Liebert® XDU Liquid to Air Heat Exchanger for Chip Cooling

Installer/User Guide

600 mm Wide

The information contained in this document is subject to change without notice and may not be suitable for all applications. While every precaution has been taken to ensure the accuracy and completeness of this document, Vertiv assumes no responsibility and disclaims all liability for damages resulting from use of this information or for any errors or omissions.

Vertiv recommends installing a monitored fluid detection system that is wired to activate the automatic closure of field-installed coolant fluid supply and return shut off valves, where applicable, to reduce the amount of coolant fluid leakage and consequential equipment and building damage. Refer to local regulations and building codes relating to the application, installation, and operation of this product. The consulting engineer, installer, and/or end user is responsible for compliance with all applicable laws and regulations relating to the application, installation, and operation of this product.

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.vertiv.com/en-us/support/ for additional assistance.

TABLE OF CONTENTS

1 Important Safety Instructions

SAVE THESE INSTRUCTIONS

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

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

This equipment is not to be installed in an area accessible to the general public.

Adhere to all warnings, cautions, notices, and installation, operating, and safety instructions on the unit and in this manual. Follow all installation, operation, and maintenance instructions and all applicable national and local building, electrical, and plumbing codes.

Any operation that requires opening doors or equipment panels must be carried out only by properly trained and qualified personnel.

To identify the unit model and serial number for assistance or spare parts, locate the identification label on the unit. The label is inside of the display of the door.

WARNING! Arc flash and electric shock hazard. Open all local and remote electric power supply disconnect switches, verify with a voltmeter that power is Off, and wear appropriate, OSHA approved personal protective equipment (PPE) per NFPA 70E before working within the 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 controller 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 the controller. The factory supplied, optional disconnect switch is inside the unit. The line side of this switch 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 electric shock. Can cause equipment damage, injury, or death. Open all local and remote electric power supply disconnect switches and verify with a voltmeter that power is off before working within any electric connection enclosures. Service and maintenance work must be performed only by properly trained and qualified personnel and in accordance with applicable regulations and manufacturers' specifications. Opening or removing the covers to any equipment may expose personnel to lethal voltages within the unit even when it is apparently not operating and the input wiring is disconnected from the electrical source.

WARNING! Risk of electric shock. Can cause serious injury or death. The Vertiv™ 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 the Liebert®iCOM™ control. Open all local and remote electric power disconnect switches and verify with a voltmeter that power is Off before working on any component of the system.

WARNING! Risk of improper moving, lifting, or handling of the unit. Can cause equipment damage, injury, or death. Read all of the following instructions and verify that all lifting and moving equipment is rated for the weight of the unit before attempting to move, lift, remove packaging from, or prepare the unit for installation. See **Table 3.2** on page 11 , for weights.

WARNING! Risk of improper wiring, piping, moving, lifting and handling. Can cause equipment damage, serious injury, or death. Installation and service of this equipment should be done only by qualified personnel who have been specially trained in the installation of air conditioning equipment and who are wearing appropriate, OSHA approved PPE.

WARNING! Risk of improper wire sizing/rating and loose electrical connections. Can cause overheated wire and electrical connection terminals resulting in smoke, fire, equipment and building damage, injury, or death. Use correctly sized copper wire only and verify that all electrical connections are tight before turning power On. Check all electrical connections periodically and tighten as necessary.

WARNING! Risk of top-heavy unit falling over. Improper handling can cause equipment damage, injury, or death. Read all of the following instructions and verify that all lifting and moving equipment is rated for the weight of the unit before attempting to move, lift, remove packaging from, or prepare the unit for installation.

WARNING! Risk of unsecured unit rolling off of pallet. Can cause equipment damage, injury, or death. The unit is on casters. Ensure that the unit and pallet are located on a flat surface before loosening the hardware securing the unit to its shipping pallet.

WARNING! Risk of hair, clothing, and jewelry entanglement with high speed rotating fan blades. Can cause equipment damage, serious injury, or death. Keep hair, jewelry, and loose clothing secured and away from rotating fan blades during unit operation.

WARNING! Risk of contact with high speed rotating fan blades. Can cause serious injury or death. Open all local and remote electric power supply disconnect switches, verify with a voltmeter that power is off, and verify that all fan blades have stopped rotating before working in the unit cabinet or on the fan assembly. If control voltage is applied, the fan motor can restart without warning after a power failure. Do not operate the unit with any or all cabinet panels removed.

CAUTION: Risk of contact with extremely hot and/or cold surfaces. Can cause injury. Verify that all components have reached a temperature that is safe for human contact or wear appropriate, OSHA approved PPE before working within the electric connection enclosures or unit cabinet. Perform maintenance only when the system is de-energized and component temperatures have become safe for human contact.

CAUTION: Risk of contact with sharp edges, splinters, and exposed fasteners. Can cause injury. Only properly trained and qualified personnel wearing appropriate, OSHA approved PPE should attempt to move, lift, remove packaging from, or prepare the unit for installation.

NOTICE

Risk of improper power supply connection. Can cause equipment damage and loss of warranty coverage.

Prior to connecting any equipment to a main or alternate power source (for example: backup generator systems) for start-up, commissioning, testing, or normal operation, ensure that these sources are correctly adjusted to the nameplate voltage and frequency of all equipment to be connected. In general, power source voltages should be stabilized and regulated to within ±10% of the load nameplate nominal voltage. Also, ensure that no three-phase sources are single-phased at any time.

NOTICE

Risk of piping system corrosion and freezing fluids. Can cause leaks resulting in equipment and very expensive building damage. Cooling coils and piping systems are at high risk of freezing and premature corrosion. Fluids in these systems must contain the proper antifreeze and inhibitors to prevent freezing and premature coil and piping corrosion. The water or water/glycol solution must be analyzed by a competent local water treatment specialist before start up to establish the inhibitor and antifreeze solution requirement and at regularly scheduled intervals throughout the life of the system to determine the pattern of inhibitor depletion.

The complexity of water/glycol solution condition problems and the variations of required treatment programs make it extremely important to obtain the advice of a competent and experienced water treatment specialist and follow a regularly scheduled coolant fluid system maintenance program.

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. Sediment deposits prevent the formation of a protective oxide layer on the inside of the coolant system components and piping. The water/coolant fluid must be treated and circulating through the system continuously to prevent the buildup of sediment deposits and or growth of sulfate reducing bacteria.

Proper inhibitor maintenance must be performed in order to prevent corrosion of the system. Consult glycol manufacturer for testing and maintenance of inhibitors.

Commercial ethylene glycol, 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.

We recommend installing a monitored fluid detection system that is wired to activate the automatic closure of field installed coolant fluid supply and return shut-off valves to reduce the amount of coolant fluid leakage and consequential equipment and building damage. The shut-off valves must be sized to close off against the maximum coolant fluid system pressure in case of a catastrophic fluid leak.

NOTICE

Risk of frozen pipes and corrosion from improper coolant mixture. Can cause water leaks resulting in equipment and building damage.

When the cooling unit or piping may be exposed to freezing temperatures, charge the system with the proper percentage of glycol and water for the coldest design ambient temperature. Automotive antifreeze is unacceptable and must NOT be used in any glycol fluid system. Use only HVAC glycol solution that meets the requirements of recommended industry practices. Do not use galvanized pipe.

NOTICE

Risk of no-flow condition. Can cause equipment damage.

Do not leave the water/coolant fluid supply circuit in a no-flow condition. 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 water/coolant fluid supply circuit system operating continuously.

NOTICE

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

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

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

We recommend installing a monitored fluid detection system to immediately discover and report coolant fluid system and condensate drain line leaks.

NOTICE

Risk of doorway/hallway interference. Can cause unit and/or structure damage. The unit may be too large to fit through a doorway or hallway while on the skid. Measure the unit and passageway dimensions, and refer to the installation plans prior to moving the unit to verify clearances.

NOTICE

Risk of damage from forklift. Can cause unit damage. Keep tines of the forklift 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 unit upright, indoors, and protected from dampness, freezing temperatures, and contact damage.

Agency Listed

The XDU Thermal Management System complying with North American requirements shall be Certified/Listed to one of the following harmonized US and Canadian product safety standards. Units are marked with the CSA logo with “c” and “us” country identifiers.

- CSA C22.2 No. 236/UL 1995 Heating and Cooling Equipment; or
- CSA/UL 60335-2-40 Household and similar electrical appliances - Safety - Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers, in conjunction with CSA/UL 60335-1 Household and similar electrical appliances - Safety - Part 1: General requirements

The XDU Thermal Management System complying with CE requirements shall conform to the following Directives, Standards and Regulations. Units are marked with the CE Mark and come with Declarations of Conformity.

- Machinery Directive 2006/42 / EC and Low Voltage Directive 2014/35 / EU:
  - EN 60335-2-40 Household and similar electrical appliances - Safety - Particular requirements for electric heat pumps, air conditioners and dehumidifiers, in combination with
  - EN 60335-1 Household and similar electrical appliances - Safety - Part 1: General requirements
- EMC Directive 2014/30 / EU:
  - EN 61000-6-2 Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments
  - EN 61000-6-3 Electromagnetic compatibility (EMC) Part 6-3: Generic standards - Emission standard for residential, commercial and light industrial environments
- Directive 2011/65/EU - Restriction of Hazardous Substances in Electrical and Electronic Equipment and Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU
- REACH Regulation EC No. 1907/2006 - Registration, Evaluation, Authorization and Restriction of Chemicals

This page intentionally left blank

2 Nomenclature and Components

This section describes the model number for Vertiv™ Liebert® XDU units and components.

2.1 Model Number Nomenclature

Table 2.2 below describes each digit of the 25-digit configuration number. The 14-digit model number consists of the first 10 digits and last four digits of the configuration number.

Table 2.1 Vertiv™ Liebert® XDU Model Number Example

Model # Part 1									Model Details													Model # Part 2		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
X	D	U	0	6	0	A	C	W	-	-	1	D	-	-	-	-	-	-	-	-	A	-	-	-

Table 2.2 Model Number Digit Definitions for Liebert XDU

Digit	Description
Digits 1, 2 = The base unit	XD = Extreme Heat Density System
Digit 3 = System Type	U = Coolant distribution unit
Digit 4, 5, 6 = Nominal Capacity	060 = 60 kW
Digit 7 = Heat Rejection	A = Air (fin-type heat exchanger)
Digit 8 = Supply Power	C = 208 V/2 = 380V/3 ~/ 60 Hz 2 = 380 V/ 3 ~/60 Hz M = 380-415 V/3 ~/50 Hz
Digit 9 = Coolant Fluid Type	W = Water
Digit 10 = Pump Configuration	- = Placeholder
Digit 11 = Pump Hp	- = Placeholder
Digit 12 = Fan Redundancy	1 = N
Digit 13 = Packaging	D = Domestic E = Seaworthy (Export)

Table 2.2 Model Number Digit Definitions for Liebert XDU (continued)

Digit	Description
Digit 14 = Agency	
	- = Placeholder
Digit 15 = Coil	
	- = Placeholder
Digit 16 = Placeholder	
	- = Placeholder
Digit 17 = Placeholder	
	- = Placeholder
Digit 18 = Placeholder	
	- = Placeholder
Digit 19 = Placeholder	
	- = Placeholder
Digit 20 = Placeholder	
	- = Placeholder
Digit 21 = Placeholder	
	- = Placeholder
Digit 22 = Special Feature Application Configuration	
	A = Standard configuration
	S = SFA
Digit 23, 24, 25 = Factory Configuration	
	- = Placeholder

2.2 Component Location

The unit component locations are described in the submittal documents included in the Submittal Drawings on page 61 .

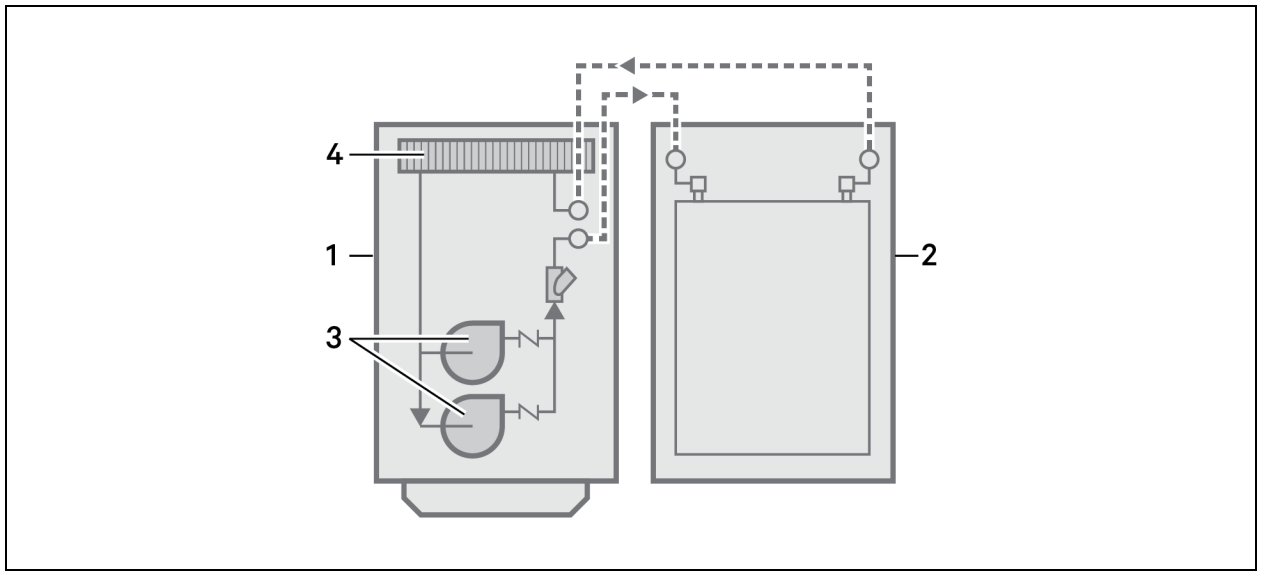
The following table lists the relevant documents by number and title.

