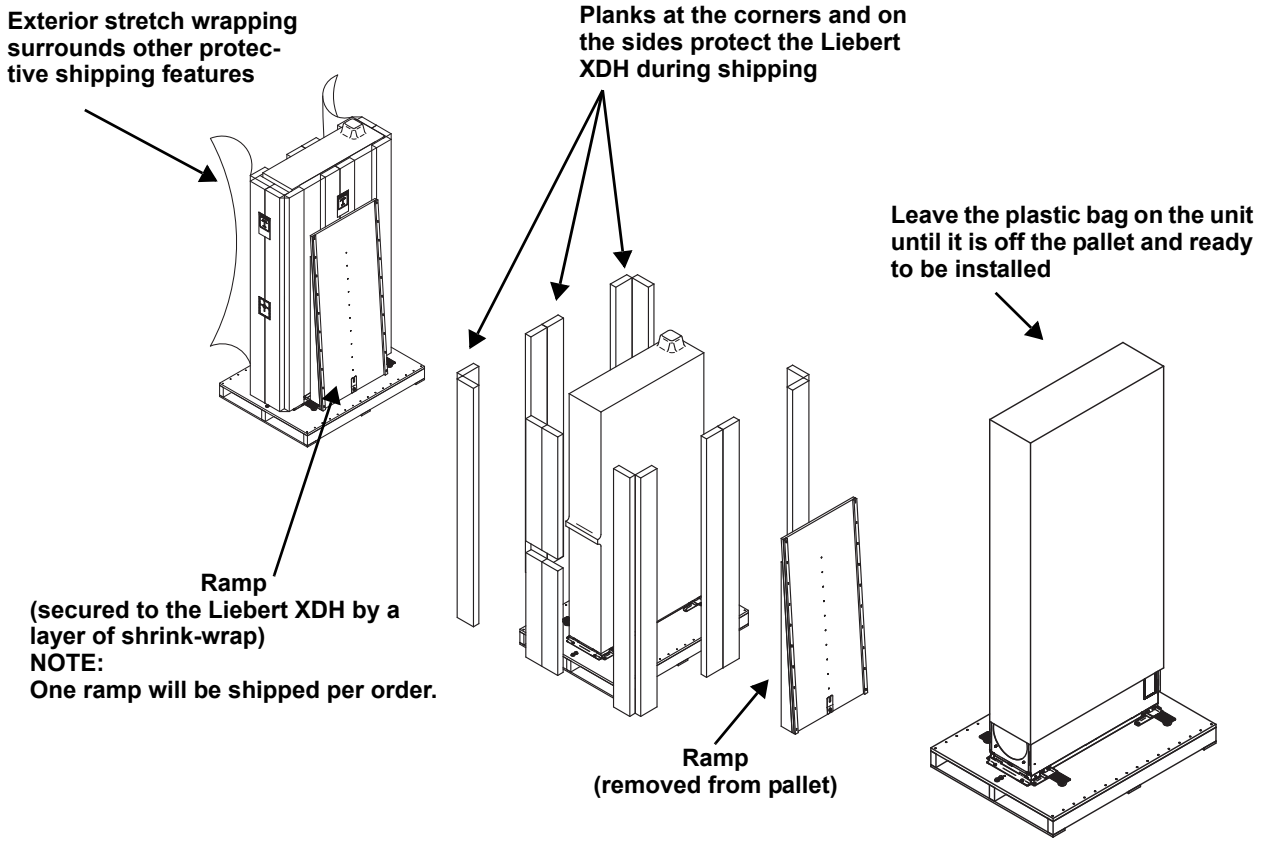
- If using a forklift or pallet jack, ensure that the fork tine length is suitable to safely move the packaged unit.
- Emerson recommends keeping the unit in the protective packaging until it has been moved to the installation site.
- When handling and unpacking the unit, exercise great care to prevent damage.
- Do not lift the unit any higher than 6" (152mm) while moving it. If it must be lifted higher than 6" (152mm), exercise great care and keep all personnel who are not helping move the unit at least 20' (5m) away from the unit.
- The Liebert XDH ships with four outrigger-style wheels to permit rolling it into position. Emerson recommends using a forklift or pallet jack to move the Liebert XDH as near as practical to its installation site before removing it from the shipping pallet.

3.2.3 Unpacking the Unit

Domestic Packaging

1. Remove the exterior stretch-wrap packaging from around the unit, exposing the protective corner and side packaging planks.
2. Remove the ramp, corner and side packaging planks from the unit, exposing the bag over the unit. Remove the bag when ready to install the Liebert XDH.

Figure 5 Removing domestic shipping packaging



3.2.4 Taking the Unit off the Pallet

WARNING

Risk of unsecured unit rolling off pallet. Can cause equipment damage, injury or death.

The Liebert XDH is on casters. Ensure that the unit/skid is located on a flat surface before loosening the hardware securing the Liebert XDH to its shipping pallet.

The Liebert XDH ships with four outrigger-style wheels to permit rolling it into position for installation. Emerson recommends using a forklift or pallet jack to move the Liebert XDH as near as practical to its installation site before removing it from the shipping pallet.

1. Locate the ramp that was shipped with the Liebert XDH (see **Figure 5**).
2. Loosen the hex screw on the ramp and remove the metal bracket (see **Figure 6**).
3. Rotate the metal bracket 180 degrees and insert the shortest slot of the metal bracket under the hex screw head and tighten the hex screw.
4. Loosen the two hex screws on the skid.
5. Align the ramp and the metal bracket with the skid. Ensure that the ramp is in contact with the skid (see **Figure 7**).
6. Insert the opposite end of the metal bracket under the hex screws on the skid. (see **Figure 7**)
7. Tighten the hex screws on the skid.
8. Remove the six hex screws from each of the two tie-down brackets, one located on either end of the Liebert XDH. (see **Figure 7**).
9. Remove the two tie-down brackets.
10. At least two properly trained personnel may roll the Liebert XDH down the ramp and off the pallet onto a flat surface.

Figure 6 Prepare ramp to remove the Liebert XDH from shipping pallet

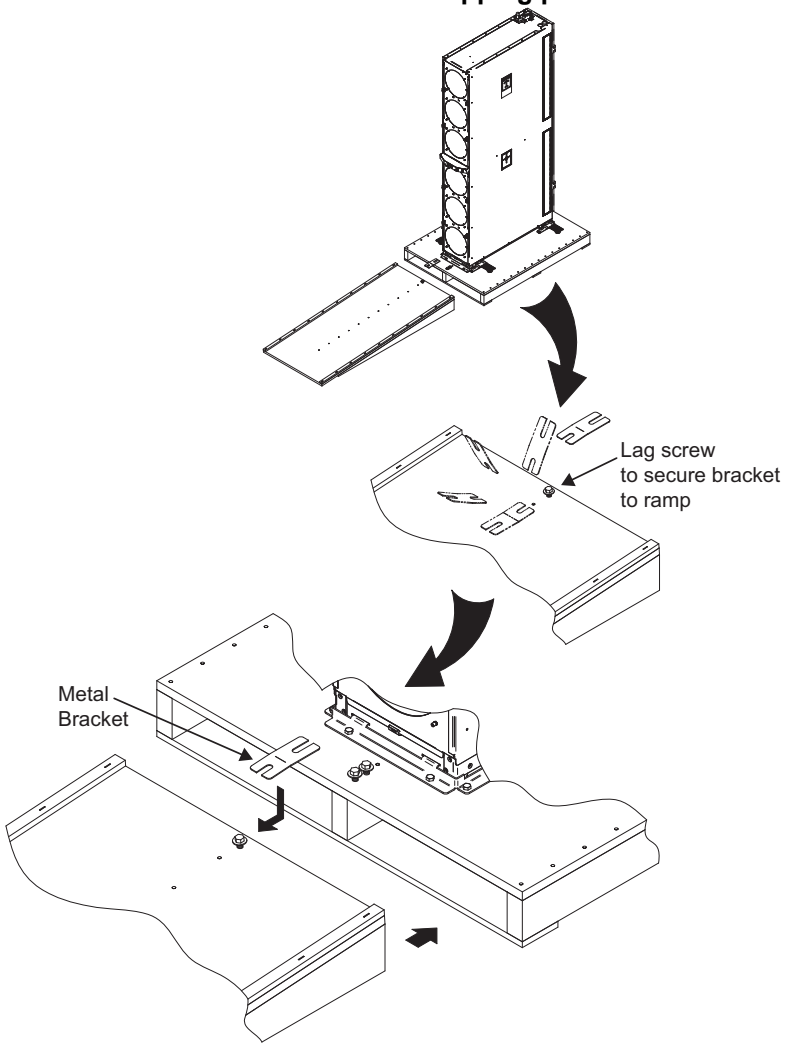
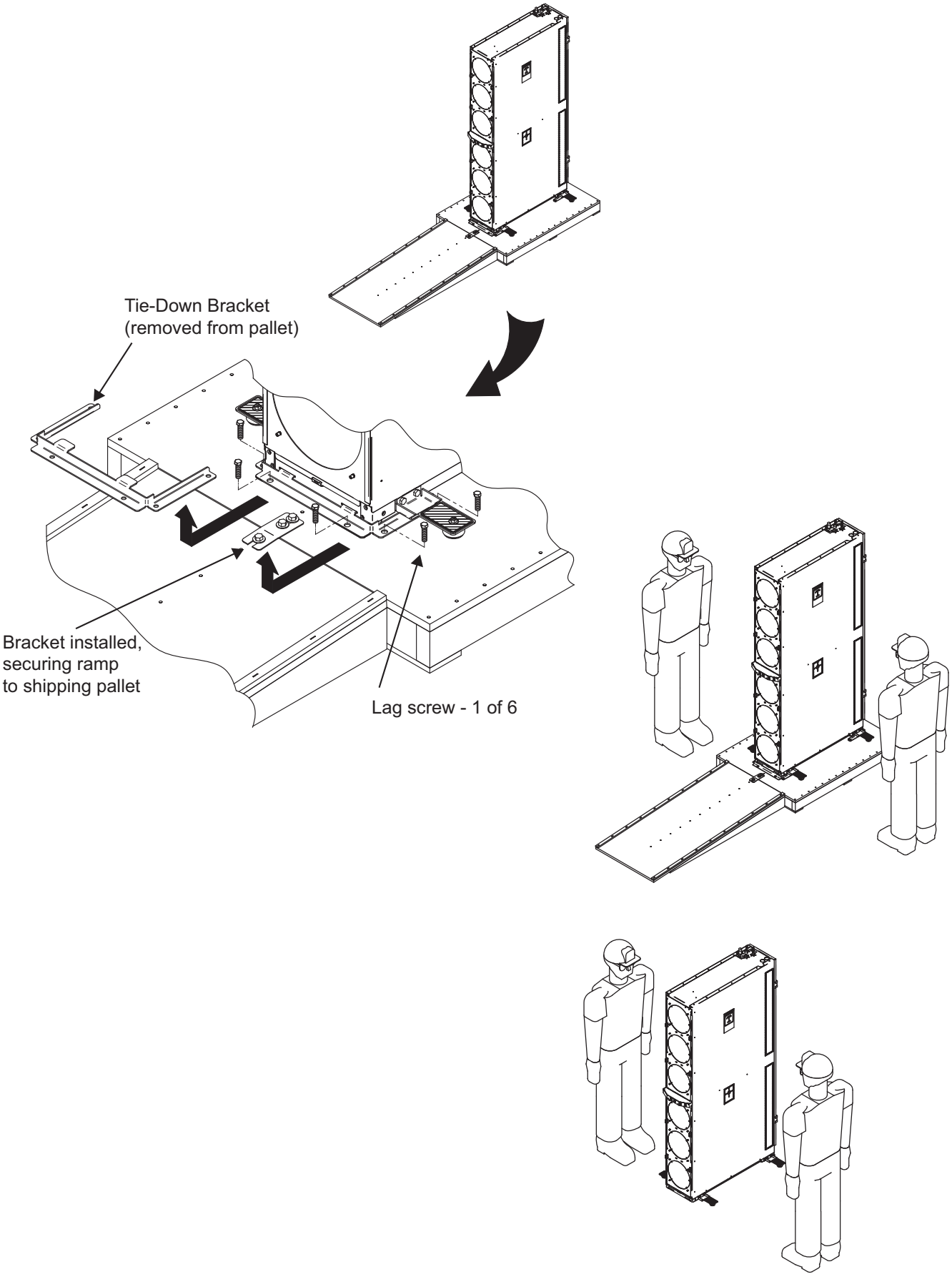


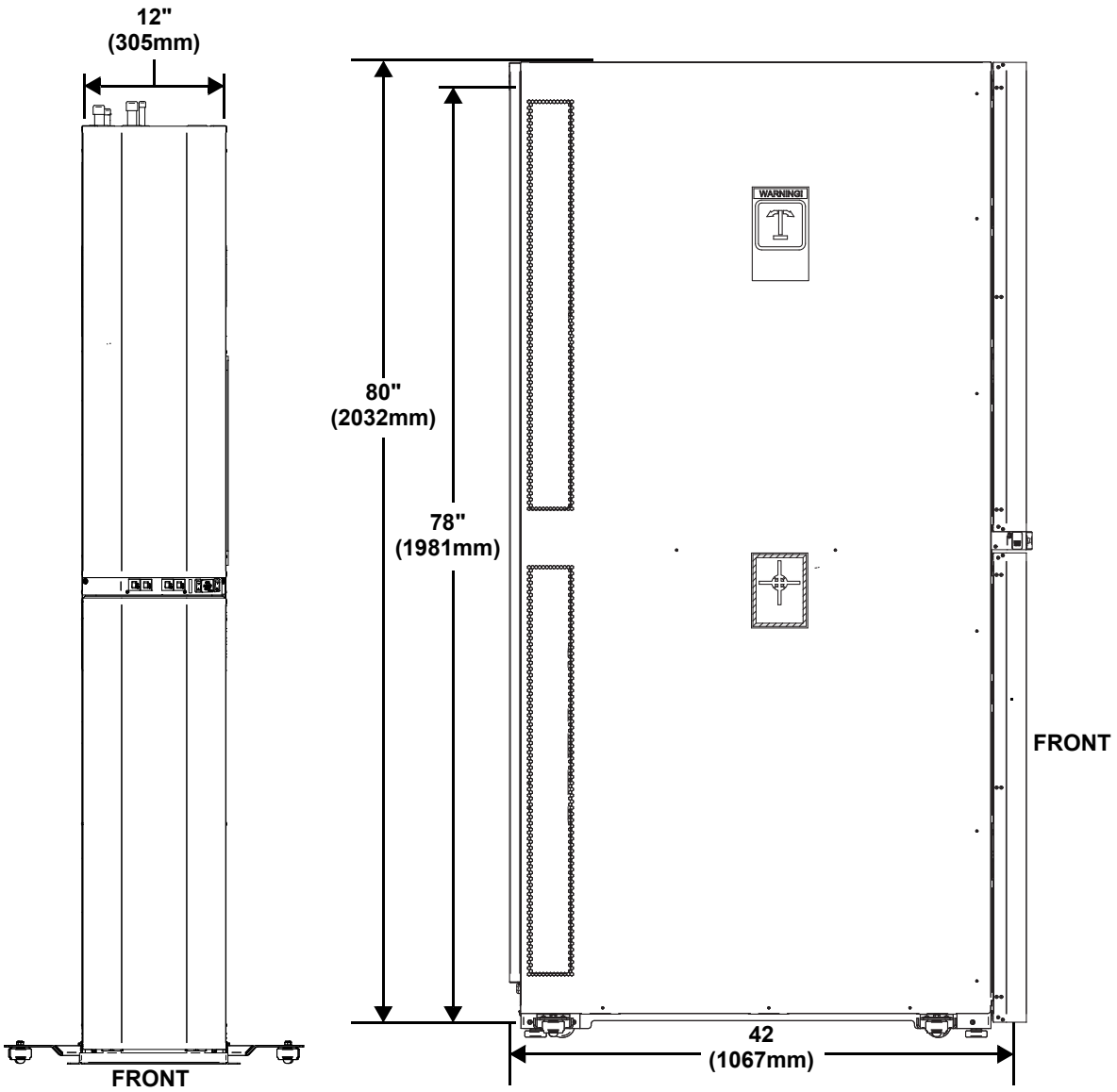
Figure 7 Attaching ramp, removing the Liebert XDH from pallet



4.0 MECHANICAL CONSIDERATIONS

4.1 Liebert XDH Dimensions

Figure 8 Liebert XDH dimensions



4.2 Determining Placement in the Conditioned Space

Refer to site-specific drawings for exact spacing. The Liebert XDH units should be placed among the cabinets that generate the greatest amount of heat. If heat loads are dispersed evenly throughout the room, the Liebert XDH modules may be spread out accordingly.