Table 2.3 Component Location Drawings

Document Number	Title
DPN004931	Component Location Diagram Liquid to Air 60 kW, 600 mm (24 in.) Model

2.3 Cooling Configuration

Figure 2.1 Liquid to Air Cooling System Overview



Item	Description
1	XDU
2	Heat load
3	Pump
4	Heat exchanger

This page intentionally left blank

3 Pre-installation Preparation and Guidelines

NOTE: Before installing unit, determine whether any building alterations are required to run piping, wiring, and duct work. Follow all unit dimensional drawings and refer to the submittal engineering dimensional drawings of individual units for proper clearances.

Refer to Model Number Nomenclature on page 7 and the appropriate submittal drawings to determine the type of system being installed and anticipate building alterations, piping, and duct work needed.

The unit dimensions, pipe connection locations, and piping schematics are described in the submittal documents included in the .

- Verify that the floor is level, solid, and sufficient to support the unit. See Table 3.2 below , for unit weights.
- Confirm that the room is properly insulated and has a sealed vapor barrier.
- For proper humidity control, keep outside or fresh air to an absolute minimum (less than 5% of total air circulated in the room).
- Install the units as close as possible to the largest heat load.
- Allow at least the minimum recommended clearances for maintenance and service. See the appropriate submittal drawings for dimensions.
- We recommend installing an under floor leak detection system. Contact your Vertiv representative for information.

3.1 Planning Dimensions

The unit and floor stand dimensions are described in the submittal documents included in Submittal Drawings on page 61 .

The following table lists the relevant documents by number and title.

Table 3.1 Dimension Planning Drawings

Document Number	Title
XDU	
DPN004930	Cabinet Dimensional Data Liquid to Air 60kW, 600 mm (24 in.) Model
Floor Stand	
DPN004933	Floorstand Dimensional Data 600 mm (24 in.) Model

3.2 Unit Weights

Table 3.2 Vertiv™ Liebert® XDU Shipping Dimensions and Unit Weights

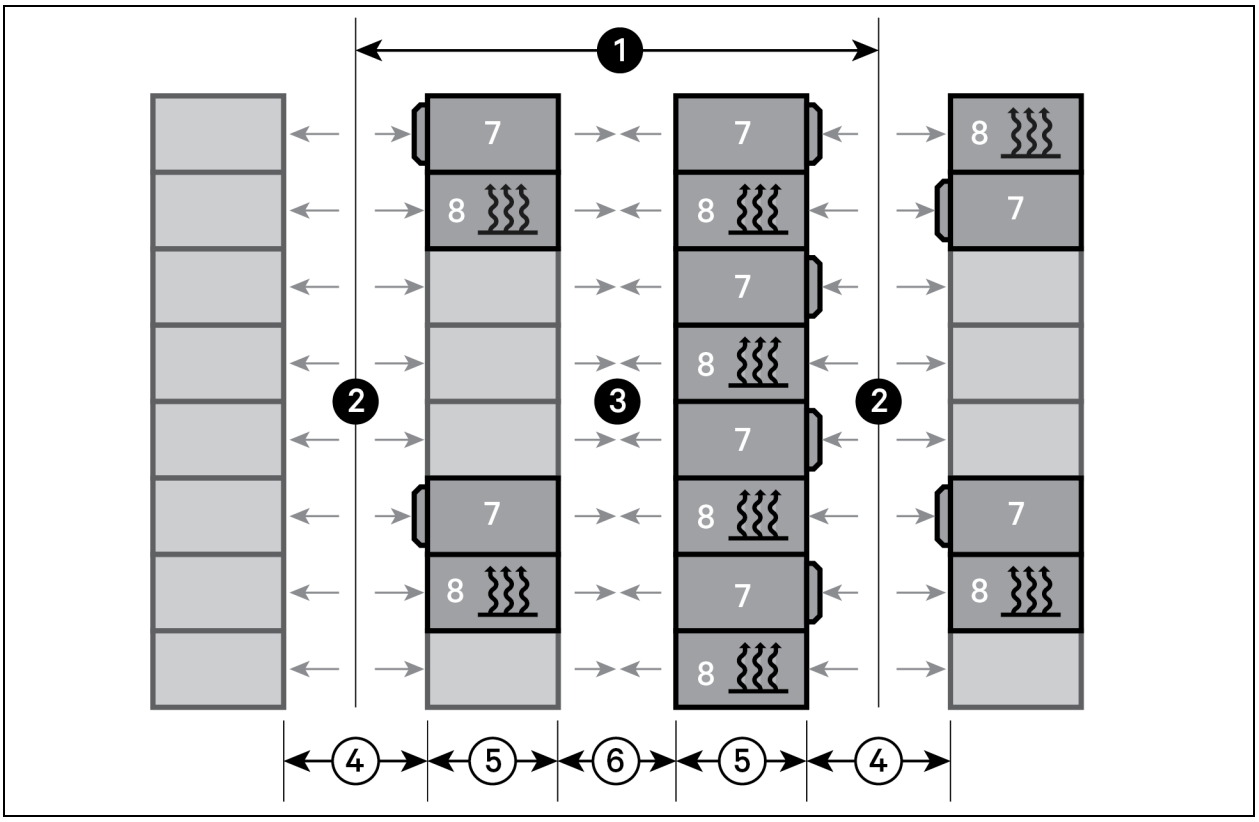
Domestic Packaging		Export Packaging		Dry Weight, lb (kg)
Ship Weight, lb (kg)	Shipping Dimensions, in. (mm)	Ship Weight, lb (kg)	Shipping Dimensions, in. (mm)	
825 (374)	90 x 128 x 97 (2286 x 3251 x 2464)	915 (415)	90.5 x 128.5 x 99 (2299 x 3264 x 2515)	700 (318)

3.3 Implementing a Hot Aisle/Cold Aisle Equipment Layout

Best practice is to place equipment racks in alternating rows of cold aisles and hot aisles. This is best accomplished when planning the layout of the file server farm area. It is more difficult to accomplish when the computer room is already populated with operating hardware.

In the cold aisle, the equipment racks are arranged face-to-face so the cooling air discharged from the cooling unit is discharged up through perforated floor tiles, drawn into the face of the computer hardware and exhausted out the back of the equipment rack into the adjacent hot aisles. Hot aisles are literally hot because the alternating cold and hot-aisle design separates the source of cooling air from hot air discharge, which returns to the computer room cooling unit. No perforated tiles should be placed in the hot aisles, which mixes hot and cold air, lowering the temperature of the air returning to the cooling units and reducing usable capacity.

Figure 3.1 Vertiv™ Liebert® XDU Layout in Hot/Cold Aisle Application



Item	Description
1	Aisle pitch, 7 tiles, 14 ft. (4.3 m)
2	Cold aisle
3	Hot aisle
4	Front aisle, 4 ft. (1.2 m)
5	Rack, 42 in. (1067 mm)
6	Back aisle, 3 ft. (0.91 m)
7	XDU
8	Heat load

4 Equipment Inspection and Handling

WARNING! Risk of top-heavy unit falling over. Improper handling can cause equipment damage, injury, or death. Read all of the following instructions and verify that all lifting and moving equipment is rated for the weight of the unit before attempting to move, lift, remove packaging from, or prepare the unit for installation.

CAUTION: Risk of contact with sharp edges, splinters, and exposed fasteners. Can cause injury. Only properly trained and qualified personnel wearing appropriate, OSHA approved PPE should attempt to move, lift, remove packaging from, or prepare the unit for installation.

NOTICE

Risk of passageway interference. Can cause unit and/or structure damage. The unit may be too large to fit through a passageway while on or off the skid. Measure the unit and passageway dimensions, and refer to the installation plans prior to moving the unit to verify clearances.

NOTICE

Risk of damage from forklift. Can cause unit damage. Keep tines of the forklift 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. Keep the unit upright, indoors, and protected from dampness, freezing temperatures, and contact damage.

Upon arrival of the unit and before unpacking:

- Verify that the labeled equipment matches the bill of lading.
- Carefully inspect all items for visible or concealed damage.
- Report damage immediately to the carrier and file a damage claim with a copy sent to Vertiv or to your sales representative

Equipment Recommended for Handling the Unit:

- Forklift
- Pallet jack
- Piano jacks

4.1 Storing Before Installation

If storing the unit for long periods before installation:

- Keep the packaging on the unit and allow proper clearance around the unit to perform periodic inspections and maintenance.
- Inspect the unit periodically for condensation inside the unit or other signs of other effects of the storage environment.
- Rotate the fans and motor shaft by hand periodically for several revolutions. Look for signs of lubrication problem or obstructions. Failure to regularly rotate fans on a stored unit will result in premature fan failure. This type of failure is not covered by warranty.
- If storing at low temperatures, trapped moisture can collect on walls and electrical components.
- We recommend routine inspections and, if needed, install electric heaters near the unit to prevent condensation.

4.2 Packaging Material

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

4.3 Handling the Unit While Packaged

Transport the unit with a forklift or pallet jack.

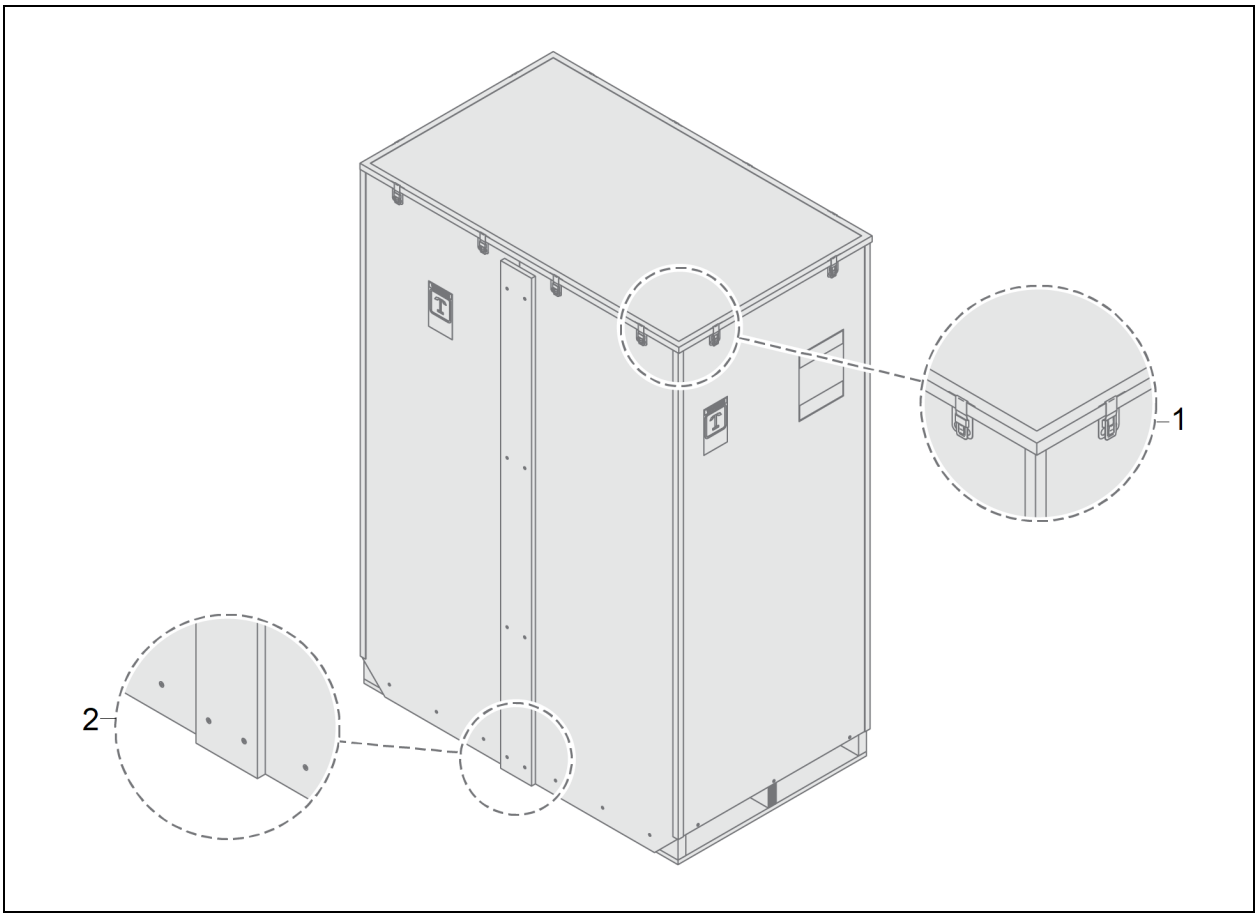
When using a forklift or pallet jack:

- Make sure that the forks (if adjustable) are spread to the widest allowable distance that will fit under the skid.
- Make sure the fork length is suitable for the skid length. Skid length is 60 inches (1524 mm).
- When moving the packaged unit, do not lift the unit any higher than 2 to 4 inches (51 to 102 mm). All personnel except those moving the unit must be kept 12 feet (3.7 m) or more from the unit while it is being moved.
- If the unit must be lifted higher than 4 inches (102 mm), all personnel not directly involved in moving the unit must be 20 feet (5 m) or farther from the unit.

4.4 Unpacking the Export Shipped Unit

1. Remove the metal clips (12 places typical) that secure the top panel of the crate to the side panels, see **Figure 4.1** on the facing page .
2. Use a Phillips head screwdriver to remove all the wood screws (34 places typical) that secure the side panels together and to the pallet, see **Figure 4.1** on the facing page .
3. To remove the remaining packaging, start with Step 1 , of Unpacking the Domestic Shipped Unit on the facing page .