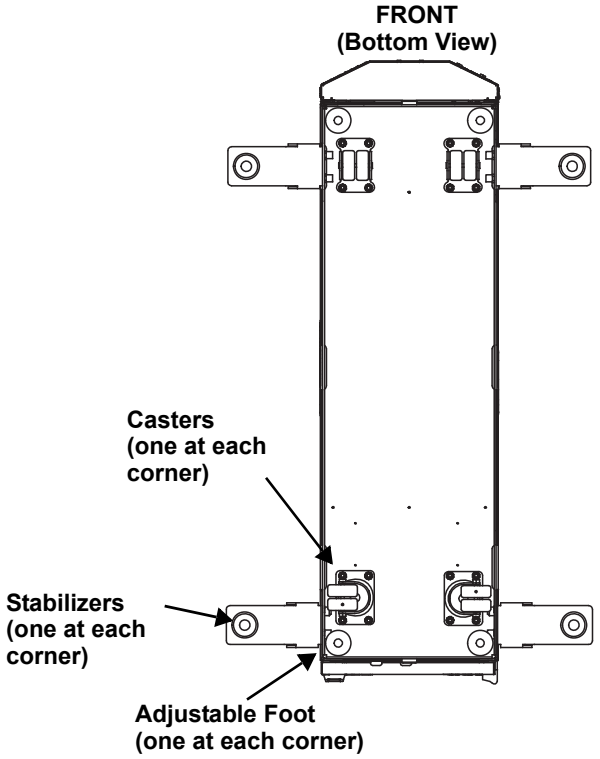
The Liebert XDH is engineered to fit among computer enclosure cabinets. **Figure 8**, below, illustrates the unit's dimensions.

4.3 Installing the Liebert XDH Within the Enclosure Row

Built-in casters allow rolling the Liebert XDH into position for installation. Stabilizers reduce the likelihood of the unit tipping over. These stabilizers must be removed before the unit is positioned in the row. Adjustable leveling feet prevent it from moving after positioning.

Once positioned, the Liebert XDH must be secured either to the floor with the included shipping brackets or to an adjacent cabinet. An adjustable bracket (Liebert P/N 187642G1) for attaching the Liebert XDH to an adjacent cabinet is included with each unit.

Figure 9 Caster and stabilizer location



4.3.1 Install a Tie-down Bracket—Optional

An optional tie-down bracket may be installed on the Liebert XDH to secure it in the row. The bracket keeps space between the Liebert XDH and adjacent equipment constant, preventing vibration.

What's Included

- Bracket: two-piece assembly
- M6 Bolt: 1
- M6 Nut: 1
- Washer: 1
- Self-tapping screws: 4

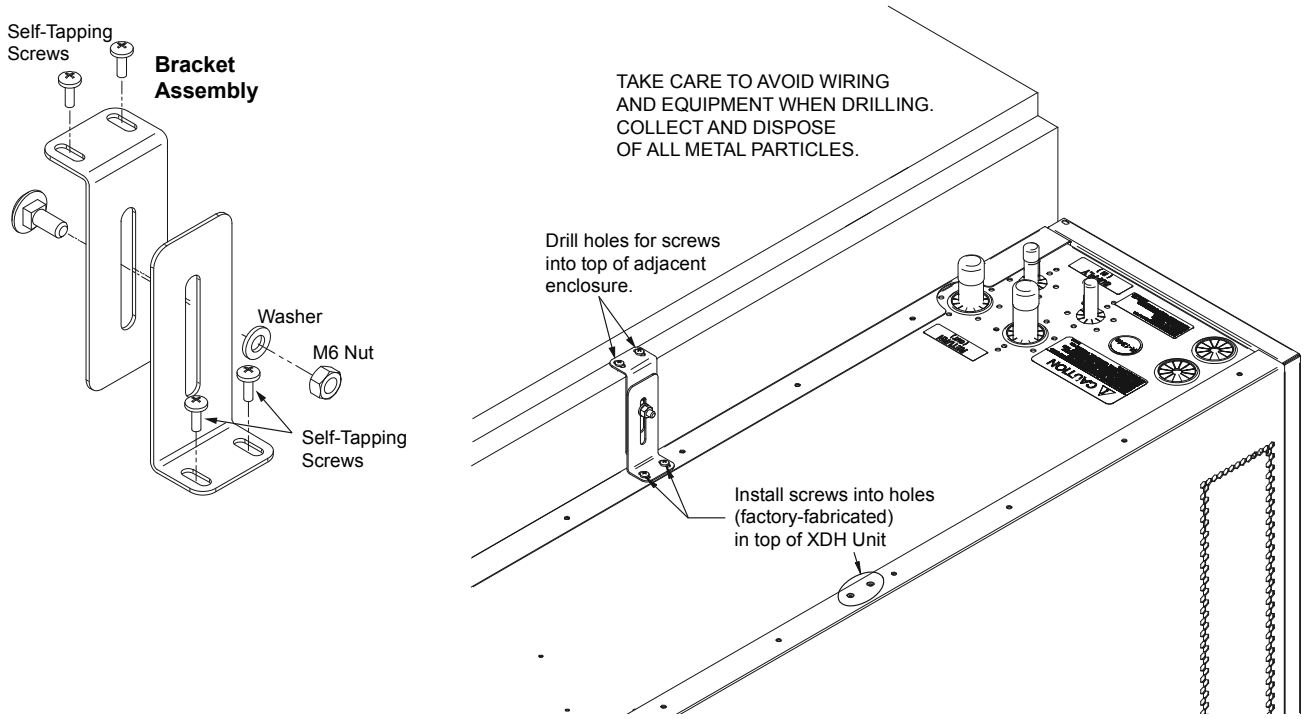
Tools Required

- Screw Driver: Phillips #2 Bit
- Drill
- Drill Bit: 1/8" diameter
- Adjustable wrench

To install the tie-down bracket:

1. Insert the M6 bolt through the longest slot in the tie-down bracket as shown in **Figure 10**.
2. Secure the tie-down bracket loosely with the washer and M6 nut.
3. Position the tie-down bracket on top of the Liebert XDH over the factory-fabricated holes and over the top of the adjacent enclosure as shown in **Figure 10**.
4. Mark the places where two self-tapping screws will attach the tie-down bracket to the adjacent cabinet.
5. Taking proper precautions to collect the metal shavings and protect equipment, drill holes in the adjacent cabinet for the two screws.
6. Use a vacuum cleaner or other method to remove all metal particles.
7. Position the bracket over the holes in the Liebert XDH and the adjacent cabinet.
8. Insert and tighten the four screws.
9. Tighten the M6 nut securely.

Figure 10 Install tie-down bracket



4.3.2 Airflow Direction

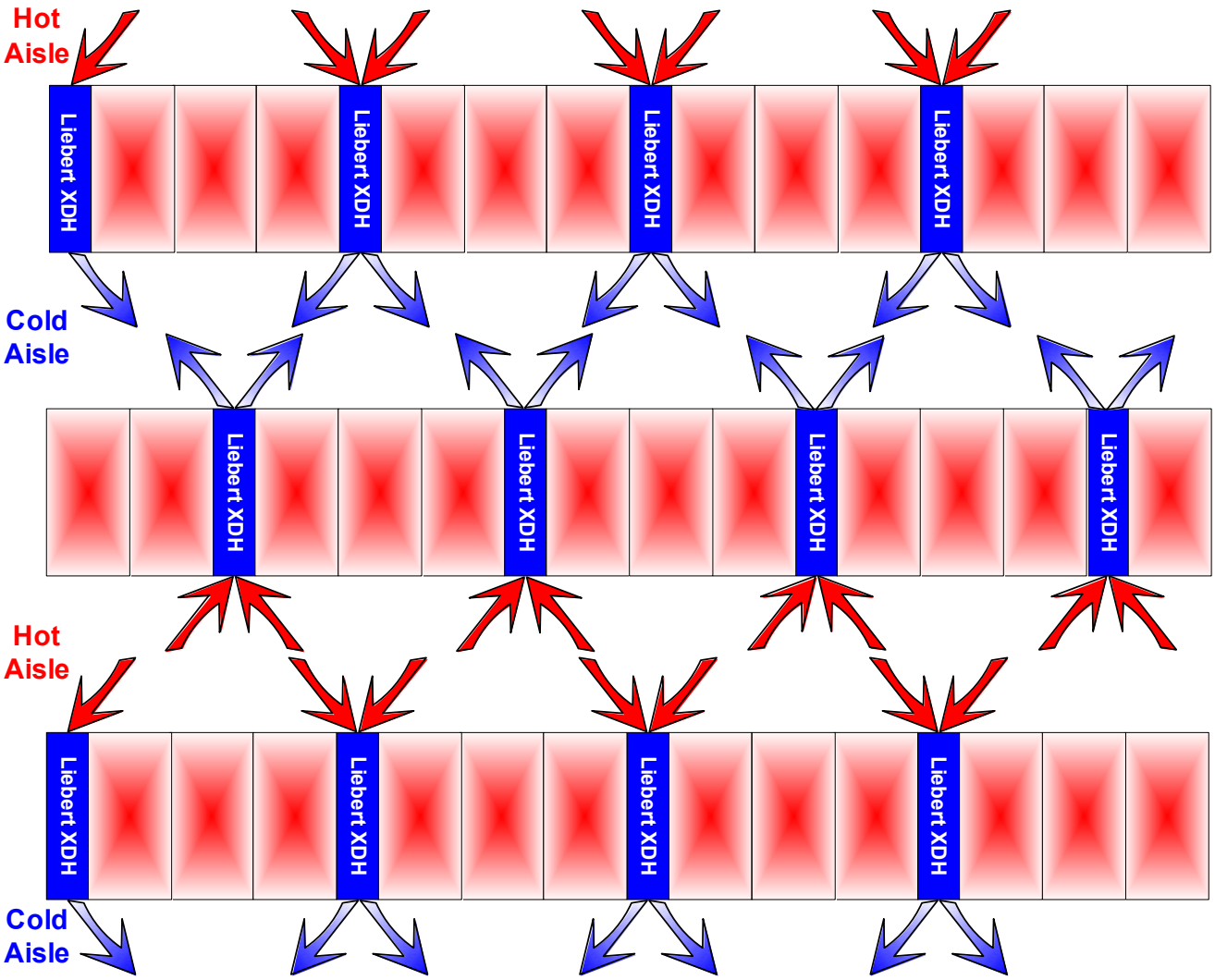
If the Liebert XDH is installed at the end of a row, Emerson recommends using uni-directional air diffusers. The uni-directional diffusers are designed to blow cooling air to the left; the diffusers can be used for right air discharge by removing them from the Liebert XDH, turning them 180 degrees, then reattaching them to the Liebert XDH.

If the Liebert XDH is installed between racks, Emerson recommends using bi-directional air diffusers. These diffusers blow air right and left, as well as to the front.

Two diffusers were shipped with the Liebert XDH. If uni-directional diffusers were ordered, the diffuser with the part number 186458 is designed for installation on the upper half of the Liebert XDH. The other diffuser, for use on the lower half of the Liebert XDH, has the part number 186459. When installed in these positions, the diffusers will direct the airflow to the left.

If directing the airflow in the opposite direction would improve cooling, the diffusers may be switched. See **Install Air Diffusers for Best Airflow Direction on page 13**.

Figure 11 Liebert XDH placement in enclosure row

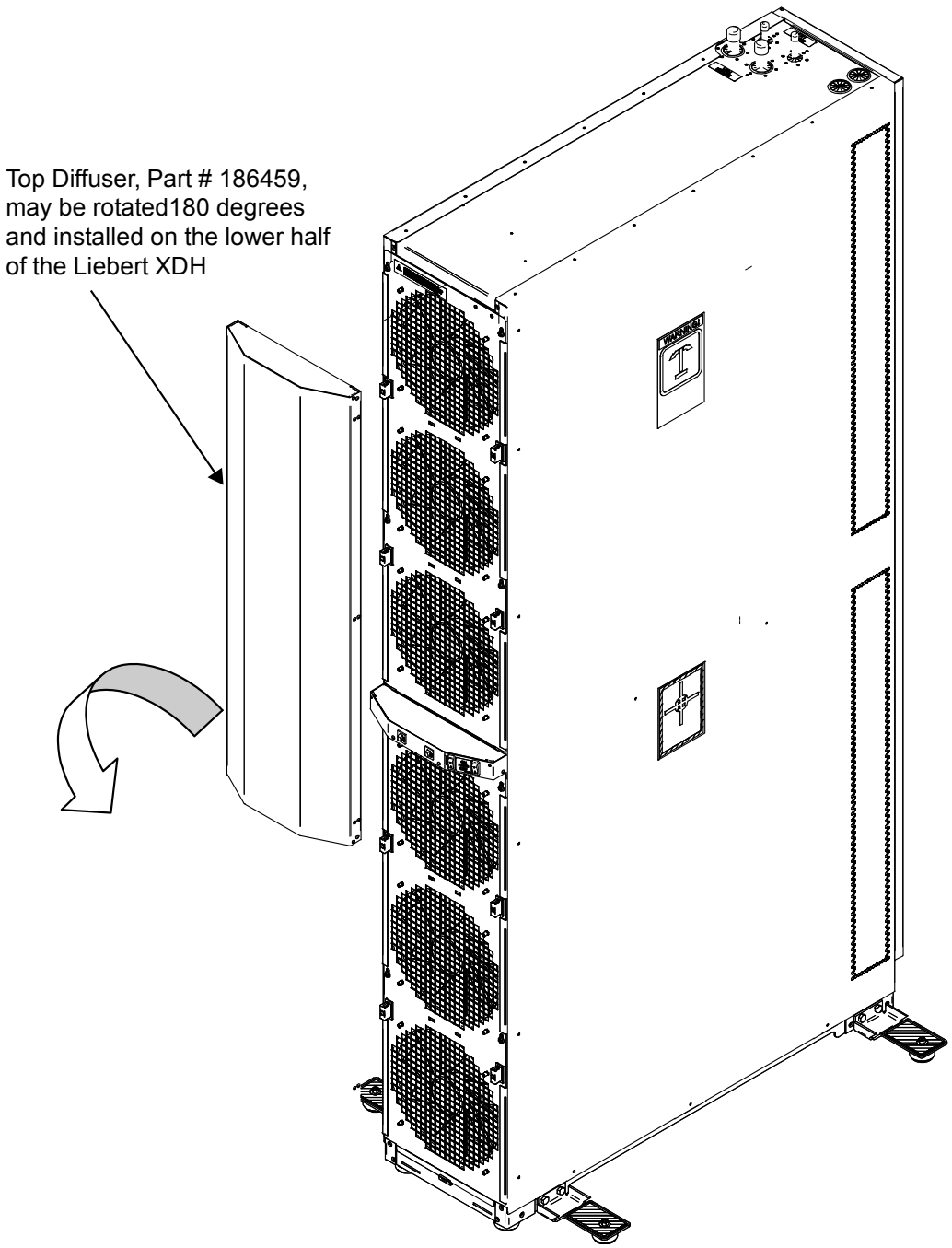


Install Air Diffusers for Best Airflow Direction

1. Remove the top diffuser, Part # 186458, from its packaging.
2. Check the top diffuser's fittings and insertion holes on the Liebert XDH to determine how the diffuser should be installed—the diffuser may be attached only one way on the top half of the Liebert XDH.
3. Rotate the diffuser 180 degrees and press it against the lower half of the Liebert XDH until it snaps into the fittings (see **Figure 12**).