Figure 4.1 Metal Clips and Wood Screws on Crate



Item	Description
1	Metal clips, typical 12 places
2	Wood screws, minimum 34 places

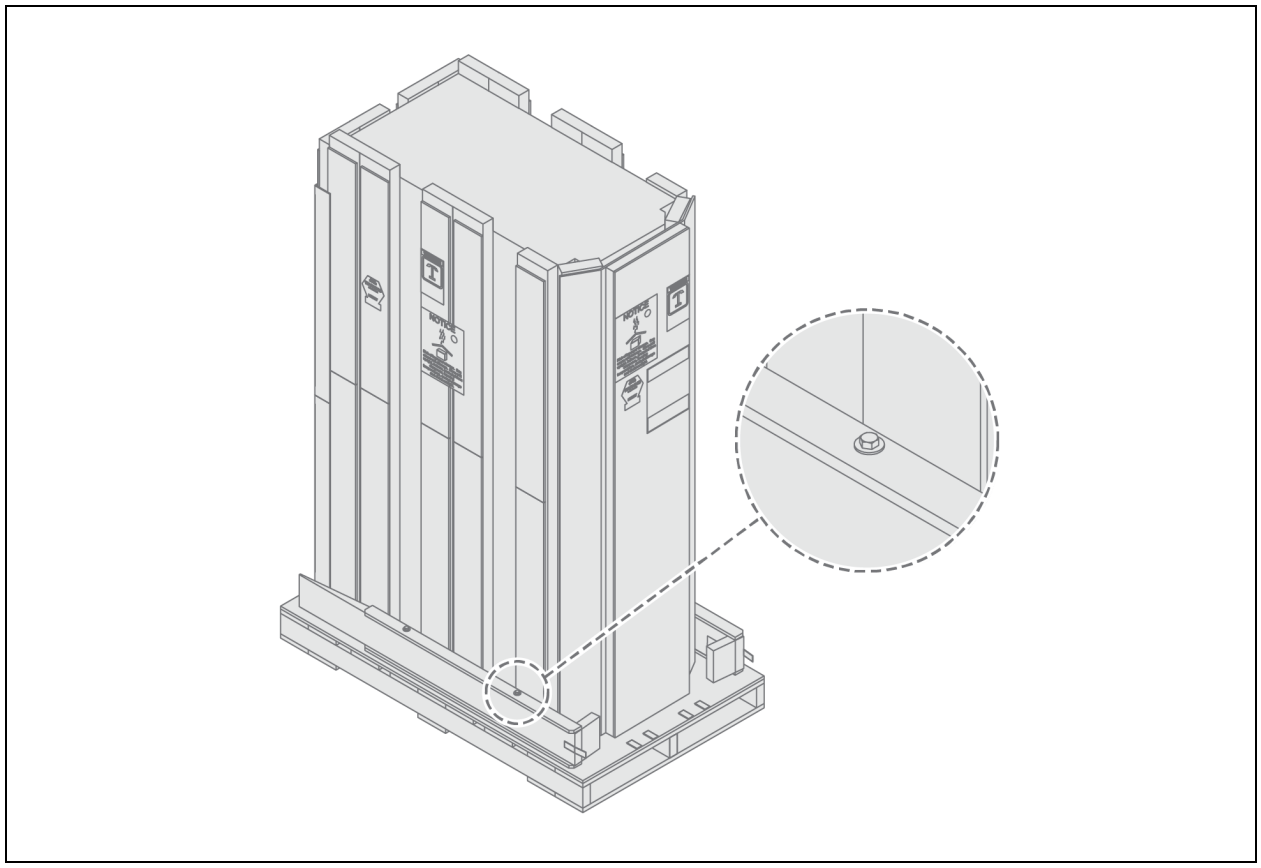
4.5 Unpacking the Domestic Shipped Unit

1. Use a 9/16-inch (14 mm) socket drive or wrench to remove the lag screws (four places typical) that secure the ramp to the pallet, see Figure 4.2 on the next page . Set the ramps aside for use later when preparing to move the unit from the pallet.
2. Remove the exterior packaging from around the unit.

NOTE: The bag may remain in place to protect from dust and to protect the unit panels, or it may be removed for immediate installation.

3. Remove the bag from the unit when ready to move off the pallet and install the unit. See Removing Units from the Pallet on page 17 .

Figure 4.2 Lag Screws that Secure Ramps



4.6 Removing Units from the Pallet

WARNING! Risk of unsecured unit rolling off of pallet. Can cause equipment damage, injury, or death. The unit is on casters. Ensure that the unit and pallet are located on a flat surface before loosening the hardware securing the unit to its shipping pallet.

CAUTION: Risk of contact with sharp edges, splinters, and exposed fasteners. Can cause injury. Only properly trained and qualified personnel wearing appropriate, OSHA approved PPE should attempt to move, lift, remove packaging from, or prepare the unit for installation.

NOTICE

Risk of overhead interference. Can cause unit and structure damage. Unit may be too tall to fit through a doorway while on or off pallet. Measure unit and doorway heights and refer to installation plans prior to moving unit for clearance verification.

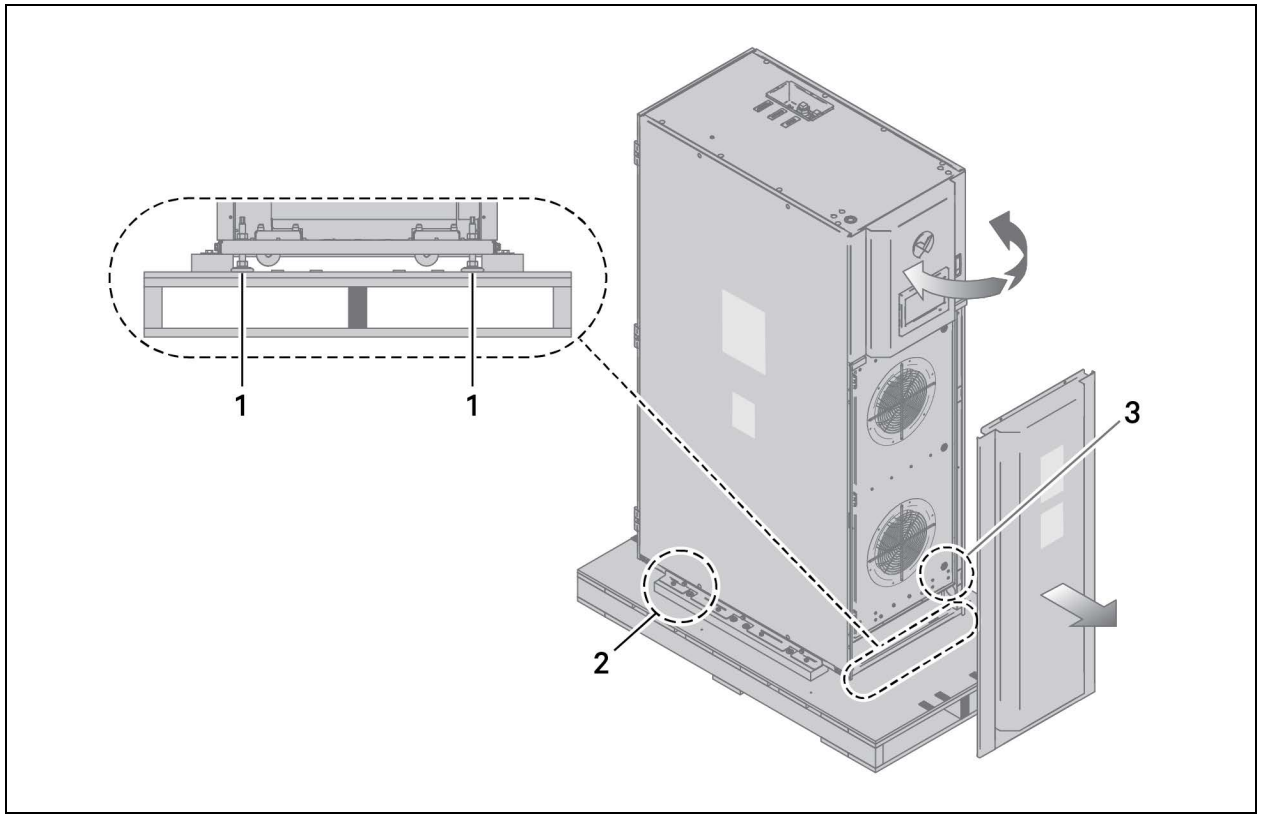
NOTICE

Risk of unit damage if improperly stored. Keep unit vertically upright, indoors, and protected from dampness, freezing temperatures, and contact damage.

IMPORTANT! Two or more properly trained and qualified personnel are required to move the unit to its installation location.

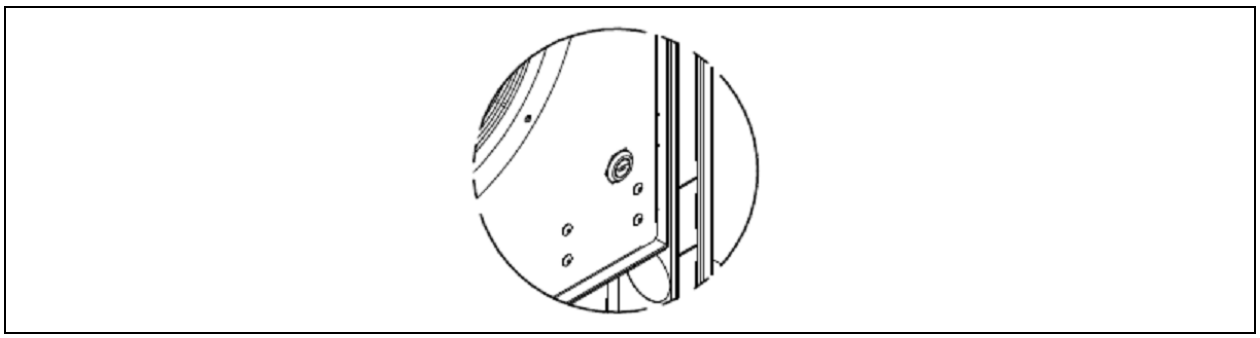
1. Open the top panel door with mounted control. See Removing Unit from Pallet on the next page .
   - Using a 5/16-inch hex head or slotted screwdriver, remove the screws securing the bottom front panel assembly, and set aside until instructed to re-attach.
   - Close and latch the top panel door.

Figure 4.3 Removing Unit from Pallet



2. Lower the four stabilizer feet to make contact with pallet deck using a 3/8-inch (10 mm) socket drive or wrench.
   - To access front stabilizer feet, open fan door. Use a large flat blade screwdriver to rotate three latches. See Expanded View of Latches below .
   - To access rear stabilizer feet, open the rear hinged door and remove cover below coil.

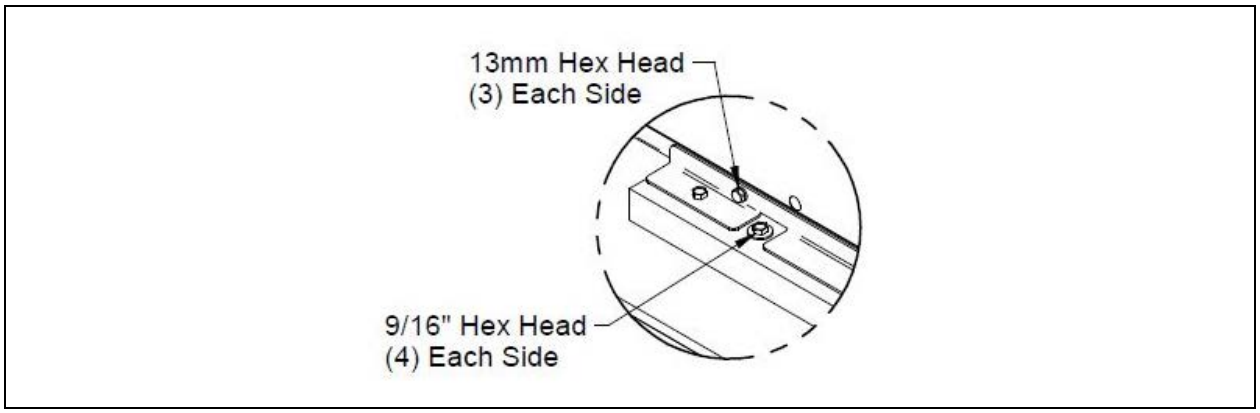
Figure 4.4 Expanded View of Latches



Item	Description
1	Stabilizer feet
2	Shipping bracket screws, lag screws
3	Latches