   The vanes in the diffuser now point in the opposite direction.
4. Repeat **Steps 1** through **3** to install the bottom diffuser, Part # 186459, on the upper half of the Liebert XDH.

Figure 12 Change airflow direction



5.0 PIPING

Refer to site-specific drawings for general locations of the piping connections. These drawings should specify where the piping connects to the Liebert XDH.

5.1 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.

5.2 System Connection Configuration

If possible, connect the Liebert XDH's upper and lower refrigeration circuits to Liebert XDPs or Liebert XDCs in an interlaced configuration (see **Figure 13**). In an interlaced configuration, half the cooling units in an aisle are connected to one Liebert XDP or Liebert XDC and the other half in that aisle are connected to another Liebert XDP or Liebert XDC. Interlacing the connection piping will keep one of the Liebert XDH's circuits operating and maintain even cooling should one of the Liebert XDP or Liebert XDC units fail.

However, in a system with just one Liebert XDP or Liebert XDC, connect Liebert XDH modules in a non-interlaced configuration (see **Figure 14**).

Figure 13 Typical Liebert XDH piping—interlaced connections

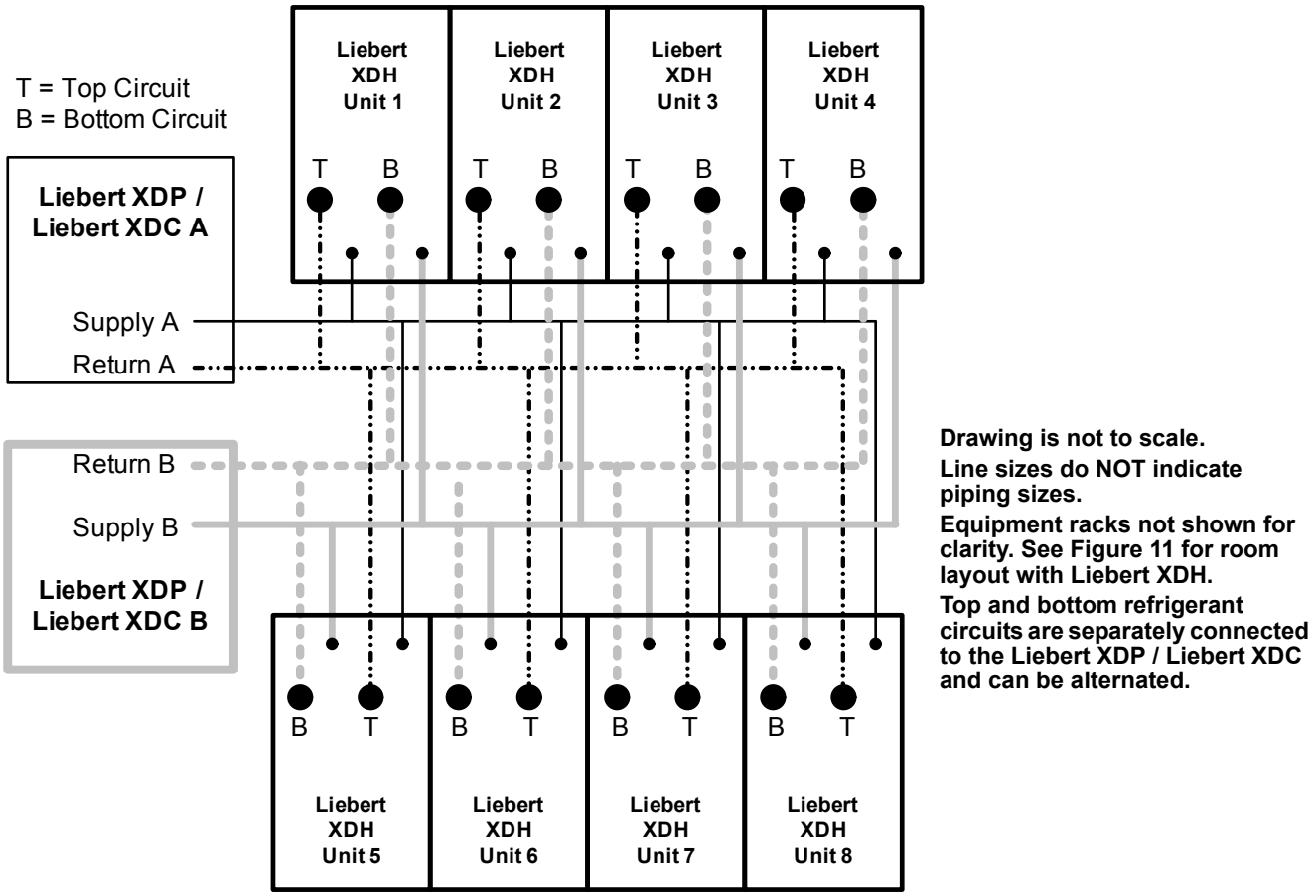
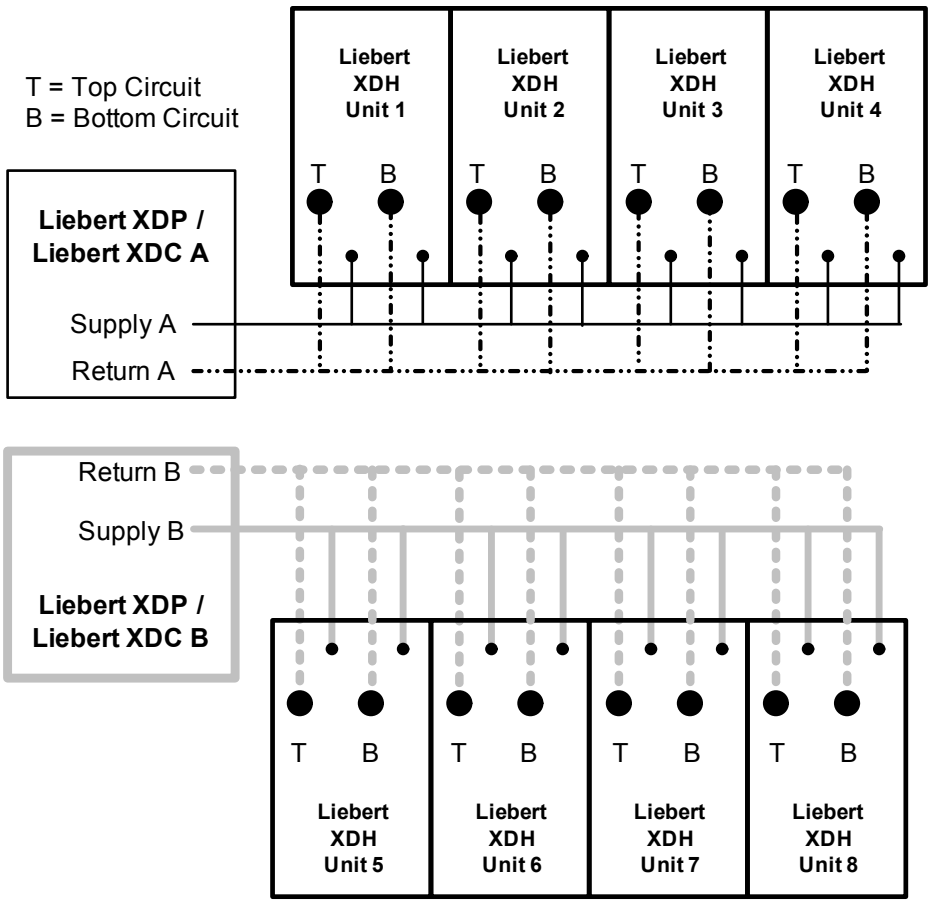


Figure 14 Typical Liebert XDH piping—non-interlaced connection



Drawing is not to scale.
Line sizes do NOT indicate piping sizes.
Equipment racks not shown for clarity. See Figure 11 for room layout with Liebert XDH.
Top and bottom refrigerant circuits are separately connected to the Liebert XDP / Liebert XDC and can be alternated.

5.3 Connection Methods and Points

Refer to site specific drawings for general locations of the piping connections. For Liebert XDH connection locations, refer also to **Figure 15**.

The assembly and connection means used for piping in the Liebert XD system are the same as those used in conventional refrigeration systems. Observe all standard practices during installation and startup to prevent damage and contamination. All piping must be ASTM Type “L” copper.

The Liebert XDH has supply and return piping access on the top of each module. Each Liebert XDH has two supply connections and two return connections, one set for each refrigerant circuit. Supply piping connection is 1/2" OD copper pipe, and return piping connection is 7/8" OD copper. The hard-piped XDH has a low-pressure nitrogen holding charge.

Both supply and return fittings may be supplied with optional one-shot connections. These fittings contain pressurized R-134a refrigerant inside the Liebert XDH.

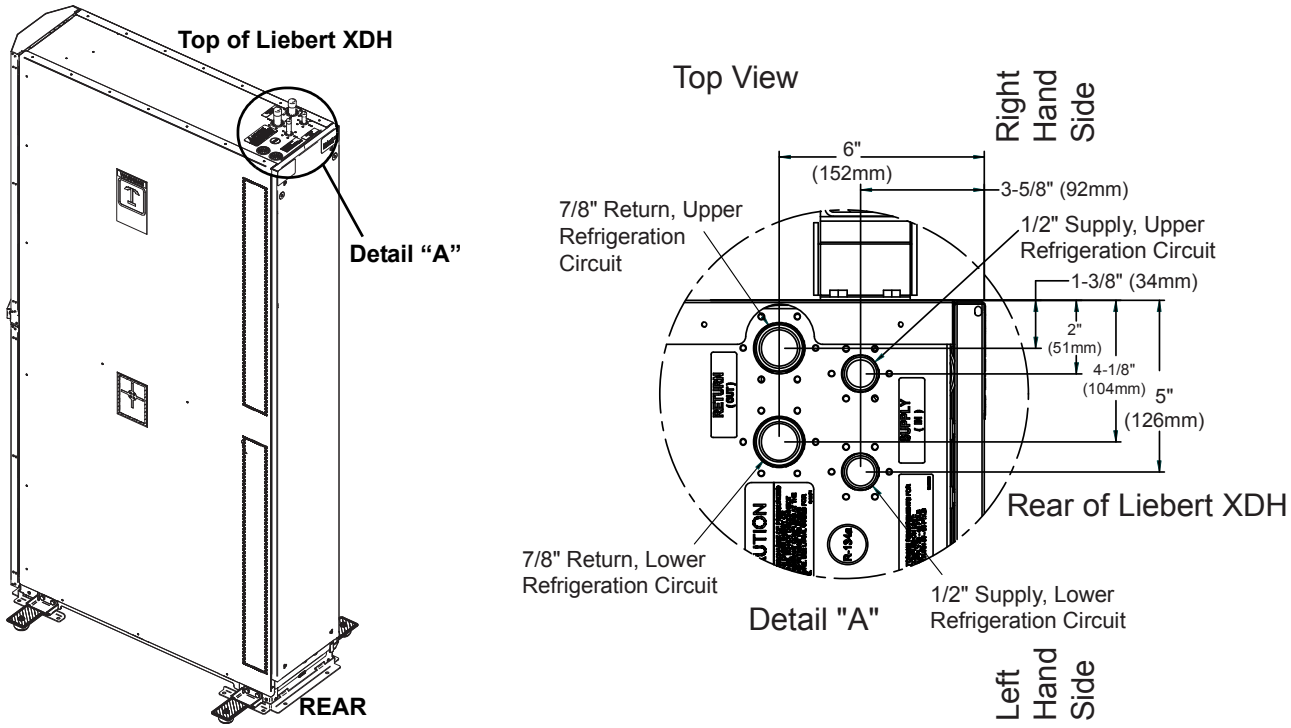
For Liebert XDHs with removable connections, the supply piping connection is 1/2" OD and the return piping connection is 7/8" OD. Both the Liebert XDH and the Liebert XD Flex Pipe with removable connections have a low-pressure nitrogen holding charge.

5.4 Hard-Piped Connection Sizes

The supply piping for each refrigeration circuit is 1/2" OD copper pipe. The return piping for each circuit is 7/8" OD copper.

The Liebert XDH units that are intended for hard-piping connections will have copper caps soldered in place and a holding charge of nitrogen.

Figure 15 Supply and return—hard-piping connections



5.4.1 Venting the Holding Charge for Hard-Piped and Removable Liebert XD Flex Pipe Connections

The Liebert XDH in hard-piped configuration is shipped with a low-pressure holding charge (about 30 psi) of nitrogen to prevent oxidation and moisture. This must be vented from the upper and lower refrigeration circuits before removing the copper caps.

To vent the holding charge:

1. Find the four Schrader valves that retain the nitrogen holding charge in the Liebert XDH. The valves are inside the rear door, one on each supply line and one on each return line. Three are near the top of the Liebert XDH; one Schrader valve is in the bottom half of the Liebert XDH.
2. Vent the holding charge in the circuits by depressing the pin in a Schrader valves on either the supply or return line for each circuit (see Detail A in **Figure 15**).
3. Replace and secure the cap on the Schrader valve that was opened.
4. Use a torch to unsweat the caps on the unit's piping connections.

5.4.2 Brazing Preparations

After the holding charge has been vented, a torch can be used to remove the caps over the ends of the supply and return lines.

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.

5.4.3 Recommended Piping Size

Connect the main pipes between the Liebert XDH branch piping and the Liebert XDP or Liebert XDC according to **Table 2**. Elbows and restrictions must be minimized to ensure good fluid flow.

See **Table 2** below for recommended pipe sizes and **Figure 3** for piping segment locations.

Table 2 Branch piping sizes for pumped refrigerant loop

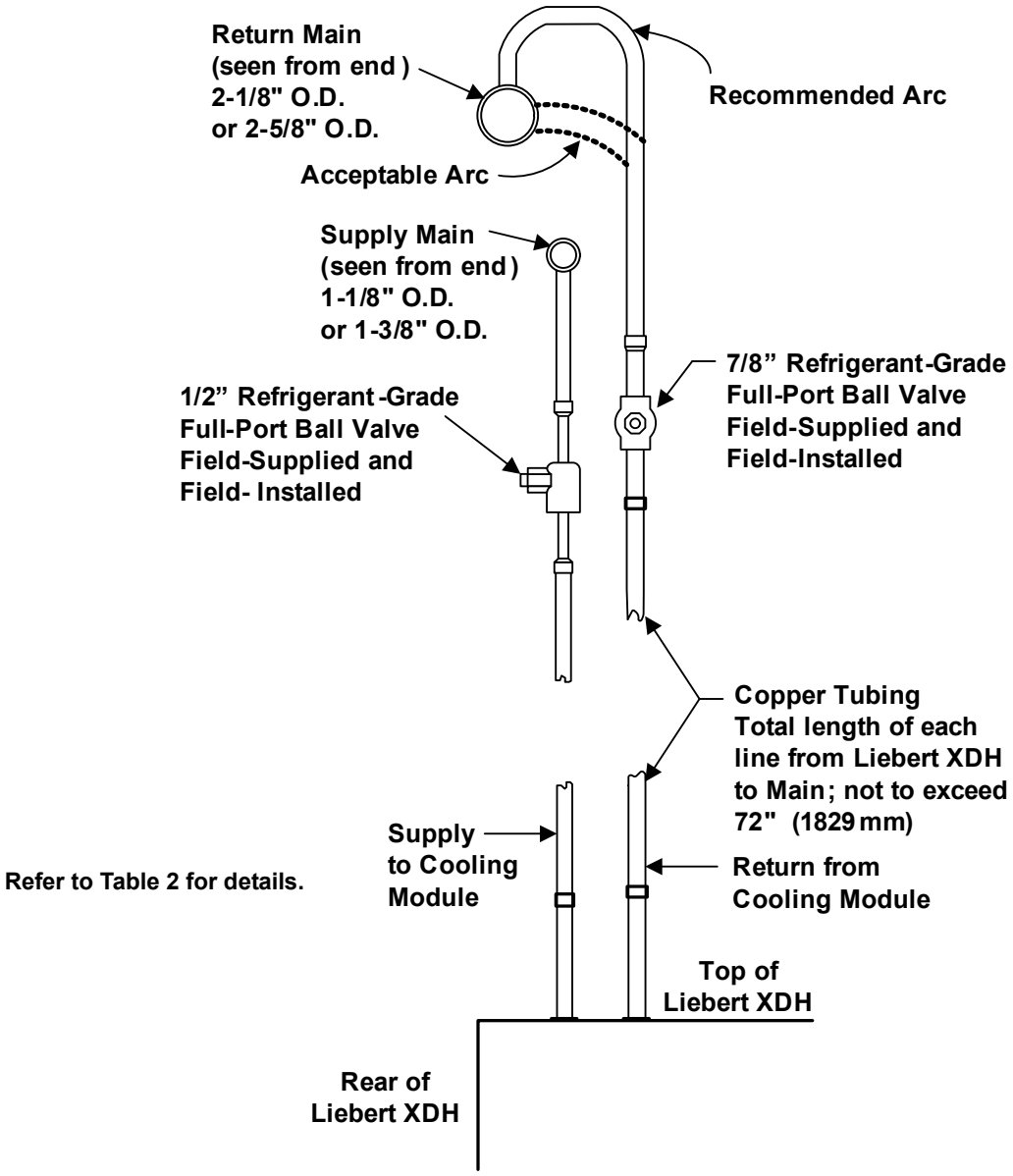
Pipe Function	Size / Equivalent Pipe Length
From Liebert XDH supply to supply line of Liebert XDP/Liebert XDC	1/2" OD (0.430" ID) for lengths up to 10 feet (3m)
	7/8" OD(0.545" ID) for lengths over 10 feet but less than 25 feet (3-7.6m)
From Liebert XDH return to return line of Liebert XDP/Liebert XDC	7/8" OD(0.545" ID) for lengths up to 10 feet (3m)
	1-1/8" OD(1.025" ID) for lengths over 10 but less than 25 feet (3-7.6m)

NOTE

To minimize the amount of pumped refrigerant required, do NOT oversize the piping.

See **Figure 15** for piping recommendations for hard-piping between the Liebert XDH and the header system.

Figure 16 Hard pipe connection diagram

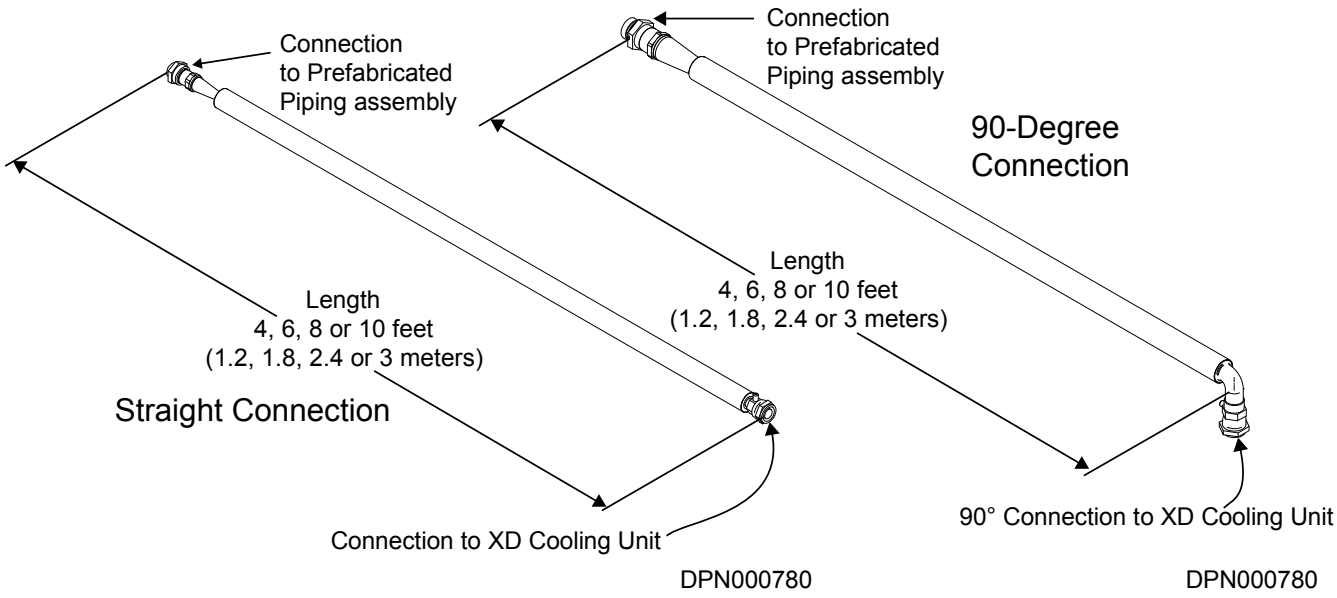


5.5 Field Installation of Liebert XD Flex Pipe Kit on the Liebert XDH

If you are performing a service installation or a field retrofit, skip this section and proceed with instructions in **5.5.6 - Connect a Liebert XDH with Liebert Flex Pipe to an Operational Liebert XD System**.

Liebert XD Flex Pipe kits are available in lengths of 4, 6, 8 and 10 feet (1.2, 1.8,2.4 and 3 meters). Connection style to the unit end may be straight or 90 degrees. Connection to the prefab piping assembly is a threaded coupler. For data on acquiring the correct kit for your installation, see **Table 9**.

Figure 17 Liebert XD Flex Pipe dimensions—straight and 90-degree connections



5.5.1 Connecting Methods—One-Shot Connections for Pre-Charged Refrigerant Option

CAUTION

Risk of sudden refrigerant discharge. Can cause loss of charge and minor injury.

If the optional pre-charged option is chosen, the Liebert XDH is shipped with a full charge of R-134a refrigerant under pressure. Do not remove the pipe caps or plugs before the unit is ready for connection to Liebert XD Piping.

Supply and return fittings on the pre-charged Liebert XDH units are one-shot connections. Do not disconnect one-shot connections after they have been connected. Disconnection will release pressurized R-134a refrigerant from the Liebert XDH.

Liebert XDHs with the pre-charged option are equipped with one-shot connections on the supply and return fittings. These contain a charge of R-134a refrigerant under pressure within the unit. This charge must not be vented.

Do not remove the pipe caps or plugs before the unit is ready for connection to Liebert XD Piping. Do not disconnect one-shot connections after they have been connected.

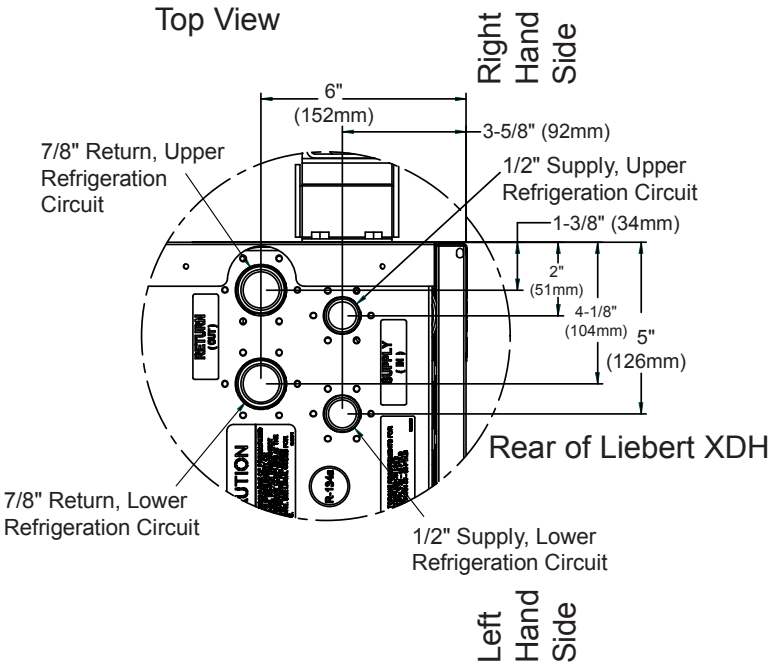
The assembly and connection means used for piping in the Liebert XD system are the same as those used in conventional refrigeration systems. Observe all standard practices during installation and startup to prevent damage and contamination.

Both supply and return fittings may be supplied with optional, one-shot connections. These fittings contain pressurized R-134a refrigerant inside the Liebert XDH.

If the unit includes the optional, factory-installed, one-shot style connections, proceed with **5.5 - Field Installation of Liebert XD Flex Pipe Kit on the Liebert XDH** and see **Figure 18**.

If the unit does not include Liebert Flex Pipes, refer to **5.4.1 - Venting the Holding Charge for Hard-Piped and Removable Liebert XD Flex Pipe Connections**.

Figure 18 Piping location and connecting sizes for pre-charged units



5.5.2 Connect a Liebert XDH with One-Shot Fittings to Liebert Flex Pipe

NOTICE

Risk of improper reuse of Liebert XD Flex Pipes with one-shot connections. Can cause refrigerant leaks.

Liebert XD Flex Pipes with one-shot connections must not be removed from the Liebert XDH unless they are being replaced with Liebert XD Flex Pipes with one-shot connections. Do not reuse Liebert XD Flex Pipes with one-shot connections. Reuse may result in refrigerant leaks

This operation must be performed on each of the two circuits in the Liebert XDH.

Tools Required

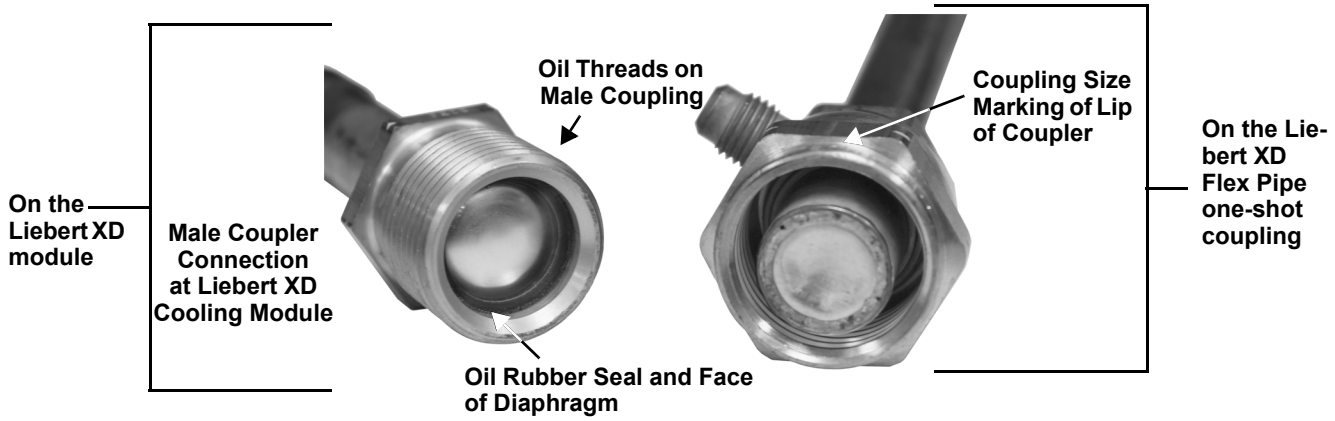
- Two adjustable wrenches with a maximum adjustment size of 2-1/2 inches
  OR two open-end wrenches (see **Table 3** for sizes)
- One torque wrench, half-inch drive (see **Table 3** for sizes)

1. Remove the protector cap and plug from the connections and carefully wipe the fittings and threaded surfaces clean.
2. Use a small applicator brush saturated with refrigerant oil to lubricate the entire surface of the diaphragm, the O-ring and the threaded area of male coupling assembly. Refer to **Figure 19**.
   If refrigerant oil is not used, an alternate lubricant for this application is a refrigerant-compatible silicone grease product, such as Dow Corning DC200/60,000 cst.
3. Thread the coupling halves together by hand to ensure that the threads mate properly. Ensure that the Schrader valve is oriented so that it points to the rear of the Liebert XDH.
4. Tighten the coupling body hex nut and union nut with the proper-sized wrench until the coupling bodies bottom out or definite resistance is felt.
5. Use a marker or pen to draw a line lengthwise across the body hex nut and onto the union nut. The line should parallel the refrigerant flow.
6. Tighten the nuts an additional quarter-turn, judging the amount by the mark drawn above.
7. If a torque wrench is used, Emerson recommends using the following torque values:

Table 3 Torque and wrench size for connecting Liebert XDH with one-shot couplers to Liebert Flex Pipe

Coupling Size	Wrench Sizes, in. (mm)		Torque, Female Coupling Only, ft-lb (Nm)
	Male Coupling	Female Coupling	
#10	1-1/16 (26.98)	1-5/16 (33.33)	35-45 (13.5- 16.2)
#11	1-1/8 (28.57)	1-5/16 (46.55)	35-45 (47.5- 61.0)
#12	1-7/16 (36.51)	1-3/8 (34.9)	50-60 (67.8- 88.1)

Figure 19 One-shot fittings: Liebert XDH and Liebert Flex Pipe

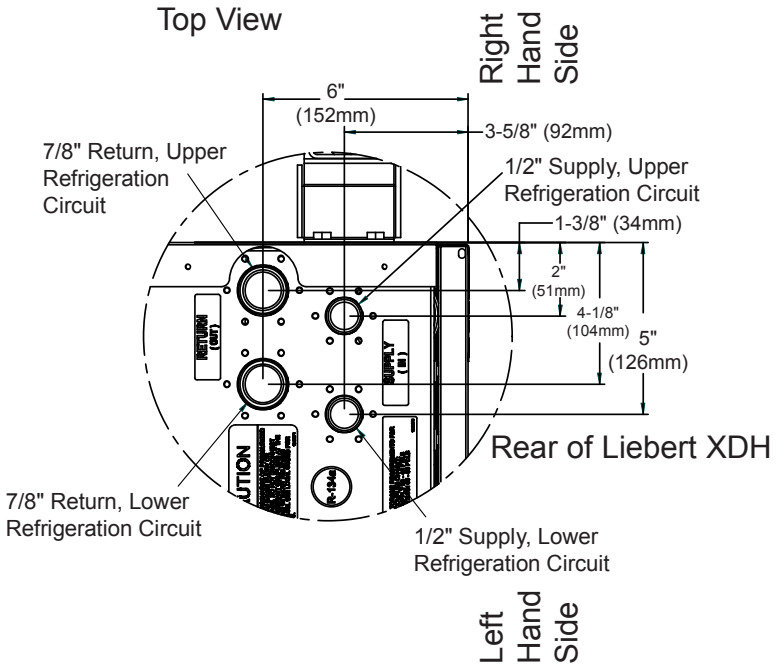


5.5.3 Connection Methods—Removable Connections

The assembly and connection means used for piping in the Liebert XD system are the same as those used in conventional refrigeration systems. Observe all standard practices during installation and startup to prevent damage and contamination.

Both supply and return fittings may be supplied with optional, removable connections.