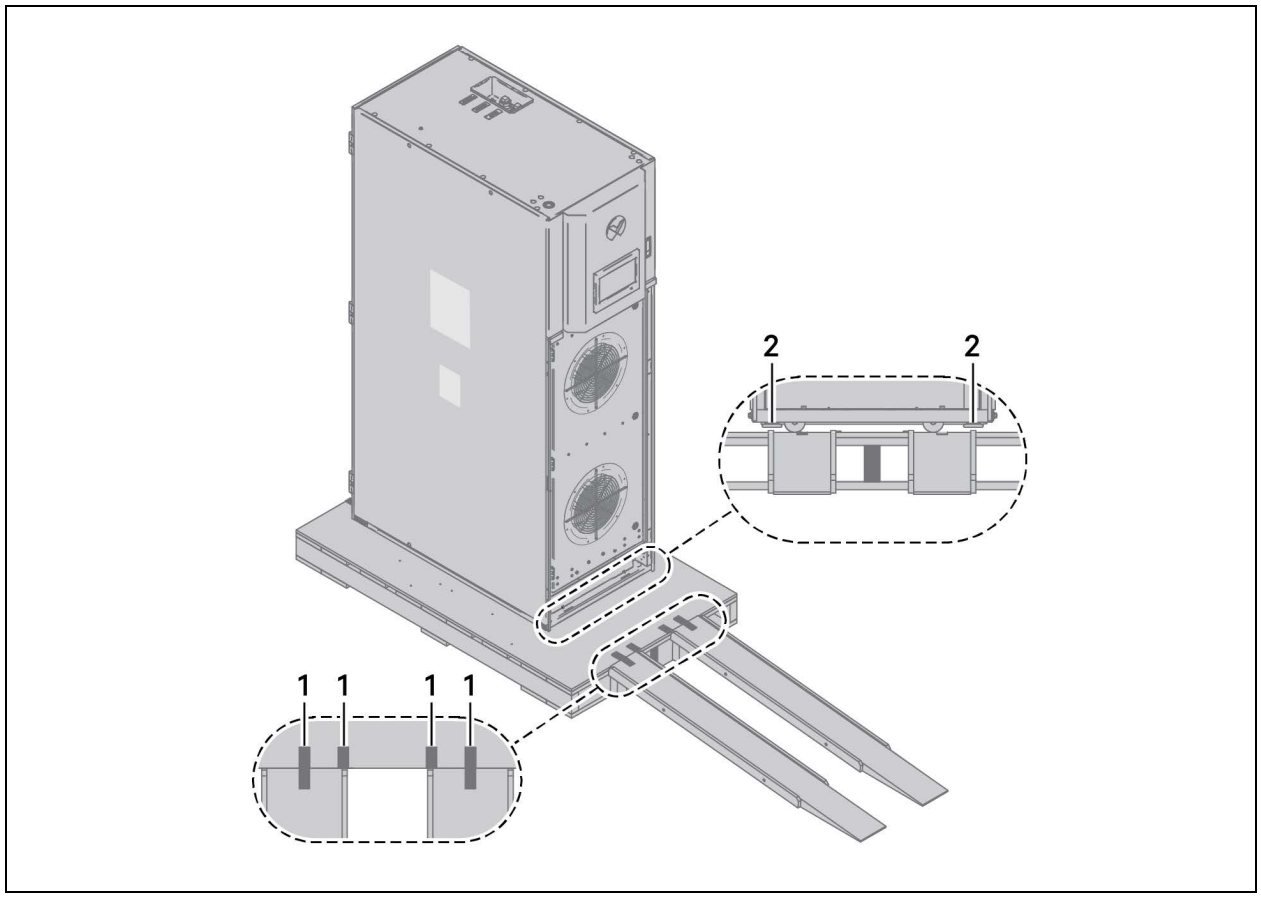
3. Remove screws that secure the shipping brackets to the side of unit base using a 1/2-inch (13 mm) socket drive or wrench. and remove the lag screws securing the shopping blocks to the pallet using a 9/16-inch (14 mm) socket drive or wrench. Expanded View of Shipping Screw and Lag Screw below .

Figure 4.5 Expanded View of Shipping Screw and Lag Screw



4. Equally adjust the four stabilizer feet to raise the unit off of the shipping blocks.
   - Remove shipping blocks from pallet. See Metal Clips and Wood Screws on Crate on page 15 .
5. Locate and attach the ramps to pallet using hook and loop strips. See Attaching Ramps to Pallet below .

Figure 4.6 Attaching Ramps to Pallet



Item	Description
1	Hook and loop strips
2	Location of stabilizer feet

6. Equally adjust the four stabilizer feet to lower unit to the pallet.
    - Once the casters make contact with the pallet, continue to adjust all stabilizer feet to full up position.
    - Observe caution as unit is now free to roll.
    - Close fan door, rotate the three latches with large flat blade screwdriver to secure and then close and latch the rear hinged door. See Figure 4.4 on page 18 .
7. It is recommended that a minimum of two trained personnel move the unit from the pallet to ramps, to floor, and then to the final installation location.
8. Once the unit is in its final installation location, re-attach the perforated panel.
    - Open top panel door with mounted control.
    - Attach the perforated panel with the removed fasteners using a 5/16-inch hex head or slotted screwdriver.
    - Close and latch the top panel door. Open rear hinged door and attach the cover below the coil with the removed fasteners using a #2 Phillips screwdriver.

5 Installing in Enclosure Row

Built-in casters let you roll the Vertiv™ Liebert® XDU into position for installation. Adjustable leveling feet prevent it from moving after positioning, See Adjusting Base Supports/Leveling Feet below .

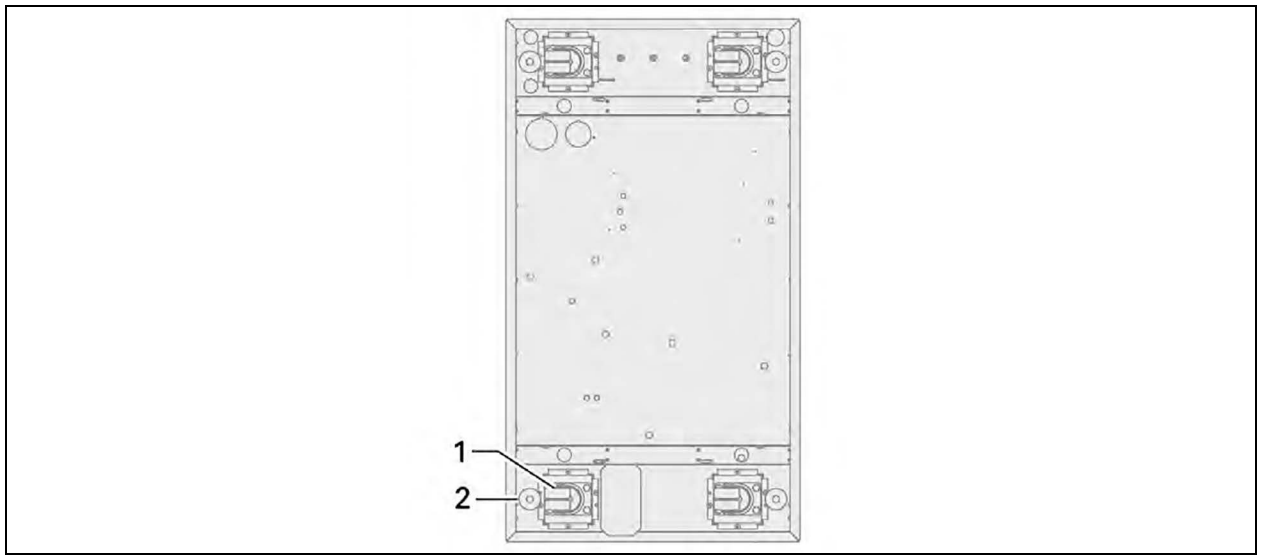
Once positioned, secure the unit to the floor or to an adjacent cabinet.

Adjustable brackets for attaching the unit to an adjacent cabinet are included with each unit. A bracket to attach the unit to the floor is available from your Vertiv representative.

5.1 Adjusting Base Supports/Leveling Feet

1. After the unit is in its final installation position, open the display door and remove the lower front panel using a 5/16-inch (7.9 mm) hex head or slotted screwdriver to prepare for installation.
2. Open the rear door.
3. Using an adjustable wrench, adjust the four base supports or feet, shown in Figure 5.1 below . Ensure that the unit is level. Lower the four stabilizer feet to make contact with the floor using a 3/8-inch (10 mm) socket drive or wrench.
   - To access front stabilizer feet, open fan door. Use a large flat blade screwdriver to rotate three latches. See Figure 5.2 on the next page .
   - To access rear stabilizer feet, open the rear hinged door and remove cover below coil.
4. Turning the base supports (leveling feet) clockwise, extends them and lifts the unit one corner at a time.
5. Tighten the nut on the top of each foot to lock the feet. The nut is inside the cabinet. See Figure 5.3 on the next page .

Figure 5.1 Caster Locations



Item	Description
1	Caster, one at each corner
2	Adjustable leveling foot, one at each corner

Figure 5.2 Expanded View of Latches

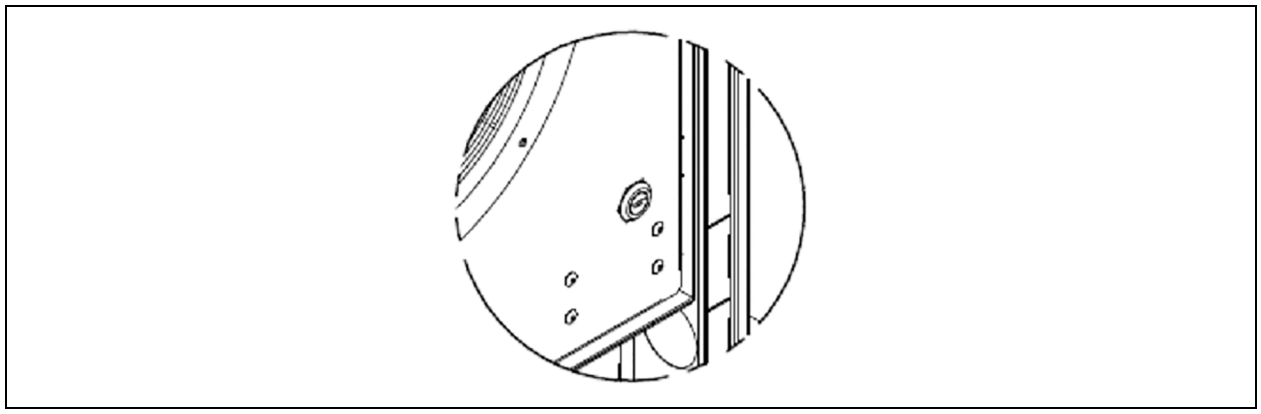
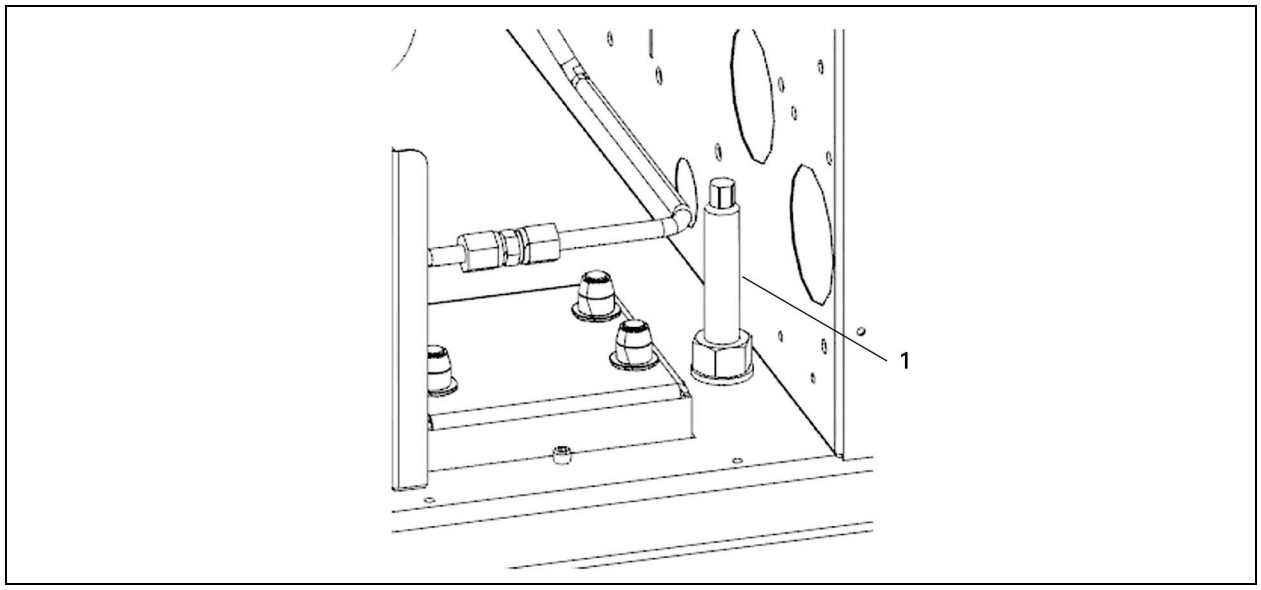


Figure 5.3 Adjust Leveling Feet



Item	Description
1	Nut on top of foot
2	Adjust foot with wrench

6 Piping Requirements

The fluid connections to the unit are threaded and sealed with threaded plugs. Connections are provided at the top and bottom of the unit.

- Field installed piping must be installed in accordance with local codes and must be properly assembled, supported, isolated, and insulated. Avoid piping runs through noise sensitive areas, such as office walls and conference rooms.
- Refer to specific text and detailed diagrams in this manual for other unit specific piping requirements.
- All piping below the elevated floor must be arranged so that it offers the least resistance . Careful planning of the piping layout under the raised floor is required. When installing piping on the sub-floor, we recommend installing the pipes in a horizontal plane rather than stacked one above the other. Whenever possible, the pipes should be run parallel.
- Place the tubing on supporting saddles.
- Install shut-off ball valves on the inlet and outlet pipes to ease maintenance.
- Install optional thermostats and pressure gauges on the inlet and outlet pipes.
- Install a water drain tap at the lowest point in the circuit.
- Locate air vents at tops of all risers and any intermediate system high points.

The pipe connection locations, piping general arrangement and schematics are described in the submittal documents included in the Submittal Drawings on page 61 .

The following tables list the relevant documents by number and title.

Table 6.1 Piping General Arrangement Drawings

Document Number	Title
DPN004928	Piping Arrangement, Liquid to Air 60 kW 600 mm (24 in.) Model

Table 6.2 Piping Connection Drawings

Document Number	Title
DPN004932	Primary Connection Locations Liquid to Air 60 kW, 600 mm (24 in.) Model

6.1 Fluid Volume for Unit and Connection Piping

The following tables provide the fluid volume requirements for the Liebert® XDU Liquid to Air Heat Exchanger for Chip Cooling and connected piping/hosing.