Figure 20 Piping location and connecting sizes for pre-charged units



5.5.4 Connect Liebert XD Flex Pipe with Removable Coupling to a Liebert XD Cooling Module

Tools Required

- Two adjustable wrenches with a maximum adjustment size of 2-1/2 inches OR two open-end wrenches (see **Table 4** for sizes)
- One torque wrench, half-inch drive (see **Table 4** for sizes)

1. Remove the protector cap and plug from the couplers on the Liebert XDH.
2. Wipe the fittings and threaded surfaces clean of particles and other foreign substances.
3. Place the Liebert Flex Pipe assembly against the fitting body so that the flat face of the flange comes into contact with the O-ring. The O-ring is on the front of the male fitting.
4. Tighten the coupling body hex nut and union nut with the proper-sized wrench until the coupling bodies bottom out or definite resistance is felt.
5. Use a marker or pen to draw a line lengthwise across the body hex nut and onto the union nut. The line should parallel the refrigerant flow.
6. Tighten the nuts an additional quarter-turn, judging the amount by the mark drawn above.
7. If a torque wrench is used, the following torque values are recommended:

Table 4 Torque and wrench sizes for connecting Liebert Flex Pipe to the Liebert XDH with removable couplings

Fitting Size	Wrench Size, in. (mm)		Torque, Female Coupling Only, ft-lb (Nm)
	Male Coupling	Female Coupling	
1/2"	7/8 (22.23)	15/16 (23.81)	40 (55)
5/8"	1-1/16 (26.98)	1-1/8 (23.58)	60 (80)
1"	1-1/2 (38.1)	1-5/8 (41.28	110 (150)

Figure 21 Removable couplings

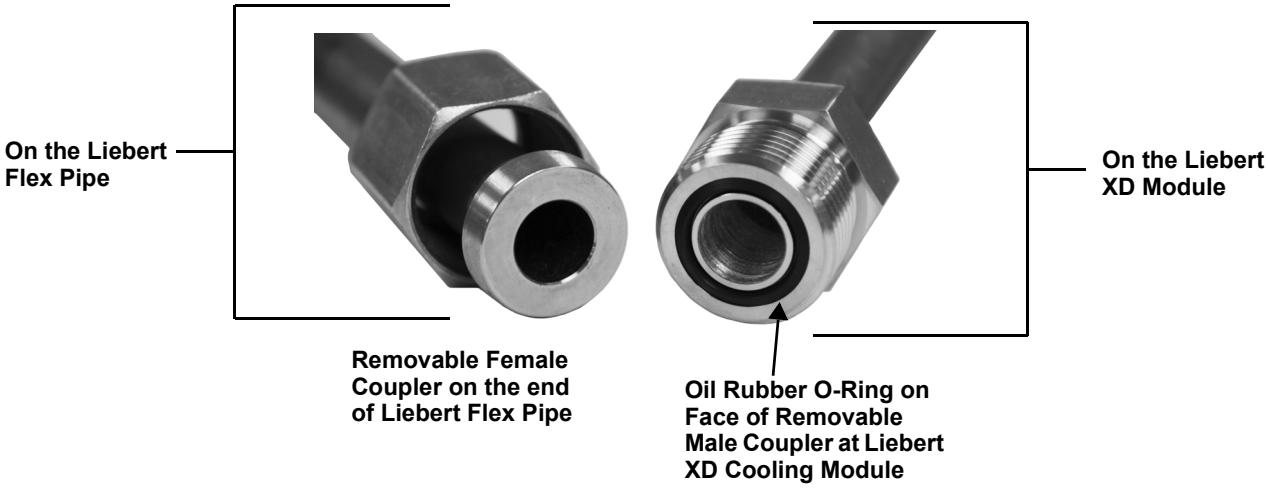


Table 5 O-ring part number

Liebert Part #	Size, in.	Fitting
192917P1	1/2	FD57-1224-08-10
192917P2	5/8	FD57-1224-10-11
192917P3	7/8	FD57-1224-14-12

5.5.5 Header System

The Liebert XDH module system with optional flexible piping requires use of the Liebert XD prefabricated piping assembly. The prefabricated piping is compatible with the Liebert XD Flex Pipe required to attach to the Liebert XDH modules. For the details on piping connection locations, see **Figure 15**.

For additional information, refer to the Liebert X-treme Density System Design Manual, SL-16655, available at the Liebert Web site: **www.liebert.com**

5.5.6 Connect a Liebert XDH with Liebert Flex Pipe to an Operational Liebert XD System

NOTE

Check the entire system for leaks before connecting the Liebert XDH with Liebert Flex Pipe to the prefabricated piping mains.

Read all instructions before beginning installation.

Tools Required

- One adjustable wrench with a maximum adjustment size of 2-1/2 inches
- One torque wrench, half-inch drive
- Crowsfoot (supplied with Liebert XDP and Liebert XDC)

NOTE

This operation requires two or more people.

5.5.7 Connect/Reconnect the Liebert Flex Pipe to the Header Assembly

NOTICE

Risk of improper reuse of Liebert XD Flex Pipes with one-shot connections. Can cause refrigerant leaks.

Liebert XD Flex Pipes with one-shot connections must not be removed from the Liebert XDH unless they are being replaced with Liebert XD Flex Pipes with one-shot connections. Do not reuse Liebert XD Flex Pipes with one-shot connections. Reuse may result in refrigerant leaks.

Tools Required

- One adjustable wrench with a maximum adjustment size of 2-1/2 inches
- One torque wrench, half-inch drive
- Crowsfoot (supplied with Liebert XDP and Liebert XDC)

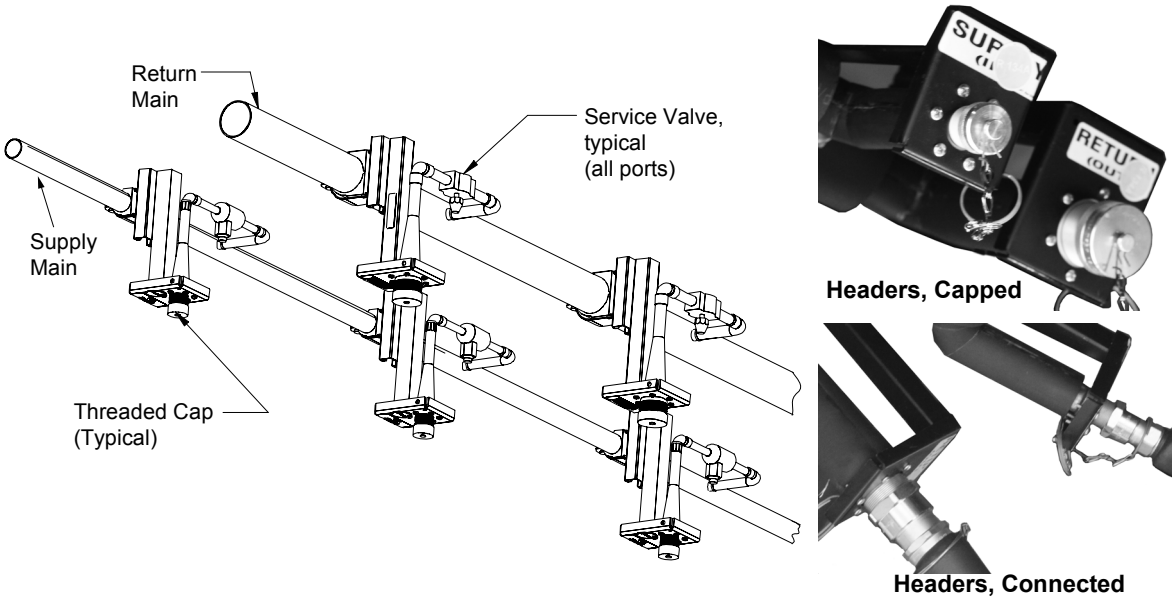
NOTE

This operation requires two or more people.

Proper connection requires that both connections are clean and have been oiled. Proper torque must be applied.

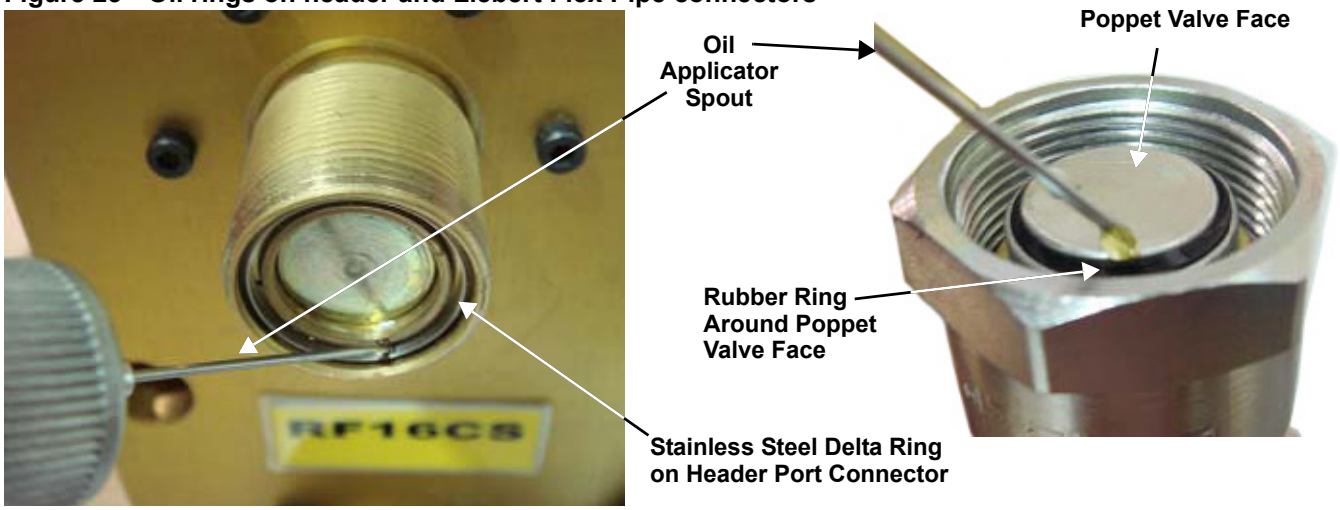
1. Determine the port location of the supply and return piping overhead.
2. Make sure the service valve for each port is closed.
3. Skip this step **if reconnecting** Liebert XD Flex Pipes with one-shot connections. Remove caps from only the required ports. Do not remove caps from the unused ports.
4. Remove the pipe plugs that are supplied on the Liebert Flex Pipe on the Liebert XDH.
5. Inspect both halves of the fittings and remove any foreign contamination from the sealing surfaces and threads before connecting the fittings.

Figure 22 Liebert XD prefabricated piping assembly



6. Use mineral oil or polyol ester oil to lubricate the face of the poppet valve and the seal around the poppet valve on the female connector (on the Liebert Flex Pipe) (see **Figure 23**).
7. Apply mineral oil or polyol ester oil to the stainless steel delta ring on the male connector (header port connector) (see **Figure 23**).

Figure 23 Oil rings on header and Liebert Flex Pipe connectors



8. Thread the union nut of the female coupler onto the male coupler until they are hand tight.
9. Using the wrench arrangement shown in **Figure 24**, torque the couplers to the values in **Table 6**.

NOTICE

Risk of improper tightening of soft metal fittings. May cause equipment damage.

It is imperative that the brass body of the female connector be held stationary while the fittings are being tightened. Failing to do so may damage the female connector.

Table 6 Torque for connecting Liebert XD Flex Pipe to prefabricated piping

Coupler Size	Crowsfoot Size, in. (mm)	Torque, ft-lb (Nm)
1/2"	1-3/16 (30)	25.8 (30-35)
3/4"	1-5/8 (41)	48.0 (60-65)
1"	1-31/32 (50)	62.7 (80-85)

Figure 24 Wrench arrangement for tightening couplers

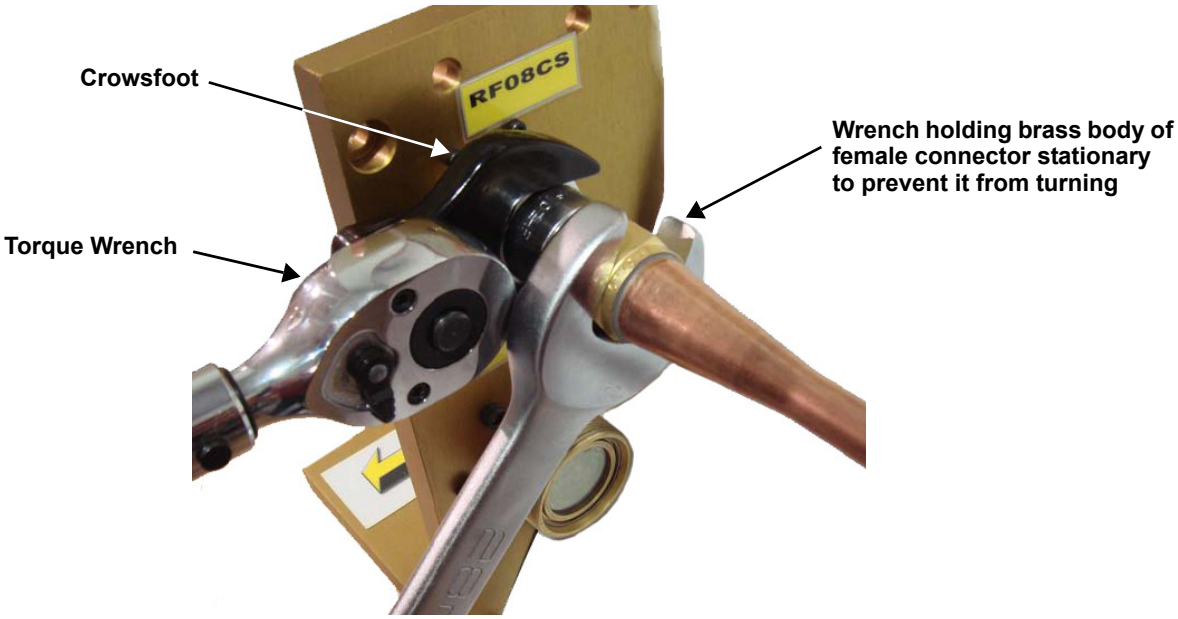
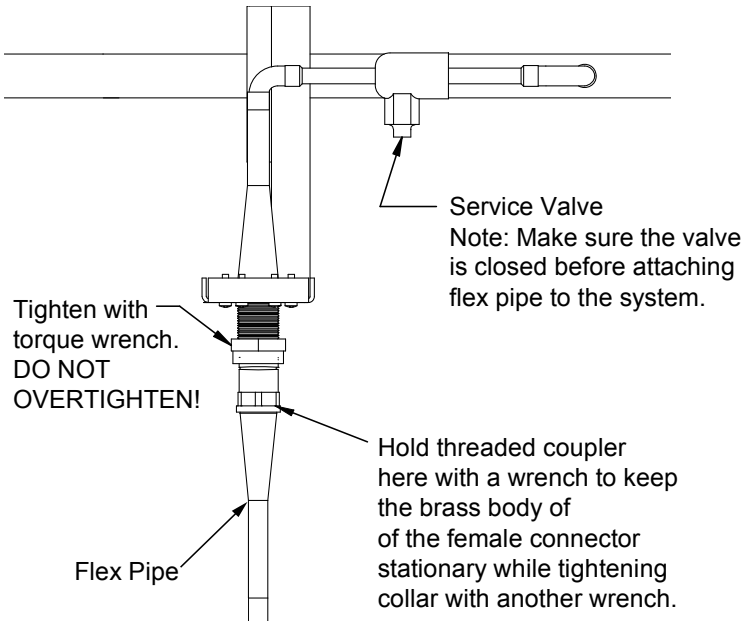
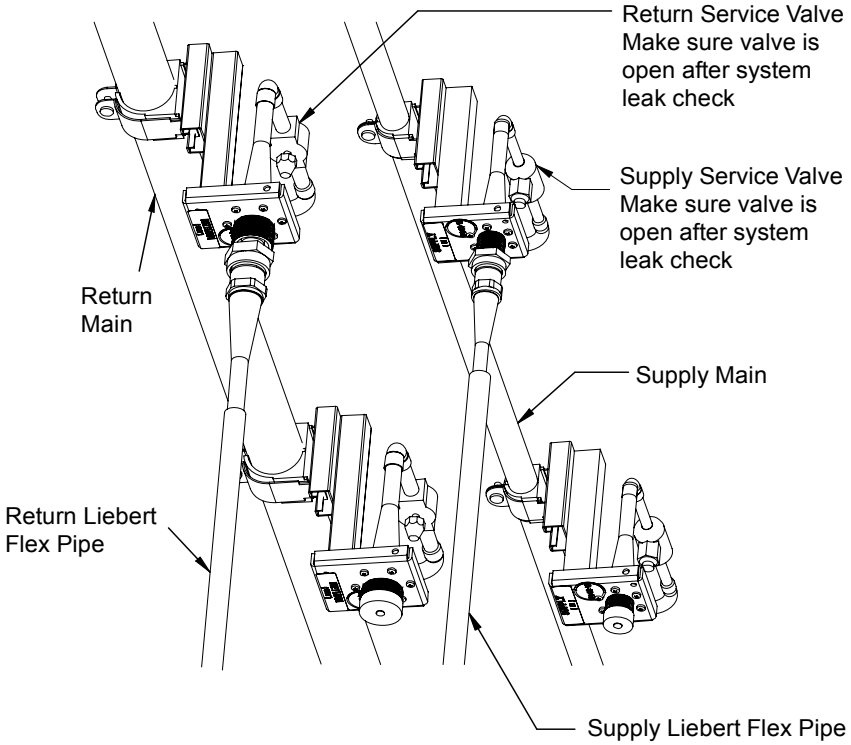


Figure 25 Detail view of Liebert XD Flex Pipe and prefabricated piping port



10. Repeat **Steps 3** through **9** for the smaller coupler (supply line).
11. Once the supply and return connections are completed, check to make sure the Liebert XDH fan power switches are Off, then connect the power cords to their power sources.
12. Turn the fan switches on. Ensure that the fans operate.
13. Open the return service valve first, then open the supply service valve.
    With the fans running, cool air is discharged from the front of the Liebert XDH.

Figure 26 Liebert XD system with prefabricated piping assembly and Liebert XD Flex Pipe



5.5.8 Disconnect a Liebert XDH With Liebert Flex Pipe from a Liebert XD System

CAUTION

Risk of sudden discharge of pressurized refrigerant. Can cause equipment damage or injury.

Do not disconnect threaded refrigerant couplers at the unit cabinet end without relieving system pressure. Reclaim any refrigerant during removal of unit from system.

NOTE

Before uninstalling a Liebert XDH with Liebert XD Flex Pipe from the prefabricated piping mains: With the fans running, close the supply service valve, wait approximately two minutes, then close the return service valve.

Read all instructions before beginning.

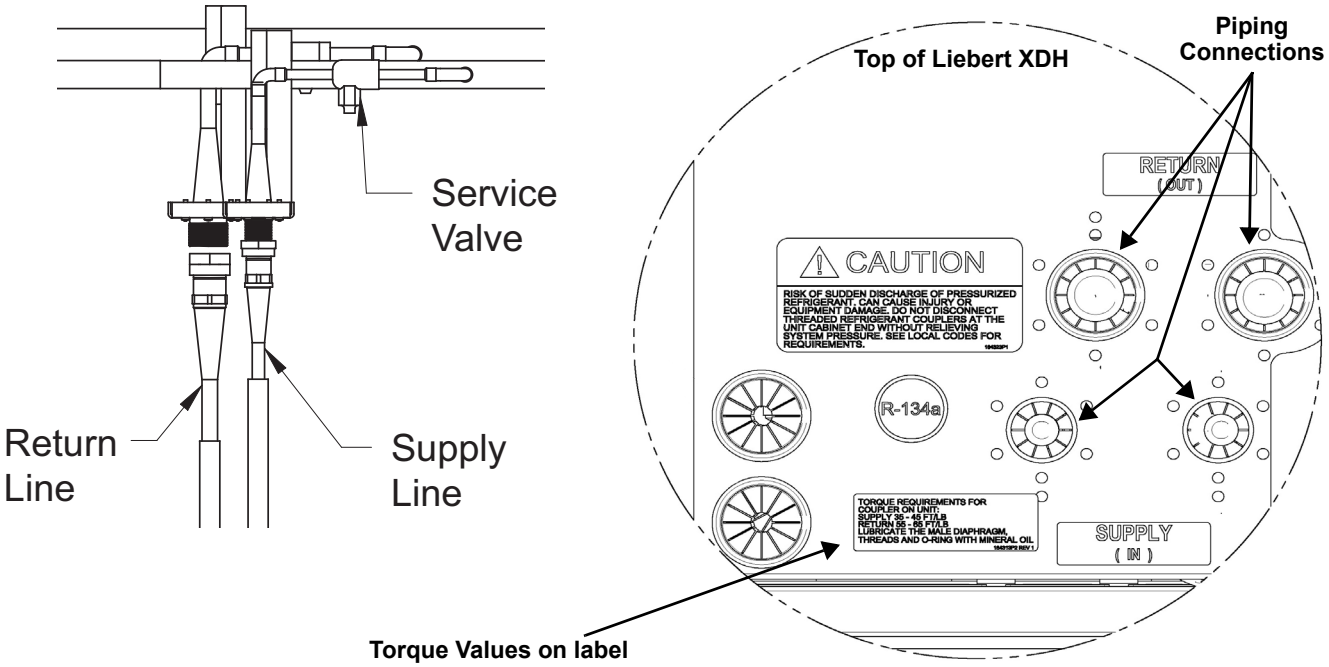
This operation must be performed on each of the two circuits in the Liebert XDH.

Tools Required

- One adjustable wrench with a maximum adjustment size of 2-1/2 inches
- One torque wrench, half-inch drive
- Crowsfoot (supplied with Liebert XDP and Liebert XDC)

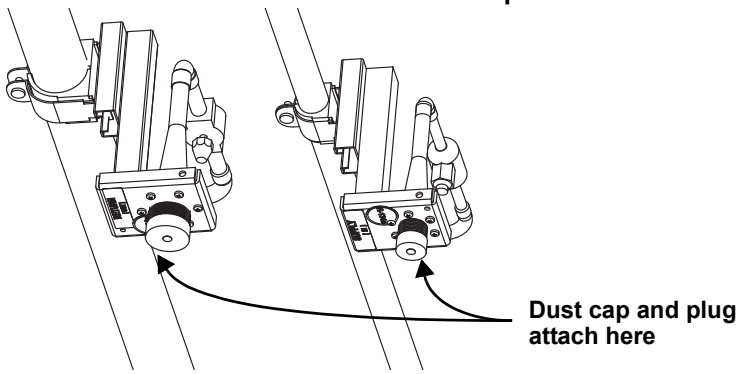
1. Ensure the Liebert XDH fan switches are both On and the fans are operational.
2. Close the service valve in the supply line to the Liebert XDH (smaller coupler).
3. With the Liebert XDH fans running, wait two minutes.
4. Close the service valve in the return line to the Liebert XDH (larger coupler).
5. Turn the fan power switches to the Off position. Once the fan switches are turned Off, unplug the power cords from their power source. See **6.0 - Electrical Connections** for details.
6. Locate and have at the ready the caps and plugs for both ends of the supply and return couplers.
7. Loosen the female supply coupler from the male supply coupler (smaller coupler). This requires an adjustable wrench and a torque wrench. Refer to **Figure 24**; use the torque values in **Table 6** and on the label on top of the Liebert XDH (see **Figure 27**.
8. The Liebert XDH side of the female coupler must be held stationary while the collar on the coupler is being loosened.
9. Disconnect the coupler.

Figure 27 Profile view of the Liebert XD system and torque label location



10. Place the protective dust cap and plug back onto both ends of the coupler on the Liebert XDH and the port pipe.

Figure 28 Piping mains without Liebert XDH and Liebert XD Flex Pipe



11. Repeat **Steps 8** through **10** for the return couplers (larger couplers).
12. Lay the Liebert XD Flex Pipe aside where they will not be damaged.

NOTICE

Risk of permanent damage to the Liebert XD Flex Pipes. Do not fold or bend flex pipe tightly.

5.6 Insulation

To minimize the possibility of condensation, insulate all piping between the Liebert XDH and the Liebert XDP or Liebert XDC.

6.0 ELECTRICAL CONNECTIONS

The unit must be installed in accordance with national wiring regulations. Refer to the unit's serial tag for electrical requirements. Refer to **Table 7** for details.

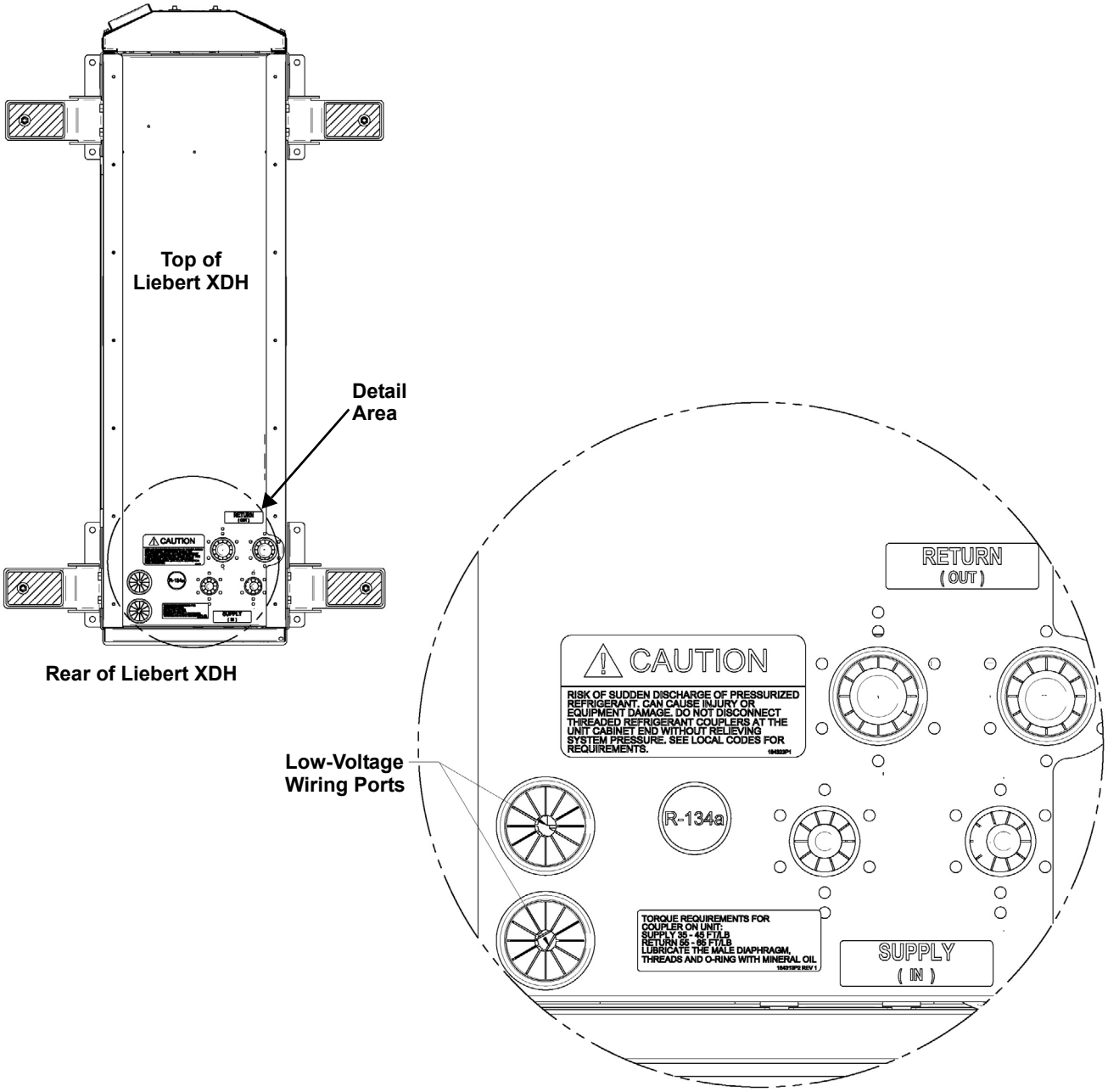
Replacement of any wiring or supply cord must be performed only by the manufacturer, the manufacturer's service agent or a similarly qualified person.

WARNING

Risk of electric shock. Can cause death or injury.

Disconnect both electric power cords before working within the unit.

Figure 29 Electrical wiring entry points—high-voltage and low-voltage



6.1 Connecting High-Voltage Wiring

The Liebert XDH requires single-phase power for normal operation. The unit ships with two power cords, each 10 feet (3m) long with NEMA 5-15 plugs, which connect to common, three-prong outlets (see **Figures 30** and **31**).

The XDH will function properly with only one power cord. The second power cord permits connection to a separate power source to increase reliability—If one power source fails, the cord connected to the remaining, live power source will power both banks of fans. If only one power source is available, then only the power connection labeled "SECONDARY" should be connected.

to the power source.

To attach the power cords, clip the plastic hangers attaching the cords to the Liebert XDH. Press the appropriate end of each cord onto the electrical inlet. Attach the strain-relievers onto the power cords and press the assemblies into the cable exit slots.

Figure 30 Standard Liebert XDH electrical connections

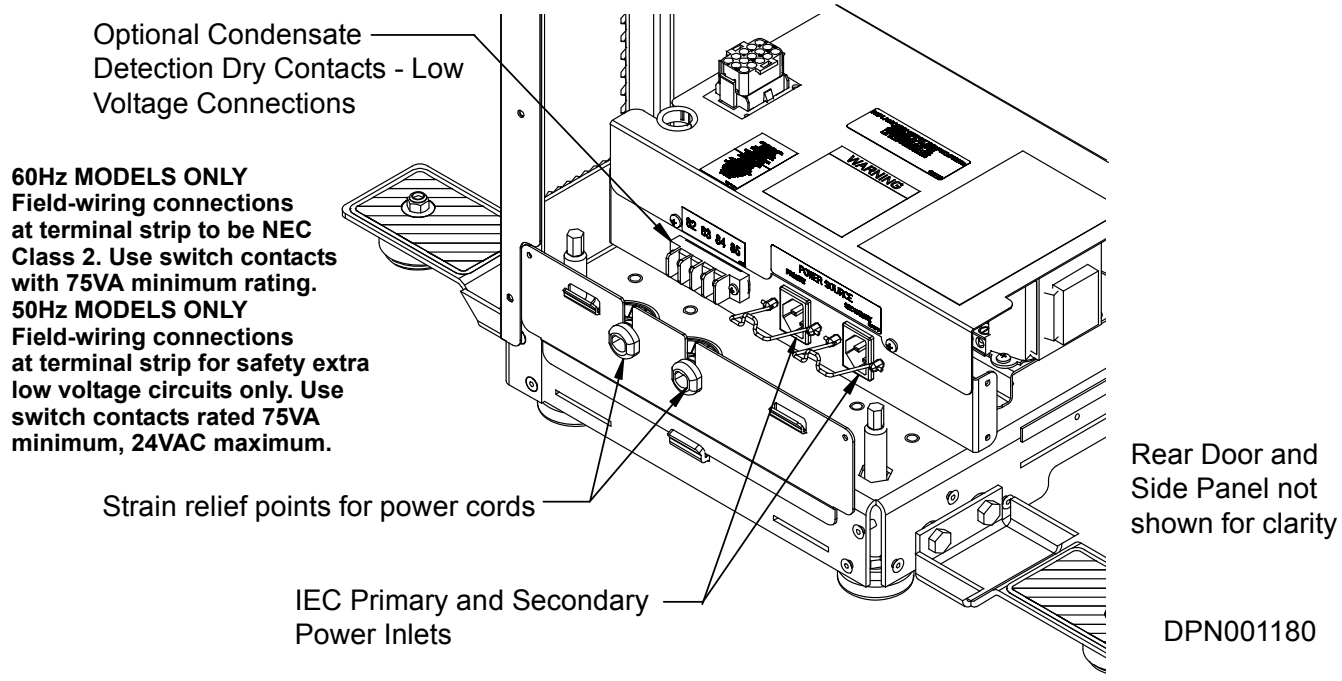
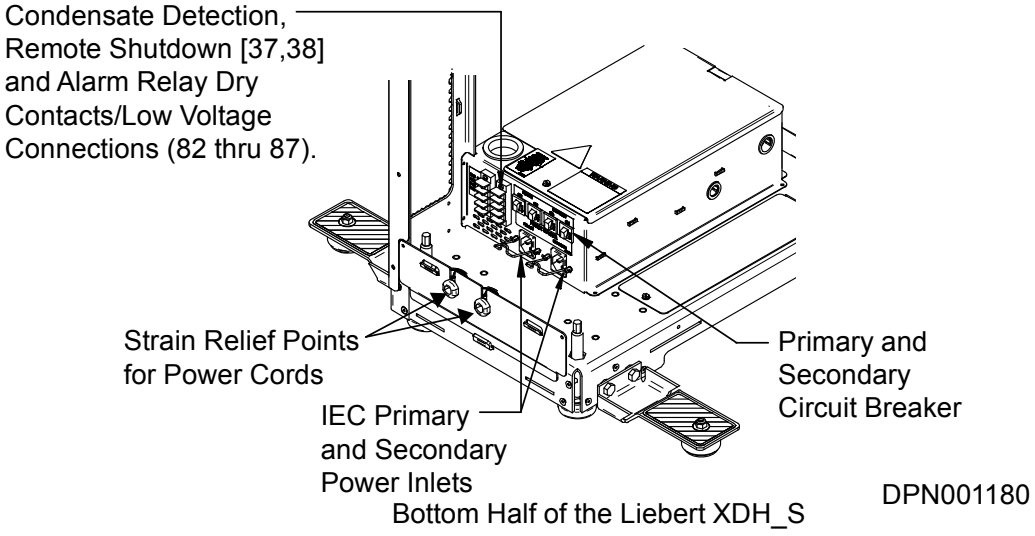


Figure 31 Smart Liebert XDH electrical connections



6.2 Connecting Low-Voltage Wiring—Standard Liebert XDH Modules

Low-voltage connections to the standard Liebert XDH are available only on units with the optional condensate detection feature (discontinued April 2009). The low voltage connections are on the bottom left side of the electrical connections, (see **Figure 32**). These dry contacts can to be connected to a monitoring unit, such as Liebert's SiteScan®.