Table 6.3 Volume of Unit Internal Fluid Circuit

	Fluid Volume	
Unit Model	cubic in., (cubic cm)	gal, (l)
XDU60	1,412.17 in.^{3} (23,141 cm3)	6.11 (23)

Rubber Hose Connection Volumes

One-inch diameter rubber hose connections are field provided. The fluid volume is total for supply and return hoses of equal length (two hoses).

Table 6.4 Fluid Volume of Rubber Hose Connection Sets

Length of Kit Hoses, ft, (m)	Fluid Volume	
	cubic in., (cubic cm)	gal, (l)
5 (1.5)	94.34 (1546)	0.41 (1.7)
10 (3)	188.59 (3090)	0.82 (3.2)
15 (4.5)	282.84 (4635)	1.23 (4.8)
20 (6)	377.09 (6179)	1.64 (6.3)
25 (7.5)	471.34 (7724)	2.04 (8)

Field Piping Connection Volumes

Field supplied, field installed piping (PVC, copper, etc.) depends on pipe diameter and length. Table 6.5 below , describes the typical fluid volumes depending on pipe diameter.

Table 6.5 Piping Fluid Volume Gallon per Foot (Liter per Meter) Reference Type L Copper

Line Size, O.D., in.	Fluid Volume	
	gal/ft	l/m
1-1/8	0.043	0.532
1-3/8	0.065	0.811
1-5/8	0.092	1.148

6.2 Water Quality Requirements

To safeguard the maximum lifetime of air/water heat exchangers, the water used for cooling purposes must meet the VGB Cooling Water Guidelines (VGB-R 455 P). The cooling water used must be soft enough to prevent deposits, but it must not be too soft because that would lead to corrosion of the heat exchanger.

Table 6.6 below , lists the most important impurities and measures for their removal.

Table 6.6 Water Impurity

Water Impurity or Condition	Corrective Method
Particles (dp < 0.3 mm)	Filter the water.
Excessive hardness	Soften the water by ion exchange.
Moderate level of particles and hardeners	Add dispersion or stabilization agents.

Table 6.6 Water Impurity (continued)

Water Impurity or Condition	Corrective Method
Moderate level of chemical impurities	Add deadening agents and inhibitors.
Biological impurities (bacteria and algae)	Add biocides.

Table 6.7 Hydrological Data

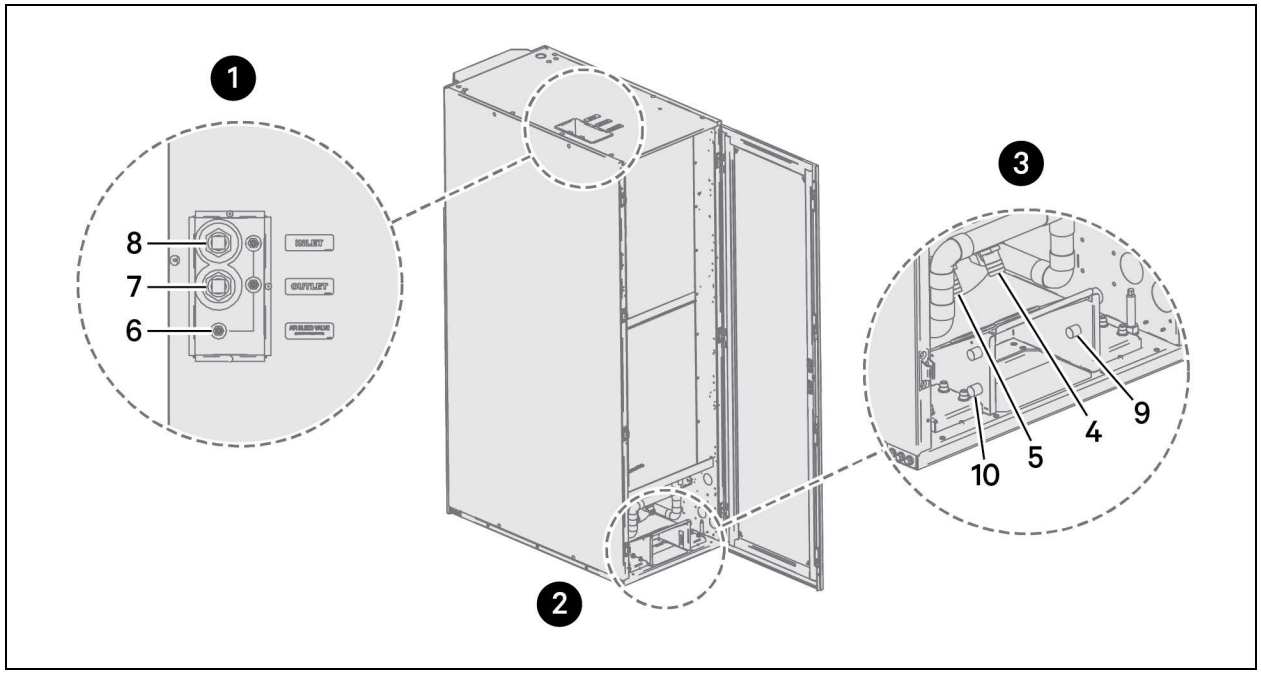
Hydrological Data	Recommended Purity Levels
pH values	(7 - 10,5)
Carbonate hardness	(3 - 8) °dH
Free carbon dioxide	(8 - 15) mg/dm3
Combined carbon dioxide	8 - 15mg/dm^3
Aggressive carbon dioxide	0mg/dm^3
Sulfides	< 10mg/dm^3
Oxygen	< 50mg/dm^3
Chloride ions	< 250mg/dm^3
Sulphate ions	< 10mg/dm^3
Nitrates and nitrites	< 7mg/dm^3
COB	< 5mg/dm^3
Ammonia	< 5mg/dm^3
Iron	< 0.2mg/dm^3
Manganese	< 0.2mg/dm^3
Conductivity	< 30S/cm
Solid residue from evaporation	< 500mg/dm^3
Potassium manganese consumption	< 25mg/dm^3
Suspended matter	< 3mg/dm^3
Partial Flow Cleaning Recommended	3 -15 mg/dm^3
Full Flow Cleaning	> 15mg/dm^3

6.3 Connecting the Closed Loop System

Depending on the connection location on the heat load unit, the Vertiv™ Liebert® XDU Liquid to Air Heat Exchanger for Chip Cooling offers top and bottom supply and return connections. See Figure 6.1 below .

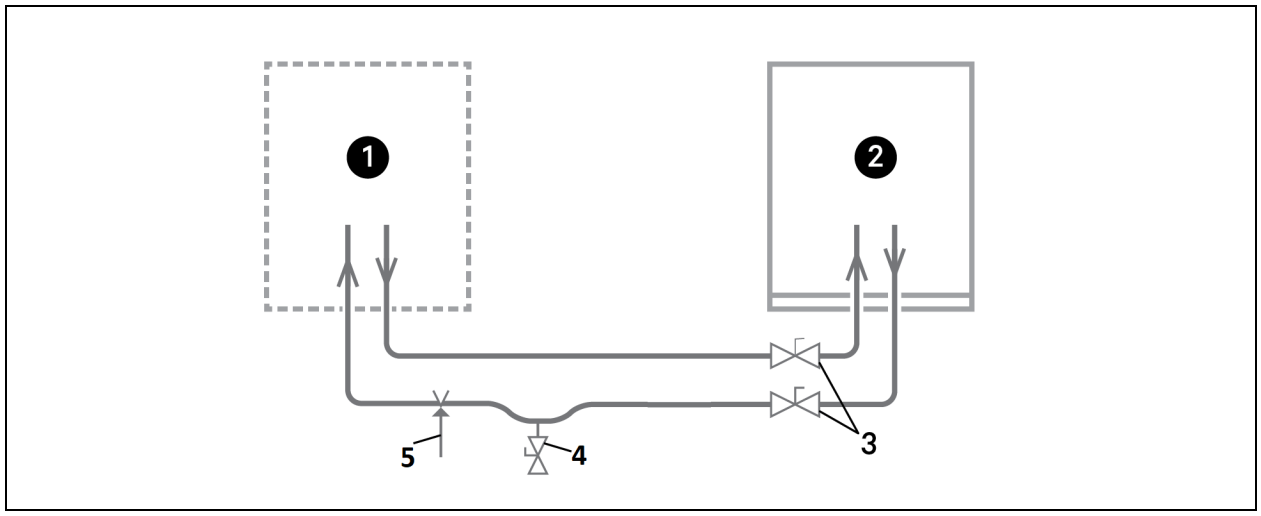
Figure 6.2 on the facing page , shows the general arrangement of the isolation valves and trap of the cooling fluid circuit on a bottom-connected system. A top-connected XDU Cooling System would use item 6 as a high point vent for the removal of air from the system.

Figure 6.1 Top and Bottom Connection Locations



Item	Description
1	Top connections
2	Rear of unit
3	Bottom connections
4	Bottom inlet (EFB)
5	Bottom outlet (LFB)
6	High point vent (air bleed valve)
7	Top outlet (LFT)
8	Top inlet (EFT)
9	Fill connection
10	Pressure ports

Figure 6.2 Components of Cooling Water Circuit



Item	Description
1	Heat load
2	XDU
3	Ball valve
4	Water drain tap (high point vent on bottom connected units)
5	Tubing support

6.4 Leak Check before Commission and Operation

NOTICE

Risk of leaking fluid. Can cause equipment damage and serious building damage. Check the cooling fluid system for leaks before commissioning. Check the fluid pipe connection to the heat exchanger for the first time, inspect the mechanical condition of the cooling fluid circuit and connections thoroughly.

To check for leaks:

1. Confirm that the flow directions of field installed components are correct.
2. Confirm that all isolating valves are open.
3. The fluid systems in the Vertiv™ Liebert® XDU is factory checked for leaks and may be shipped with an inert gas holding charge. At installation, check all fluid circuits for leaks.
4. Repair any leaks.

NOTE: We recommend isolating the unit with field installed shut-off valves during leak checking of field installed piping. When the units are included in a leak test, use of fluid for pressure testing is recommended. When pressurized gas is used for leak testing the unit, the maximum recommended pressure is 30 psig (207 kPa) and tightness of the unit would be verified by pressure decay over time (<2 psig/hour [13.8 kPa/hour]) or sensing a tracer gas with suitable instrumentation. Dry seals in fluid valves and pumps may not hold a high gas pressure.

6.5 Filling the System

The piping must be filled prior to operating the pumps to avoid damage to the pump and pump seals. The pump seals are cooled and hydrodynamically lubricated by the system fluid.

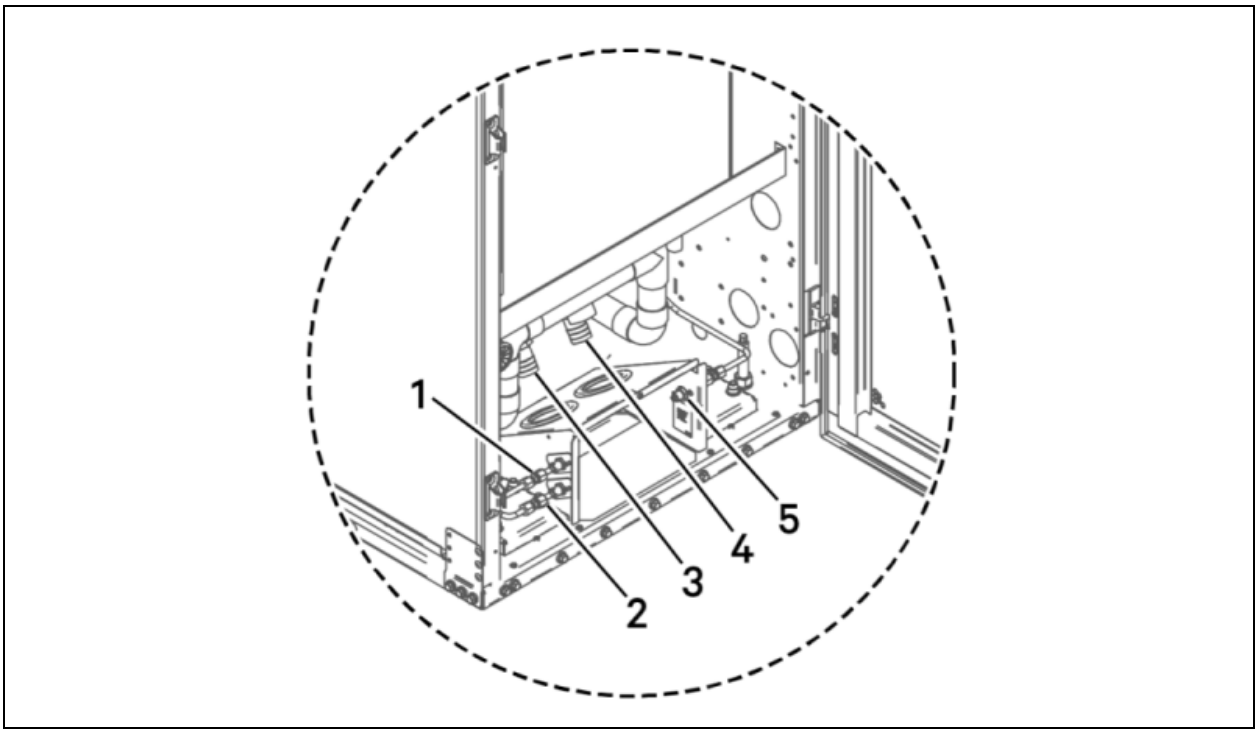
Charging and filling is done through an expansion tank fill valve located inside of the unit. A 1/4-inch SEA flare Schrader connection is provided inside of the rear door at the base of the unit. See Figure 6.3 below .

The fill valve will stop the flow of fill when the system pressure reaches the bladder pressure. The fill valve is also a check valve to prevent water from leaving the system when the fluid source is turned off. The expansion tank contains a bladder that is pre-charged to 12 psig and is ready for use without adjustment.