For units equipped with condensate detection (discontinued April 2009), make low voltage connections according to site-specific drawings. The unit must be installed in accordance with national wiring regulations.

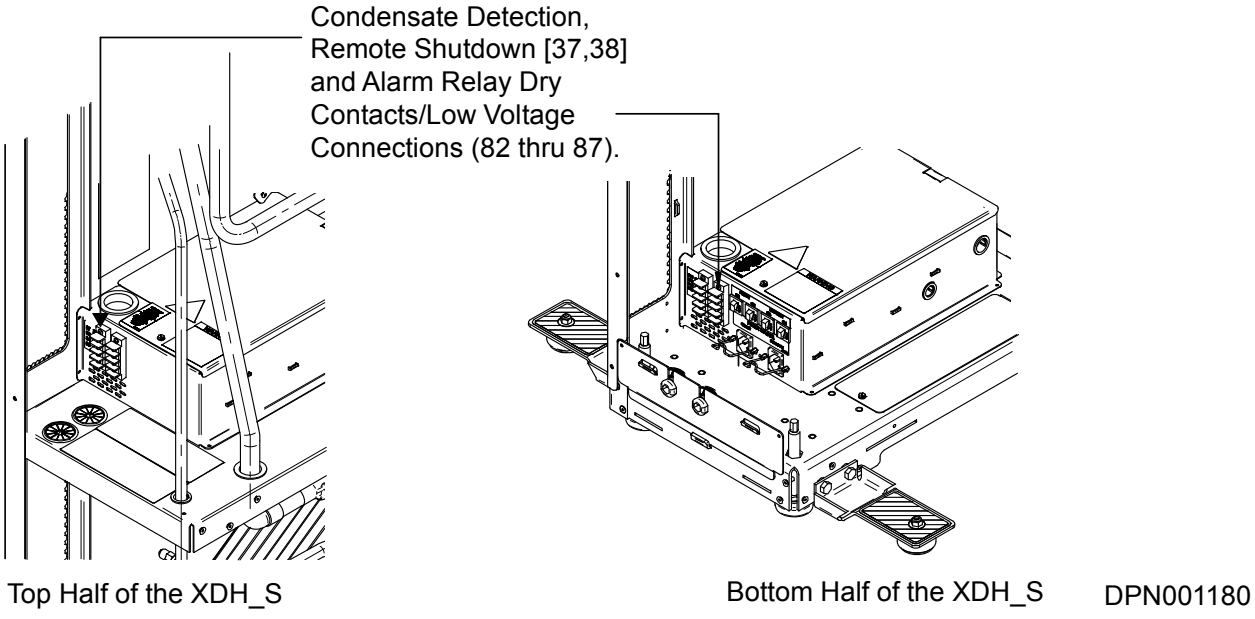
6.3 Connecting Low-Voltage Wiring—Liebert XDH Smart Modules

Low-voltage connections are available only on the Liebert XD smart module. The low-voltage connections for Liebert XDH smart modules are in the rear of the units. There are two connection locations, one for the lower bank of fans and one for the upper bank of fans. The power connections are shown in **Figure 32**; the communication ports are on the rear left side of the Liebert XDH.

These dry contacts can to be connected to a monitoring unit, such as Liebert's SiteScan®. Make connections on these units according to site-specific drawings. The unit must be installed in accordance with national and local wiring regulations.

Terminal block connections 37, 38 and 82 through 87 can be connected to a monitoring unit, such as Liebert's SiteScan (Contacts 37 and 38 are for remote shutdown and 82 through 87 are for reporting alarms). P66 & P67 are CANbus ports.

Figure 32 Low-voltage connections—Liebert XDH smart module



7.0 INSTALLATION CHECKLIST AND SYSTEM FILL FOR STARTUP

7.1 Checklist for Proper Installation

___ 1. The Liebert XDH module is properly mounted using tie-down brackets (see **4.3.1 - Install a Tie-down Bracket—Optional**).

___ 2. Power cords connected to electrical supply.

___ 3. Low-voltage wiring to optional condensate detection on the Liebert XD modules (discontinued April 2009) or the smart module control board.

___ 4. Piping from Liebert XDP/Liebert XDC to Liebert XD modules, with isolation valves piped to each Liebert XD module.

a. Hard-piped modules connected to overhead piping

OR

b. Liebert XD Flex Pipe connections to header assembly

___ 5. Leak check.

___ 6. Start the Liebert XD module to ensure proper operation (see **8.1 - Start the Standard Liebert XDH**).

___ 7. Shut down the Liebert XD module.

___ 8. Piping insulated.

7.2 Charging with Refrigerant and Starting the Liebert XD System

The Liebert XD System must be completely installed before it is charged with refrigerant. After installation is complete, refer to the Liebert XDP or Liebert XDC user manual for instructions on charging the Liebert XD modules with refrigerant and starting the system. The complete Liebert XD system includes all Liebert cooling modules, a Liebert XDC **or** Liebert XDP unit and any other connected equipment.

8.0 OPERATION

The Liebert XDH's controls are on the front of the unit at the Liebert XDH's midline for easy access. Each switch controls the operation of one bank of three fans (see **Figure 33** for standard module, **Figure 34** for smart module). The separate switches permit the use of only one bank of fans at a time, reducing the airflow if the Liebert XDH's full cooling capacity is not needed.

CAUTION

Risk of improper operation. Can cause equipment damage.

At least one of the Liebert XDH's banks of fans must be turned on before either the Liebert XDP or Liebert XDC is switched on.

At least one of the Liebert XDH's banks of fans must be operating at all times that the Liebert XDP or Liebert XDC is operating. Operating either the Liebert XDP or the Liebert XDC without at least one of the Liebert XDH's banks of fans rotating may cause a system malfunction.

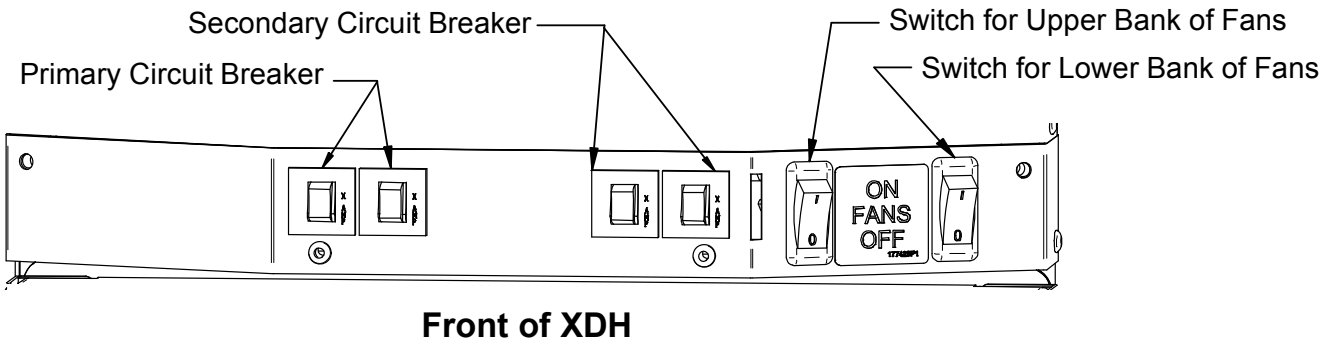
8.1 Start the Standard Liebert XDH

At least one bank of the Liebert XDH's fans must be On before starting the Liebert XDP or Liebert XDC that will supply refrigerant to the Liebert XDH units.

To start the Liebert XDH:

1. Press either of the rocker switches to turn On one or both of the Liebert XDH's banks of fans (see **Figure 33**).
   Pressing the left switch starts the fans in the upper half of the Liebert XDH; the right switch, the lower fans.
2. Start the refrigerant source, either Liebert XDP or Liebert XDC. For that procedure, refer to the unit's user manual, available at Liebert's Web site: **www.liebert.com**

Figure 33 Fan switches, standard Liebert XDH



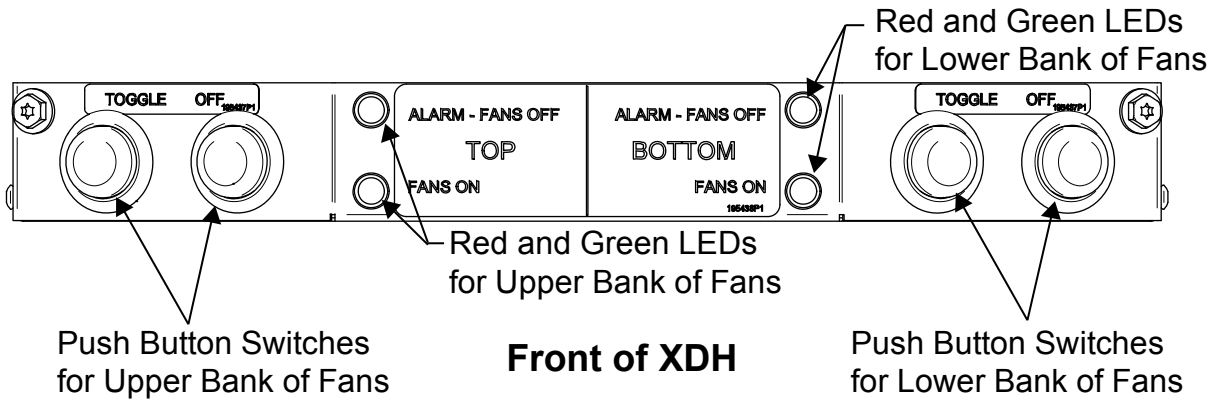
8.2 Start the Liebert XDH Smart Module

At least one bank of the Liebert XDH's fans must be On before starting the Liebert XDP or Liebert XDC that will supply refrigerant to the Liebert XDH units.

To start the Liebert XDH:

1. Turn On one or both of the Liebert XDH's banks of fans by pressing either of the push button switches on the front of the unit (see **Figure 34**).
   a. Pressing the left push button (toggle) switch starts the top and bottom fans in the upper half of the Liebert XDH; the right toggle switch starts the top and bottom fans in the lower bank.
   b. Pressing either toggle switch a second time initiates an algorithm that turns the middle fans in the fan banks On and Off as needed for cooling.
2. Pressing each toggle switch a third time turns the middle fans on continuously.
3. Start the refrigerant source, either a Liebert XDP or a Liebert XDC. For that procedure, refer to the unit's user manual, available at Liebert's Web site: **www.liebert.com**

Figure 34 Fan switches, Liebert XDH smart modules



8.3 Smart Module LED Indicators

Liebert XDHs with smart modules have two LEDs on the front, one red and one green.

- Red LED indicates alarms
- Green LED indicates the status of fan relays

8.3.1 LED Meanings

Red LED

- Blinking every 2 seconds: Fans are off; remote shutdown is not active
- Blinking On for 1 second, Off for 1 second: Remote shutdown is active
- Unlit: No alarms; remote shutdown is not active
- On Continuously (not blinking): Alarm condition; either a fan undercurrent condition or a condensate detection condition. Remote shutdown is not active.

Green LED

- Unlit: No fan relays are active
- Blinking On for 1 second, Off for 1 second: Only one fan relay is active
- On Continuously (not blinking): Both fan relays are active, no fans under temperature control

8.3.2 Activating Remote Shutdown Option

The optional remote shutdown option can be made operational by removing the jumper on Terminal Blocks 37 and 38. If the jumper is not removed, the unit will stay active.

If the remote shutdown jumper is present, then remote shutdown is not operational.

9.0 MAINTENANCE

Minimal maintenance is required to keep the Liebert XDH operating at optimal levels. The unit should be cleaned and checked for damage and worn parts. Suggested maintenance includes:

- Cooling fins—Clean any dust and debris from the cooling fins, taking care not to bend them
- Circulating fans—Clean any dust from the fans.

9.1 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.

9.2 Internal Access

WARNING

Risk of electric shock. Can cause injury or death.

System contains hazardous electrical voltage. Disconnect both power cords from the electrical supply outlets or from the receptacles on the back of the Liebert XDH before working within.

- Turn off the two fan switches on the front of the Liebert XDH (see **Figure 33**).

The conditions required for sensitive electronic equipment should preclude the accumulation of appreciable amounts of dust in the Liebert XDH. Most of that small amount should be found on the coils, which are accessible by opening the rear door of the unit. The fans, on the front may be cleaned by removing the front grilles, which are secured with snap-on connections.

The rear door and the fan tray on the front of the Liebert XDH are easily removed for maintenance. (A wiring diagram is provided on the center shelf.)

9.3 Remove Fan Tray

WARNING

Risk of electric shock. Can cause injury or death.

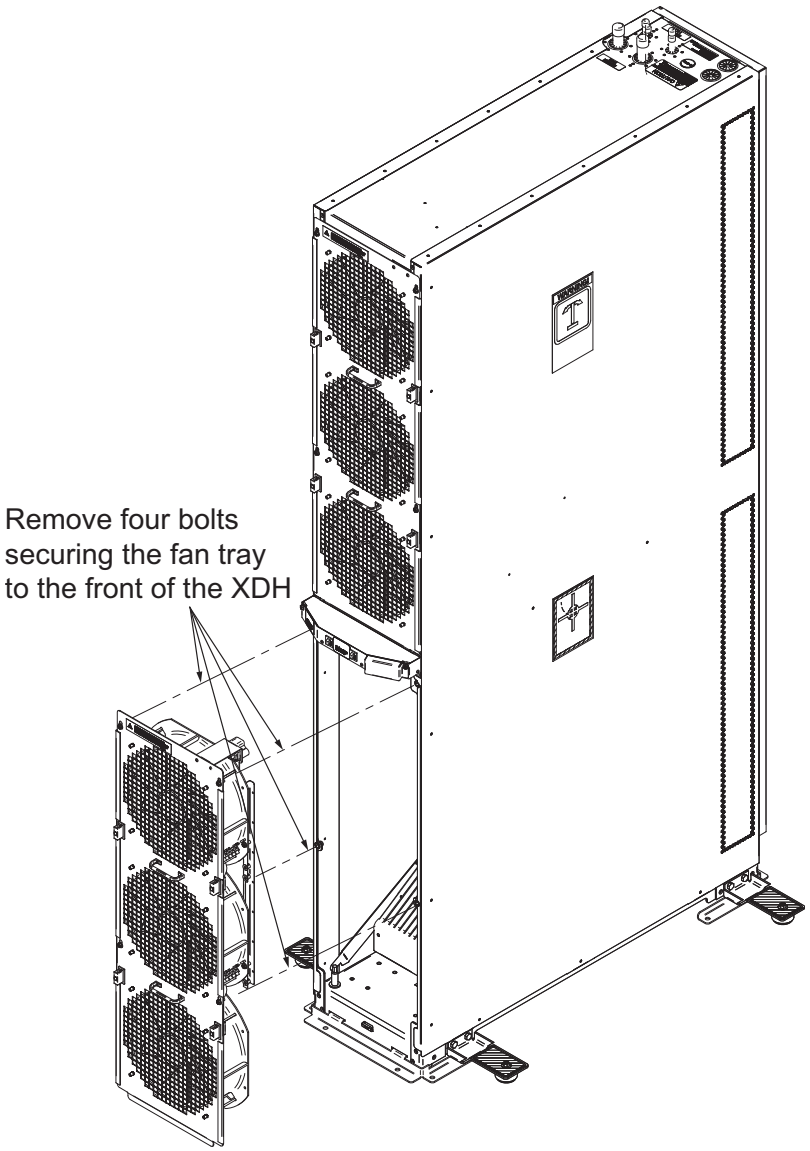
System contains hazardous electrical voltage. Disconnect both power cords from the electrical supply outlets or from the receptacles on the back of the Liebert XDH before working within.

- Turn off the two fan switches on the front of the Liebert XDH (see **Figure 33**).

1. Ensure that all electrical power to the Liebert XDH has been shut off before beginning to remove the fan tray.
2. Remove four bolts on the Liebert XDH fan tray (see **Figure 35**).
3. Lift the tray out of the unit to install the new tray.

Reverse the steps above to install a new fan tray. Be certain to align the connectors, including the electricity connector, when installing the new fan tray.

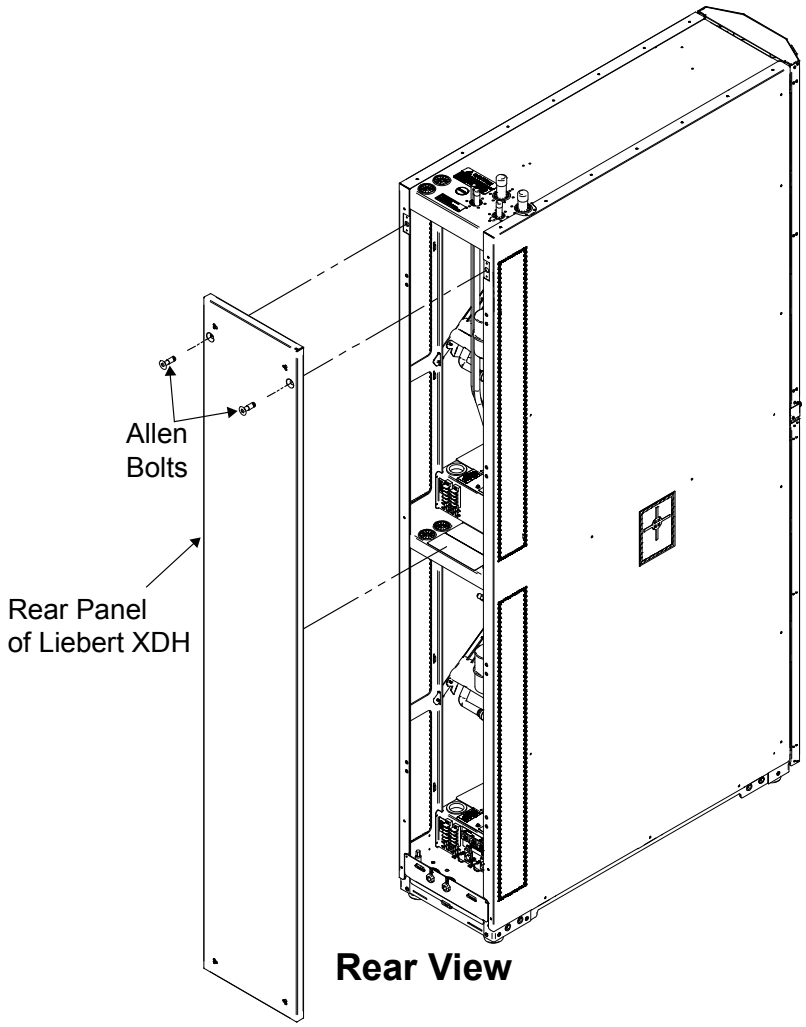
Figure 35 Remove fan tray



9.4 Accessing Internal Components in the Rear of the Liebert XDH

The Liebert XDH rear panel can be removed to gain access to internal components, such as the electronic boards and related items. The panel of the standard Liebert XDH or units with Smart IO connections is removed the same way, by removing the bolts on the rear panel (see **Figure 36**).

Figure 36 Remove Liebert XDH rear panel



9.5 Open Electric Box—Liebert XDH Standard Modules

WARNING

Risk of electric shock. Can cause injury or death.

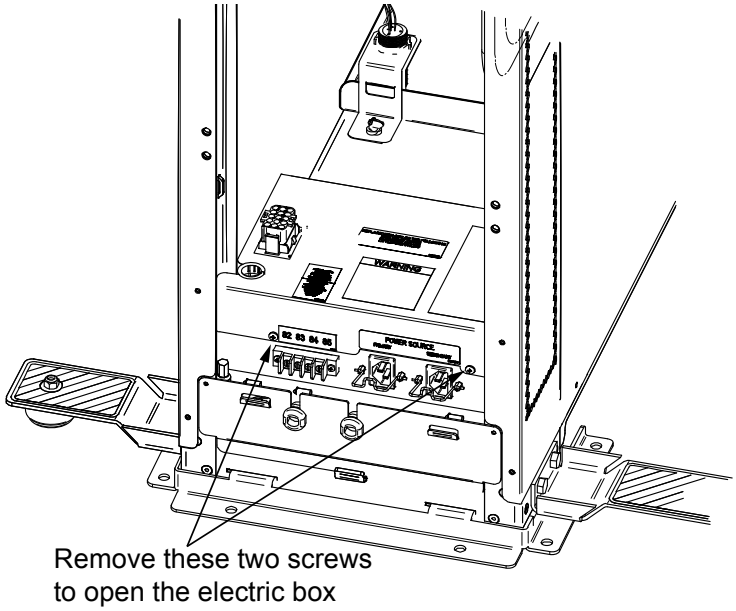
System contains hazardous electrical voltage. Disconnect both power cords from the electrical supply outlets or from the receptacles on the back of the Liebert XDH before working within.

The electric box in the lower portion of the Liebert XDH can be opened for maintenance, such as replacing a circuit breaker and checking wiring connections. To open the box:

1. Disconnect both power cords from the electrical supply outlets or from the receptacles on the back of the Liebert XDH.
2. Remove the back from the Liebert XDH and lay it aside where it will not be damaged (see **Figure 36**.
3. Unplug the power cords from the primary and secondary input connections on the electric box.
4. Remove the two screws on the front of the electric box (see **Figure 37**).
5. Lift off the front of the electric box.

After performing the maintenance, reverse the removal steps to reinstall the electric box's front cover.

Figure 37 Open electric box on Liebert XDH standard module



9.6 Open Electric Box—Liebert XDH Smart Modules

WARNING

Risk of electric shock. Can cause injury or death.

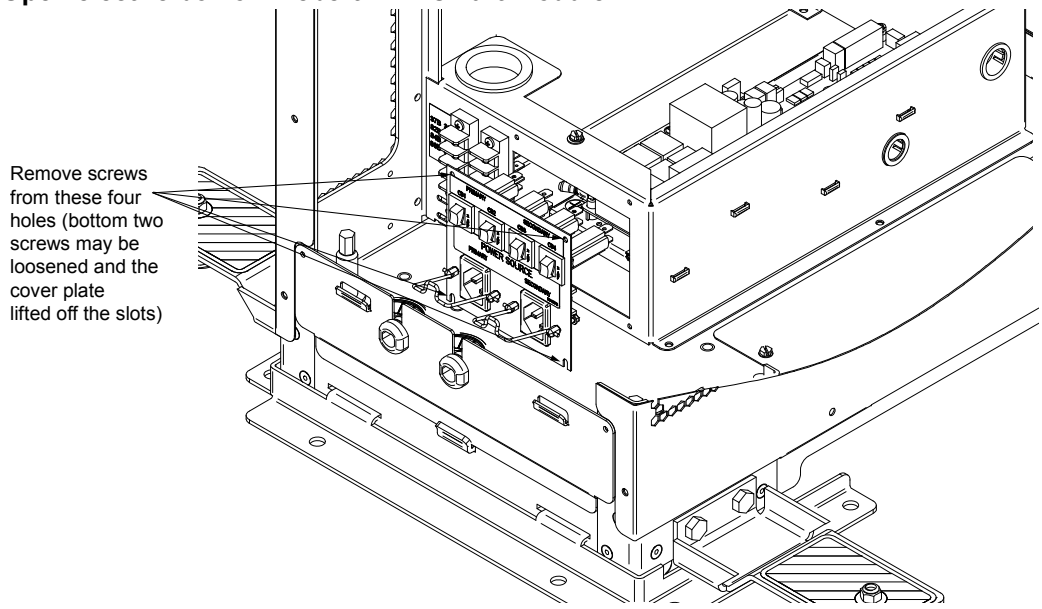
System contains hazardous electrical voltage. Disconnect both power cords from the electrical supply outlets or from the receptacles on the back of the Liebert XDH before working within.

The electric box in the lower portion of the Liebert XDH can be opened for maintenance, such as replacing a circuit breaker and checking wiring connections. To open the box:

1. Disconnect both power cords from the electrical supply outlets or from the receptacles on the back of the Liebert XDH.
2. Remove the back from the Liebert XDH and lay it aside where it will not be damaged (see **Figure 36**.
3. Unplug the power cords from the primary and secondary input connections on the electric box.
4. Remove the four screws on the front of the electric box the lower two screws may be loosened and left in the box (see **Figure 37**).
5. Lift off the front of the electric box.

After performing the maintenance, reverse the removal steps to reinstall the electric box's front cover.

Figure 38 Open electric box on Liebert XDH smart module



10.0 SPECIFICATIONS

Table 7 Liebert XDH32 specifications

Models	XDH32DK [1, 2] XDH32BK [1] XDH32SK [1] (60Hz)	XDH32DS [1, 2] XDH32BS [1] XDH32SS [1] (50/60Hz)
Cooling Capacity	**XDH32**, 60Hz Nominal (98ºF [37°C] EAT): 30kW/8.5 Tons **XDH32**, 60Hz Maximum (105ºF [41°C] EAT): 34kW/9.7 Tons **XDH32**, 50Hz Nominal (98ºF [37°C] EAT): 30kW/8.5 Tons **XDH32**, 50Hz Maximum (103ºF [39°C] EAT): 34kW/9.7 Tons	
Conditions	Capacity rating is @ 55ºF (13ºC) Entering Fluid Temperature and 50ºF (10ºC) or lower dew point	
Electrical Requirements		
Input	120V-1ph-60Hz	220-240V-1ph-50Hz, CE / 208-240V-1ph-60Hz, CSA
Input Power Connections	Two IEC320-C14 power inlets and two IEC power cords with NEMA 5-15P plugs	Two IEC320-C14 power inlets and two IEC power cords with IEC320-C14 plugs
Full Load Amps	10	5
Power Consumption, Nominal, Watts	1200	1150
Dimensions, inches (mm)		
Height—Unit Only	78 (1981)	
Height—Including Pipe Connections	80 (2032)	
Width	12 (305)	
Depth	42 (1067)	
Weight, lb (kg)		
Unit Only	246 (112)	246 (112)
Shipping Weight	330 (150)	330 (150)
Number of Fans	6	
Airflow, Nominal, ft^3/min (m^3/hr)	4000 (6796)	3850 (6541)
Audible Noise, Sound Power	86 dBa	86 dBa
Pipe Connections		
Refrigerant Supply	1/2" OD, Cu (optional 1/2" threaded one-shot coupling on the unit)	
Refrigerant Return	7/8" OD, Cu (optional 7/8" threaded one-shot coupling on the unit)	
Serviceable Parts	Fans and electrical components	
Cabinet Exterior Finish	Black, matte finish, heat-fused powder coat	
Options		
** Condensate sensing (factory-installed), discontinued April 2009	Dry contact (24VAC - 1A maximum)	
Smart Module control board (factory-installed)	Dry contact (24VAC - 1A maximum)	
Pre-Charged Refrigerant	R-134a refrigerant, one-shot connections	
Air Diffusers	Uni-directional or bi-directional	
Agency		
Approvals	CSA 60Hz	CE 50Hz, CSA 50/60Hz

1. Refer to **Figure 2** for complete part number.
2. Discontinued April 2009.

Table 8 Liebert XDH20 specifications

Models	XDH20DK [1, 2] XDH20BK [1] XDH20SK [1] (60Hz)	XDH20DS [1, 2] XDH20BS [1] XDH20SS [1] (50/60Hz)
Cooling Capacity	**XDH20**, 60Hz Nominal (98ºF [37°C] EAT): 22kW/6.3 Tons **XDH20**, 60Hz Maximum (105ºF [41°C] EAT): 25.3kW/7.2 Tons **XDH20**, 50Hz Nominal (98ºF [37°C] EAT): 21.6kW / 6.1 Tons **XDH20**, 50Hz Maximum (105ºF [41°C] EAT): 25.3kW/7.2 Tons	
Conditions	Capacity rating is @ 55ºF (13ºC) Entering Fluid Temperature and 50ºF (10ºC) or lower dew point	
Electrical Requirements		
Input	120V-1ph-60Hz	220-240V-1ph-50Hz, CE / 208-240V-1ph-60Hz, CSA
Input Power Connections	Two IEC320-C14 power inlets and two IEC power cords with NEMA 5-15P plugs	Two IEC320-C14 power inlets and two IEC power cords with IEC320-C14 plugs
Full Load Amps	5	2.5
Power Consumption, Nominal, Watts	600	575
Dimensions, inches (mm)		
Height—Unit Only	78 (1981)	
Height—Including Pipe Connections	80 (2032)	
Width	12 (305)	
Depth	42 (1067)	
Weight, lb (kg)		
Unit Only	233 (106)	233 (106)
Shipping Weight	317 (144)	317 (144)
Number of Fans	6	
Airflow, Nominal, ft^3/min (m^3/hr)	2500 (4248)	2428 (4125)
Audible Noise, Sound Power	81 dBa	81 dBa
Pipe Connections		
Refrigerant Supply	1/2" OD, Cu (optional 1/2" threaded one-shot coupling on the unit)	
Refrigerant Return	7/8" OD, Cu (optional 7/8" threaded one-shot coupling on the unit)	
Serviceable Parts	Fans and electrical components	
Cabinet Exterior Finish	Black, matte finish, heat-fused powder coat	
Options		
Condensate sensing (factory-installed), discontinued April 2009	Dry contact (24VAC - 1A maximum)	
Smart Module control board (factory-installed)	Dry contact (24VAC - 1A maximum)	
Pre-Charged Refrigerant	R-134a refrigerant, one-shot connections	
Air Diffusers	Uni-directional or bi-directional	
Agency		
Approvals	CSA 60Hz	CE 50Hz, CSA 50/60Hz

1. Refer to **Figure 2** for complete part number.
2. Discontinued April 2009.

Table 9 Liebert XD Flex Pipe one-shot assemblies, supply and return

Description	Length ft (m)	Liebert P/N Straight Connection Assembly	Liebert P/N 90-Degree Connection Assembly	Minimum Bend Radius in (mm)	
				Supply	Return
Liebert XD Flex Pipe Kit	10 (3.0)	186566G2	186565G2	7 (178)	9 (229)
	8 (2.5)	186566G3	186565G3		
	6 (1.8)	186566G1	186565G1		
	4 (1.2)	186566G4	186565G4		

Table 10 Liebert XD Flex Pipe removable assemblies, supply and return

Description	Length ft (m)	Liebert P/N Straight Connection Assembly	Liebert P/N 90-Degree Connection Assembly	Minimum Bend Radius in (mm)	
				Supply	Return
Liebert XD Flex Pipe Kit	10 (3.0)	187865G2	187864G2	7 (178)	9 (229)
	8 (2.5)	187865G3	187864G3		
	6 (1.8)	187865G1	187864G1		
	4 (1.2)	187865G4	187864G4		

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