Bleeding the air from the system is accomplished through three 1/4-inch SEA connections on the top of the Vertiv™ Liebert® XDU. When filling, bleed air from the coil bleed connection nearest the back of the unit first, until a steady stream of fluid is observed. Bleed air from the remaining two connections as needed. See Figure 6.1 on page 26 . Units piped from the top supply and return connections will be bled from field provided connections at the highest point of the field piping system and not from the two connections adjacent to the top connections.

It is recommended to perform a preliminary flush with clean potable water to flush the XDU unit, field piping, and hose set prior to filling the unit for connection to the server load cabinet. This will prevent any install debris from plugging the small passages within the servers.

Figure 6.3 Fill Valve Location



Item	Description
1	System low pressure tap
2	System high pressure tap
3	Bottom supply connection to heat load

Item	Description
4	Bottom return connection from heat load
5	System fluid fill connection

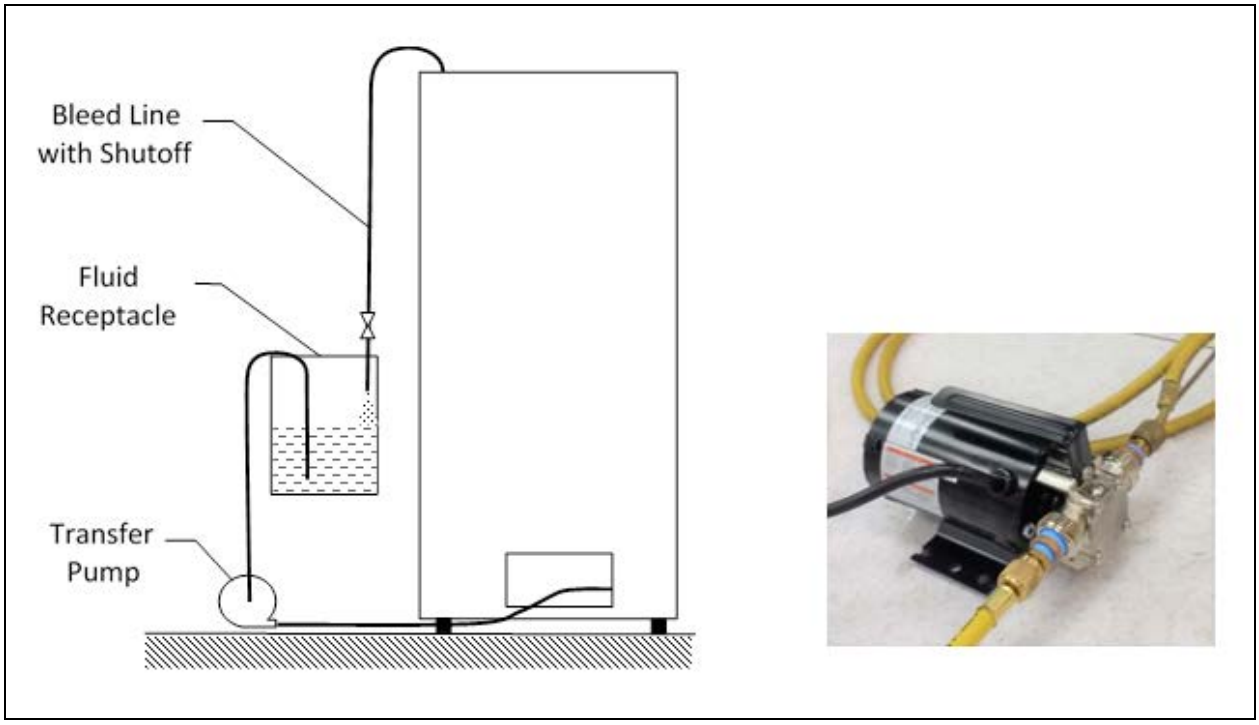
6.5.1 Fluid Fill Source

The fluid fill source for the system may be from a municipal utility source or pumped in manually or by use of a transfer pump from a portable fluid receptacle and provide 10-12 psig.

Guidelines:

- Pump should be capable of 15 psi (30 feet H2O) max head.
- Elevate the fluid receptacle above the pump to provide net positive suction head (NPSH) required by pump.
- Prime the pump and hoses to avoid pump damage and minimize the introduction of air to the system.
- Place free end of the bleed hose into the fluid receptacle to minimize loss of treated fluid.
- Follow transfer pump manufacturer's instructions for duty cycle, net positive suction head, and priming requirements.

Figure 6.4 Transfer Pump Fill General Arrangement



6.5.2 Flushing the Cooling System

To flush the unit and piping system:

1. Connect the load ends of the supply and return hoses together.
2. Fill the system as described in steps 2 through 6 of Filling the Complete System below .
3. Turn the Vertiv™ Liebert® XDU On and allow pumps to run for several minutes.
4. Turn the unit Off and relieve the system pressure from the bleed hose.
5. Disconnect the supply and return lines from step 1 and drain the water from the unit.
6. Clean and replace the element from the Y-strainer. See Checking and Cleaning the Strainer on page 43 .

NOTE: For Y-strainer location, see submittal Component Locations included in the .

6.5.3 Filling the Complete System

NOTE: The closed loop system must be completely installed and connected before filling the system. See Connecting the Closed Loop System on page 26 .

NOTE: Test the water quality when filling the system. See Water Quality Requirements on page 24 .

To fill the system:

1. Make connections to the heat load.
2. Open the rear door of the XDU.
3. Connect the water fill source to the fill valve and a drain hose to the high point vent at the top of the unit. See Figure 6.1 on page 26 and Figure 6.3 on page 28 .
4. Turn on the water fill source and allow to run until all of the air is purged from the hose connected to the high point vents. Failure to properly purge the air will result in pump cavitation and premature pump failure.
5. Remove the hose from the high point vents and allow the water fill source to run for about two minutes. The unit fill volume is listed in Fluid Volume for Unit and Connection Piping on page 23 .
6. Verify that the pump suction pressure (Vertiv™ Liebert® iCOM™ parameter XDU.065) is greater than 10 psi.
7. Remove the fill supply line, close the fan panel and quarter-turn screws. Replace the front panel by inserting tabs at the bottom into the slots and securing the top with the two screws.

It may be necessary to repeat the fill steps after the pump(s) have run to remove trapped air from the system.

6.5.4 Draining the System

Vertiv recommends storing decommissioned units in spaces with temperatures that are above freezing in order to prevent any remaining water from freezing in the unit.

Before moving the Vertiv™ Liebert® XDU, drain the fluid from the system through the customer connection points at the bottom of the unit. Additionally, drain water from both pumps via the drain port located at the bottom of each pump housing.

NOTICE

Risk of piping system corrosion and freezing fluids. Can cause leaks resulting in equipment and expensive building damage. Cooling coils, heat exchangers, and piping systems are at high risk of freezing and premature corrosion. Fluids in these systems must contain an inhibitor to prevent premature corrosion.

The system coolant fluid must be analyzed by a competent fluid treatment specialist before start up to establish the inhibitor level and evaluated at regularly scheduled intervals throughout the life of the system to determine the pattern of inhibitor depletion. The fluid complexity and variations of required treatment programs make it extremely important to obtain the advice of a competent and experienced fluid treatment specialist and follow a regularly scheduled coolant fluid system maintenance program.

Fluid chemistry varies greatly 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 coolant fluid used must be considered because some sources may contain corrosive elements that reduce the effectiveness of the inhibited formulation. Sediment deposits prevent the formation of a protective oxide layer on the inside of the coolant system components and piping. The coolant fluid must be treated and circulating through the system continuously to prevent the buildup of deposits and/or growth of bacteria. Proper inhibitor maintenance must be performed to prevent corrosion of the system.

Consult fluid manufacturer for testing and maintenance of inhibitors.

Commercial grade coolant fluid is generally less corrosive to the common metals of construction than water itself. It will, however, assume the corrosivity of the coolant fluid from which it is prepared and may become increasingly corrosive with use if not properly inhibited.

Vertiv recommends installing a monitored fluid detection system that is wired to activate the automatic closure of field installed coolant fluid supply and return shut-off valves to reduce the amount of coolant fluid leakage and consequential equipment and building damage. The shut-off valves must be sized to close off against the maximum coolant fluid system pressure in case of a catastrophic fluid leak.

7 Electrical Connections

WARNING! Arc flash and electric shock hazard. Open all local and remote electric power supply disconnect switches, verify with a voltmeter that power is Off, and wear appropriate, OSHA approved personal protective equipment (PPE) per NFPA 70E before working within the 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 controller 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 the controller. The factory supplied, optional disconnect switch is inside the unit. The line side of this switch 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 electric shock. Can cause equipment damage, injury, or death. Open all local and remote electric power supply disconnect switches and verify with a voltmeter that power is off before working within any electric connection enclosures. Service and maintenance work must be performed only by properly trained and qualified personnel and in accordance with applicable regulations and manufacturers' specifications. Opening or removing the covers to any equipment may expose personnel to lethal voltages within the unit even when it is apparently not operating and the input wiring is disconnected from the electrical source.

Before proceeding with the electrical connections, ensure that:

- All electrical components are undamaged.
- All terminal screws are tight.
- The supply voltage and frequency are as indicated on the unit.

NOTE: The serial tag on the 600-mm (24-inch) unit is on the inside of the display panel.

7.1 Power Supply Cable Connection Guidelines

- Connect the cable to the line inlet terminal board.
- Use the appropriate cable size for the current draw, supply voltage, and installation type.
- Protect the supply using a backup fuse or circuit breaker.
- Do not fit the supply cable in the raceways inside the unit's electric board—600 mm (24 inch) units.
- Use only multi-polar cables with sheath (CEI20-22).

7.2 Wiring Connection Guidelines

- Remote On/Off connections must be provided by the installer.
- The General Alarm terminals allow remote alarm signaling.

In case of short circuit, check the affected switch for sticking and replace it, if necessary.

7.3 Electrical Field Connections

The electrical connections are described in the submittal documents included in the Submittal Drawings on page 61 .

The following table lists the relevant documents by number and title.

Table 7.1 Electrical Field Connection Drawings

Document Number	Title
DPN004935	Electrical Field Connections Descriptions 60 kW, 600 mm (24 in.) Models

7.4 Protective Features of the Electronically Commutated (EC) Fans—All Models

The EC fans are protected against:

- Over temperature of electronics
- Over temperature of motor
- Locked rotor protection
- Short circuit at the motor output

When any of these failures occurs, the motor stops electronically, with no potential for separation, and the status relay is released.

The unit does not restart automatically. To reset the alarm, the power supply must be switched Off for 20 minutes once motor is at standstill.

- Input power under voltage detection:

  If the utility power falls below the trip value of the below table (typical value) for five seconds or longer, the motor is switched Off electronically, with no potential for separation, and the status relay is released.

  When the utility voltage returns to a correct value, the motor restarts automatically.

Unit Input Power	Fan Undervoltage Trip
208 VAC, 60 Hz	< 143 VAC
380 VAC, 60 Hz 380/415 VAC, 50 Hz	< 287 VAC

- Phase failure recognition:

  If one phase fails for five seconds or longer, the motor is switched Off electronically, with no potential for separation and the status relay is released.

  When all three phases return to correct values, the motor restarts automatically in 10 to 40 seconds.

The power supply for an external speed setting potentiometer is protected against short circuiting.

The motor is overload protected via motor current limitation.

8 Vertiv™ Liebert® XDU Start Up

WARNING! Risk of hair, clothing, and jewelry entanglement with high speed rotating fan blades. Can cause equipment damage, serious injury, or death. Keep hair, jewelry, and loose clothing secured and away from rotating fan blades during unit operation.

WARNING! Risk of contact with high speed rotating fan blades. Can cause serious injury or death. Open all local and remote electric power supply disconnect switches, verify with a voltmeter that power is off, and verify that all fan blades have stopped rotating before working in the unit cabinet or on the fan assembly. If control voltage is applied, the fan motor can restart without warning after a power failure. Do not operate the unit with any or all cabinet panels removed.

NOTICE

Risk of damage to pump and seals if operated without fluid in the system. Fill and bleed air from the fluid system before applying power to the unit.

To start the XDU:

1. Open all valves in the water circuit according to the instruction label attached to the valve.
2. Close main switch to apply power to the unit.

NOTE: The default setting for the Vertiv™ Liebert® iCOM™ control is for stand-alone operation. The stand-alone mode lets you turn on the unit by rotating the main switch on the electrical panel. The yellow LED on the iCOM display panel lights after the unit is turned on because electrical power is present.

If the LED does not light:

- Check the electrical panel power supply.
- Check the protection devices (for example, thermal switches).
- Check the fuses.

3. Check to ensure that there are no water leaks.
4. Check the supply voltage on all phases.
5. Start the unit by pressing the On/Off switch.
6. Check the amp draw of all components (see Electrical Connections on page 33).

8.1 Checks to Perform after Startup

Once the system is operating under load, check the various components as follows:

1. Verify that the fans are operating properly.
2. Ensure that the supply fluid temperature and flow are being controlled.
3. Record the following on the warranty inspection form (PSWI-8542-444CO)

    a. Fan and pump voltages and current draws.

    b. All air and fluid temperatures.

    c. Fluid entering and leaving pressures.

This page intentionally left blank

9 Troubleshooting

Unit Diagnostics below lists possible issues, probable causes, and corrective steps.

Table 9.1 Unit Diagnostics

Symptom	Possible Cause	Check or Remedy
Pump 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.
	Blown fuse	Check fuses to pump(s).
	Incorrect phase wiring	Check wiring phase.
Pump will not start or run	Flow meter not functioning	Check for defective flow meter or miswiring.
	VFD error	Check alarm history on unit for PUMP INVRTR FAIL.
	No enable signal	Check P1 and P2 relay closure and connections.
	No control signal	Check connections at T41 and T42 of VFD.
Pump noisy	Air in the system	Purge air from the high point vent on the top of the unit.
	Cavitation due to vapor in pump	Check for adequate charge in system, see Filling the System on page 28 .
	Worn motor bearings	Replace pump.
	Pump is rotating in reverse	Check wiring phase.
Pump suddenly stops	Loss of power	When power is restored, the XDU Liquid to Air Heat Exchanger for Chip Cooling automatically restarts.
	Clogged strainer/or impeller	Clean out debris.
Pipe rattle	Loose pipe connections	Check pipe connections.
Leaving water temperature high	Low fluid flow	Check alarm history for flow related alarms.
		Clean strainer.
		Check pressure drop of hose set and connected load.
		Check flow meter.
	Low air flow	Check alarm history for fan related alarms.
		Check for dirt and debris on coil.
	Room temperature too high	Reduce room temperature.
Evaporator Fans will not modulate from 100%	Fan control not properly set	Refer to the fan settings descriptions in the Vertiv™ *Liebert® iCOM™ Installer/User Guide* available at www.Vertiv.com.
		Contact Vertiv Technical Support.
Unit fans fail to start	Fan is faulty	Confirm rear door switches are made.
		Contact Vertiv Technical Support.
	Top or Bottom Fan Failure Alarm	Confirm line voltage is present at the fan.
		Contact Vertiv Technical Support.

Table 9.1 Unit Diagnostics (continued)

Symptom	Possible Cause	Check or Remedy
Local display is not operational, but unit operates	Local display cable disconnected	Connect cable.
	Local display cable damaged	Replace cable.
	Local display configuration lost	Contact Vertiv Technical Support.
Local display is not operational, and unit does not operate	Unit electrical supply is Off	Restore electrical supply.
	Unit main switch is Off	Switch On the unit.
	Control board supply issue	Contact Vertiv Technical Support.
	Control board issue	Contact Vertiv Technical Support.
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.
XDU Liquid to Air Heat Exchanger for Chip Cooling not making capacity	Air in the system	Check for adequate charge in system, see Filling the System on page 28 . Purge air from the high-point vent on the top of the unit
	Entering air temperature too high	Reduce entering air temperature.

10 Maintenance

10.1 Safety Instructions

All maintenance operations must strictly observe national, state, and local accident prevention regulations, especially the regulations concerning electrical systems, refrigerators, and manufacturing resources.

Air conditioning equipment maintenance may be performed only by authorized properly trained and qualified personnel.

To keep all warranties valid, the maintenance must adhere to the manufacturer's regulations.

WARNING! Arc flash and electric shock hazard. Open all local and remote electric power supply disconnect switches, verify with a voltmeter that power is Off, and wear appropriate, OSHA approved personal protective equipment (PPE) per NFPA 70E before working within the 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 controller 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 the controller. The factory supplied, optional disconnect switch is inside the unit. The line side of this switch 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 contact with high speed rotating fan blades. Can cause serious injury or death. Open all local and remote electric power supply disconnect switches, verify with a voltmeter that power is off, and verify that all fan blades have stopped rotating before working in the unit cabinet or on the fan assembly. If control voltage is applied, the fan motor can restart without warning after a power failure. Do not operate the unit with any or all cabinet panels removed.

CAUTION: Risk of contact with extremely hot and/or cold surfaces. Can cause injury. Verify that all components have reached a temperature that is safe for human contact or wear appropriate, OSHA approved PPE before working within the electric connection enclosures or unit cabinet. Perform maintenance only when the system is de-energized and component temperatures have become safe for human contact.

WARNING! Risk of hair, clothing, and jewelry entanglement with high speed rotating fan blades. Can cause equipment damage, serious injury, or death. Keep hair, jewelry, and loose clothing secured and away from rotating fan blades during unit operation.

NOTICE

Risk of improper maintenance. Can cause equipment damage.

All maintenance must be performed only by authorized, properly trained, and qualified personnel.

Ignoring safety instructions is dangerous. Soiled parts cause a loss of performance and, for switch or control devices, can lead to the breakdown of the unit performance and operation.

10.2 Fluid and Piping Maintenance

Maintaining the system fluid quality is required throughout the life of the system. Fluid and piping system maintenance schedules must be established and performed. A coolant fluid maintenance program must be established that will evaluate fluid chemistry and apply necessary treatment. The complexity of water condition problems and the variations of required treatment programs make it extremely important to obtain the advice of a competent and experienced water treatment specialist and follow a regularly scheduled coolant fluid system maintenance program.

Perform periodic inspections of the heat exchanger and coolant fluid piping system for leaks and visible damage.

10.3 Spare Parts

Only original spare parts made by Vertiv must be used. Using third-party material will invalidate the warranty. When seeking technical assistance, always refer to the component list supplied with the equipment, and specify the model number, serial number and, if available, the part number.

NOTE: When replacing a faulty component, follow the relevant manufacturer instructions.

NOTE: When the spare parts must be brazed, be careful not to damage the internal parts (gaskets, seals, O-rings, etc.).

10.4 Maintenance Schedule

Conduct monthly, quarterly, biannual, and annual checks according to the following guidelines.

All tasks and time periods listed here are the manufacturers' regulations and must be documented in an inspection report.

Table 10.1 Maintenance Schedule

Component		Maintenance Period			
		Monthly By User	Every 3 Months	Every 6 Months	Annually
General	Check unit display for clogged-filter warning.	X			
	Check for irregular noise from unit fans.	X			
	Check and clean strainer.			X	
Blowers	Verify impellers move freely.		X		
	Check bearings.			X	
	Check motor mounts for tightness.			X	
	Check fan safety switch.				X
Electrical/Electronics	Check condition of contacts.			X	
	Check electrical connections.				X
	Check operation of controller.			X	
	Check unit operation sequence.			X	
Pumps	Check for irregular noise from the pumps.		X		
	Check for leaks of the pump casing and seals.	X			
	Check motor mounts for tightness.				X

10.5 Fan Replacement

10.5.1 Replacing a Fan in 600-mm (24-Inch) Models

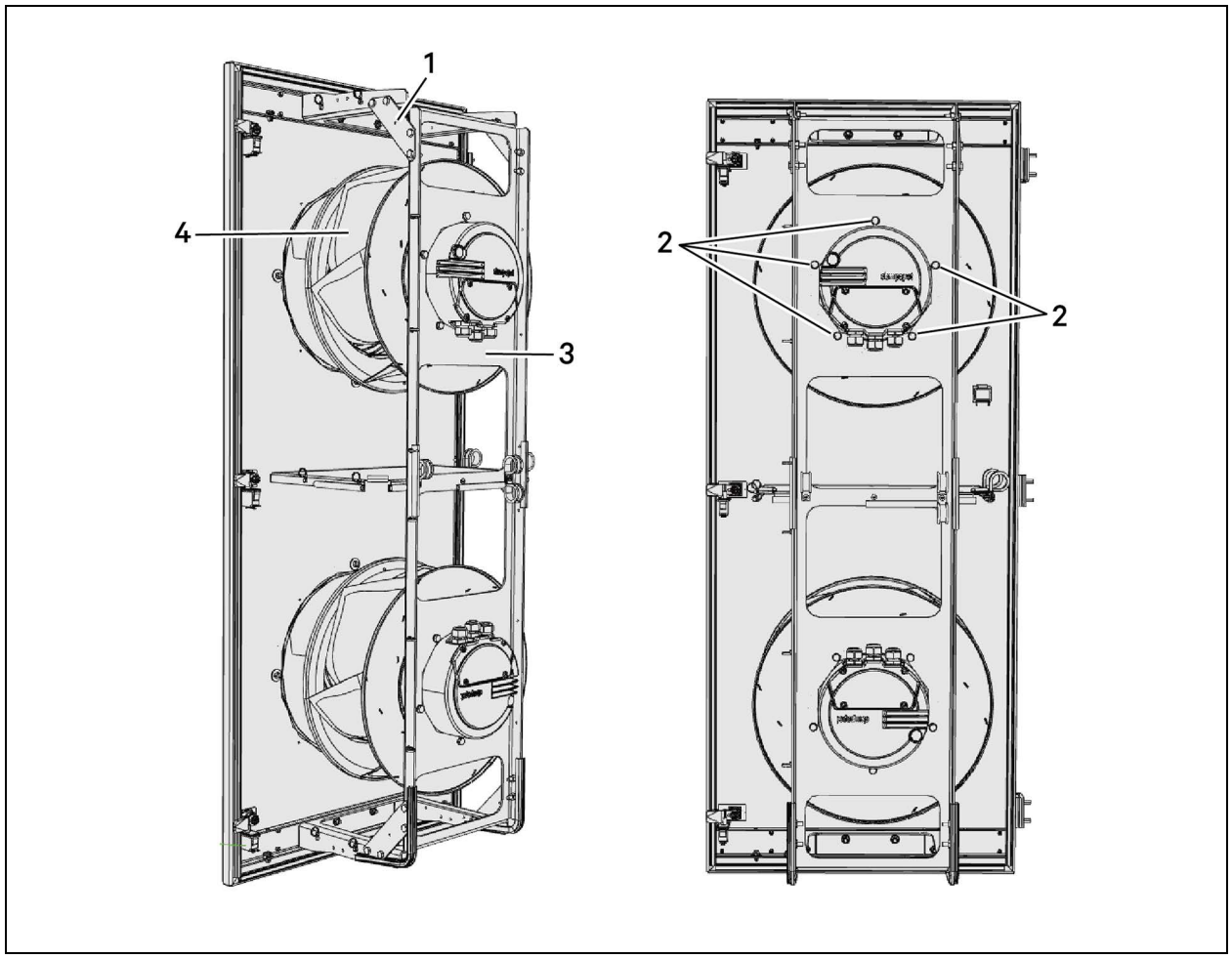
WARNING! Risk of contact with high speed rotating fan blades. Can cause serious injury or death. Open all local and remote electric power supply disconnect switches, verify with a voltmeter that power is off, and verify that all fan blades have stopped rotating before working in the unit cabinet or on the fan assembly. If control voltage is applied, the fan motor can restart without warning after a power failure. Do not operate the unit with any or all cabinet panels removed.

To replace the fan:

1. Shut off all power to the unit by opening the main disconnect switch on the electrical panel on the front of the Vertiv™ Liebert® XDU.
2. Remove the lower front panel.
3. Open the panel assembly that contains the fans, using the quarter-turn latches.
4. Disconnect the fan's power connections in the electrical junction box.
5. Remove the fan frame assembly by removing the four bolts from the corner braces at each corner.
6. Set the fan assembly in a work area.
7. Remove the four bolts that attach the fan to be replaced to the frame assembly.
8. Reverse the steps to install the replacement fan.

Refer to Figure 10.1 on the next page for the fan-assembly components.

Figure 10.1 Fan Assembly Components—600-mm (24-Inch) Models

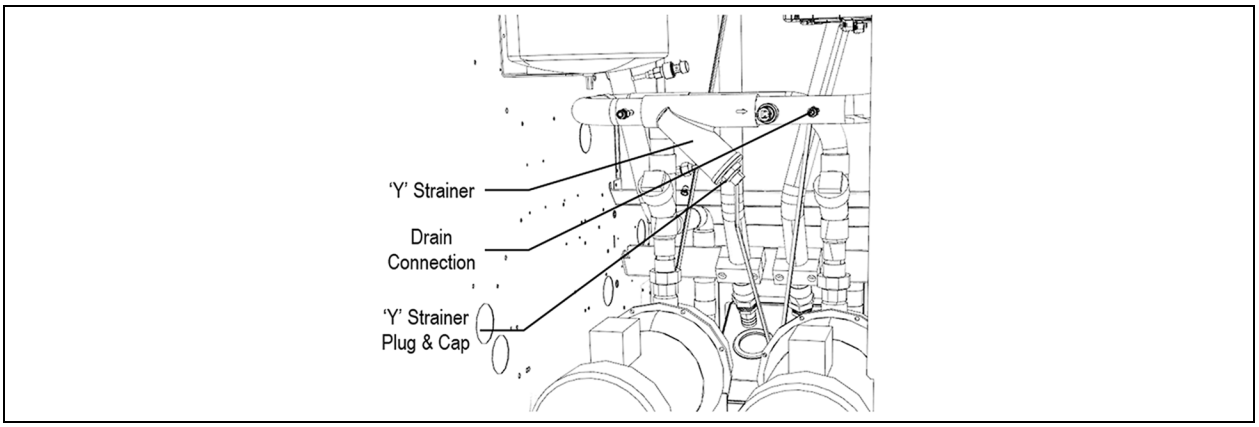


Item	Description
1	Corner brace with four bolts
2	Bolts, five around fan
3	Mounting plate
4	Fan

10.6 Checking and Cleaning the Strainer

The Y-strainer in the Vertiv™ Liebert® XDU will require cleaning after the flush of the initial fill and may require periodic cleaning throughout the service life. The strainer is located above the pumps in the base of the unit and is accessed through the fan door at the front of the unit. Schrader connections on either side of the Y-strainer may be used to drain the unit.

Figure 10.2 Y-Strainer Location



NOTE: The XDU must be shut down to remove and clean the Y-strainer. This will stop cooling of the connected load. Take all necessary steps to prevent damage to the load.

NOTE: The XDU fluid system may be under pressure. Relieve pressure prior to servicing the Y-strainer.

To access and clean Y-strainer:

1. Turn the XDU Off.
2. Disconnect the supply and return lines/hoses from the load.
3. With the free end in a bucket, connect a hose to the Schrader downstream of the strainer to relieve pressure and drain the fluid from the unit.
4. Remove the plug from the strainer to remove fluid from the strainer.
5. Remove the strainer cap and gently remove the strainer element.
6. Rinse any debris from the strainer element using clean water or fluid.
7. Inspect screen and cover gasket for damage. If either is damaged, replace. Always ensure there is a spare gasket and screen on hand prior to maintenance.
8. Remove any debris or sludge from within the strainer.
9. Replace cleaned or new screen into its original position, ensuring it is squarely positioned on the screen seat.
10. Replace cover gasket and cap or cover. Tighten cap or cover to specified torque rating.
11. Fill the system as described in Filling the Complete System on page 30 .

10.7 Flow Sensor

WARNING! Arc flash and electric shock hazard. Open all local and remote electric power supply disconnect switches, verify with a voltmeter that power is Off, and wear appropriate, OSHA approved personal protective equipment (PPE) per NFPA 70E before working within the 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 controller 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 the controller. The factory supplied, optional disconnect switch is inside the unit. The line side of this switch 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 contact with high speed rotating fan blades. Can cause serious injury or death. Open all local and remote electric power supply disconnect switches, verify with a voltmeter that power is off, and verify that all fan blades have stopped rotating before working in the unit cabinet or on the fan assembly. If control voltage is applied, the fan motor can restart without warning after a power failure. Do not operate the unit with any or all cabinet panels removed.

Fluid flow is sensed and reported to the unit control by an ultrasonic flow sensor. The sensor is clamped to the unit piping without penetrating the pipe or obstructing the flow.

To replace the flow sensor:

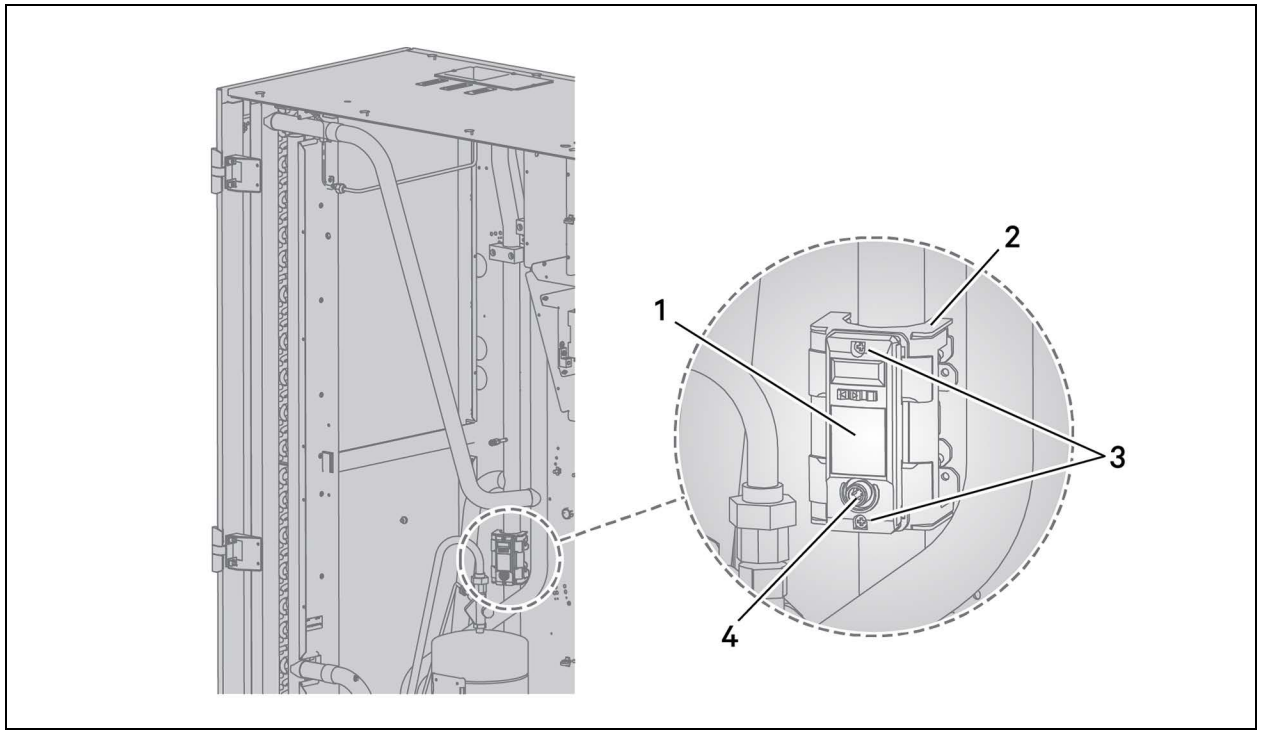
1. Shut off all power to the unit by opening the main disconnect switch on the electrical panel on the front of the Vertiv™ Liebert® XDU.
2. Open the display door and remove the high voltage deadfront.
3. Remove the six fan fuses.
4. Remove the two screws from the top of the lower front panel. Remove the panel and set aside.
5. Open the fan panel assembly using the quarter-turn latches.
6. Disconnect the flow sensor cable.
7. Unscrew the two sensor mounting screws and remove the sensor.
8. Attach the sensor cable to the new flow sensor.
9. Replace the electric panel deadfront and restore power to the unit.
10. Program the flow sensor quick setting code and parameters using the instructions provided with the sensor. (See Figure 10.3 on the facing page)
11. Shut off all power to the unit by opening the main disconnect switch on the electrical panel on the front of the Liebert® XDU.
12. Disconnect the flow sensor cable.
13. Attach the new flow sensor to the mounting bracket with the two screws.
14. Attach the sensor cable to the flow sensor.
15. Re-install the six fan fuses.
16. Replace the electrical panel deadfront.
17. Close the fan panel assembly using the quarter-turn latches.
18. Replace the lower front panel and secure with the two screws in the top edge of the panel.

19. Restore power to the unit and close the display door.

Quick Code and Parameter Settings:

Quick setting code	7003 0200
Response time	0.5 seconds
Analog output lower limit	0 lpm
Analog output upper limit	115 lpm

Figure 10.3 Flow Sensor Display



Item	Description
1	Flow sensor
2	Mounting bracket
3	Mounting screws
4	Cable connection

10.7.1 Setting the Flow Sensor for the Vertiv™ Liebert® XDU

The Vertiv™ Liebert® XDU flow sensor monitors the flow of fluid in the system and provides the data to the Vertiv™ Liebert® iCOM™ control of the unit. To provide the correct information it is important that the sensor setup is correct.

The sections below provide the process for verifying the current setting, resetting the manufacture's default settings, and setting the Vertiv settings for proper operation. The flow sensor code sets all but one of the parameters required for proper communication to the iCOM. The analog upper limit must be manually set.

Setting the Flow Sensor Code

To set the XDU flow sensor code from the default screen (If the default "P-n nPn" screen does not show, see reset factory settings.)

1. Press the Enter, Up Arrow and Down Arrow buttons briefly and at the same time. See Figure 10.4 below .
2. Press the Up Arrow or the Down Arrow to select "YES", then press Enter.
3. Press the Up Arrow to set "7" as the first digit. Press Enter X 3 to the fourth location.
4. Press the Up Arrow to set "3" as the fourth digit. Press Enter X 2 to the sixth location.
5. Press the Up Arrow to set "2" as the fourth digit. Press Enter and hold until "CodE oK" is displayed.

Code Verification

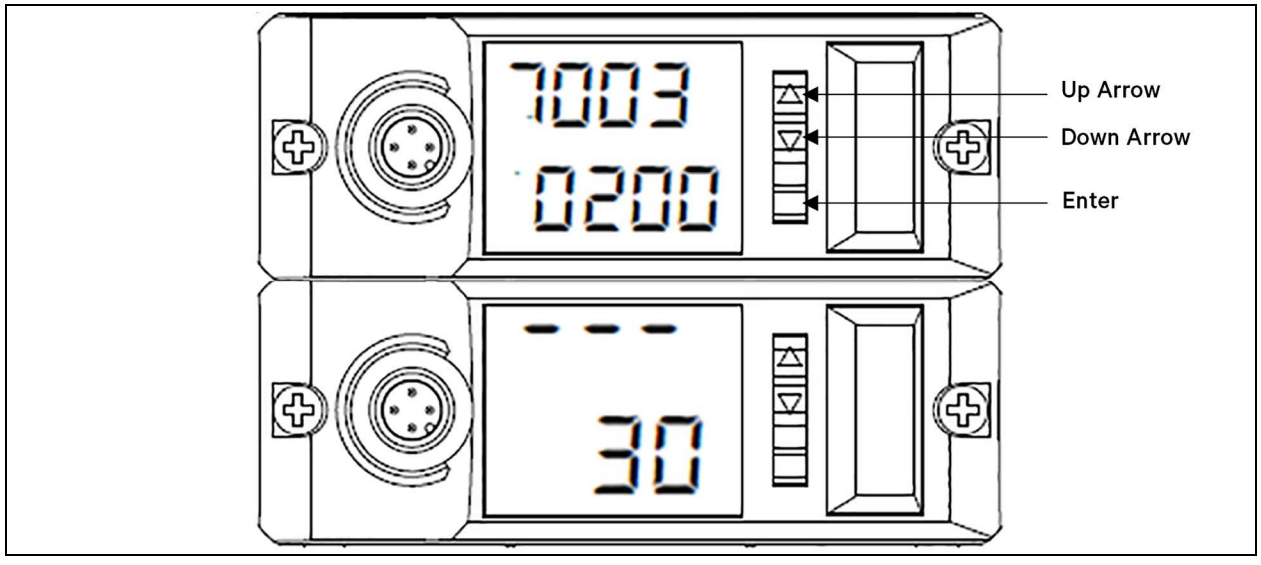
To verify the sensor code setting:

1. Press the Enter, the Up Arrow and Down Arrow buttons briefly and at the same time. See Figure 10.4 below .
2. Set code is displayed, verify 7003

   0200
3. Press Enter and the display returns to "- - - 30".

   If the code is not correct, restore the factory code.

Figure 10.4 Flow Sensor



Factory Code Reset

If the code verified above is not correct reset the sensor as indicated below.

1. Press and hold the Enter button while pressing the Up Arrow X 5.
2. Press the Up Arrow or the Down Arrow button to select “YES”. Press Enter.
3. Return to Setting the Flow Sensor Code on the previous page .

Setting the Analog Upper Limit “A – Hi”

1. Press Enter and hold until screen displays “out 1 Std”.
2. Press Enter X 4 to “A-Hi”.
3. Press the Up Arrow or the Down Arrow to select “115”.
4. Press Enter X 4 to complete.

What the Code Sets

The below table values are set by the code.

Entry	Description	Value
A	Selecting NPN/PNP	NPN
B	Selecting ch.2 function	ANLG
C	Flow direction	L to R
D	Selecting bore diameter of pipe	1-1/4"
E	Correcting the flow rate value	OFF
F	Selecting unit	L
1	Output 1 detection mode	STD
2	Output 1 output logic	N.O.
3	Response time	0.5s
4	Integrated flow unit	1
5	Output 2 detection mode	STD
6	Output 2 output logic	N.O.
7	Selecting input function	RSET
8	Analog output current	4-20mA
11	Display resolution	1
15	Display indicator illumination mode	GRN
16	Power-saving mode	OFF
19	Key lock method	STD
-	Schedule	SGP
_	Span	100

Table Entry column values correspond to flow sensor manufacturer's instruction manual for the flow sensor (KEYENCE FD-Q Series).

Manually Set Parameter(s)

The below table value(s) must be set by manually navigating the sensor menu. See Setting the Analog Upper Limit “A – Hi” on the previous page .

Entry	Description	Value
10	Analog output upper limit	115
Table Entry column values correspond to flow sensor manufacturer’s instruction manual for the flow sensor (KEYENCE FD-Q Series).		

11 Preventive Maintenance Worksheet

Source: DPN002955, Rev. 2

Inspection Date		Job Name	
Indoor Unit Model #		Indoor Unit Serial Number #	
Room Temperature/Humidity	°	%	
Cooling Module #			

Good maintenance practices are essential to minimizing operation cost and maximizing product life. Read and follow all applicable maintenance checks listed below. At a minimum these checks should be performed semi-annually. However, maintenance intervals may need to be more frequent based on site-specific conditions. Review the unit user manual for further information on unit operation. Vertiv recommends the use of trained and authorized service personnel, extended service contracts, and factory certified replacement parts. Contact your local Vertiv Representative for more details.

Cabinet and Coil

1. Wipe inlet and out grills clean.
2. Wipe fans and fan inlets clean.
3. Verify coil is clean.

Electrical Panel

1. Check fuses.
2. Check/re-torque wire connections.

Controls

1. Check/verify control operation (sequence).
2. Check/test changeover devices (if equipped).
3. Check/test water detection devices (if equipped).

Pump

1. Check for pump motor bearing noise.
2. Verify pump suction pressure is above 10 ps.

   Suction: _____

3. Pump amp draw

#1	L1		L2	L3
#2	L1		L2	L3

4. Verify pump changeover (if multiple pumps).

Fans

1. Ensure mounting bolts are tight.
2. Verify fan guard bolts are tight.
3. Make sure Impeller spins freely.
4. Verify fan safety switch (door switch).
5. Check fan amp draw.

#1	L1	L2	L3
#2	L1	L2	L3

Other

1. Verify expansion tank air pressure is above 10 psi.
2. Verify proper water maintenance is being performed.
3. Check for water leaks.
4. Compare pump and fan amps to nameplate amps.

MAINTENANCE NOTES

Name

Signature

Company

Make photocopies for your records. Compare readings/information to previous maintenance worksheet.

To locate your local Vertiv representative for Vertiv engineered parts, check https://www.Vertiv.com/en-us/support/ or Call 1-800-222-5877.

This page intentionally left blank

Appendices

Appendix A: Technical Support and Contacts

A.1 Technical Support/Service in the United States

Vertiv Group Corporation

24x7 dispatch of technicians for all products.

1-800-543-2378

Liebert® Thermal Management Products

1-800-543-2778

Liebert® Channel Products

1-800-222-5877

Liebert® AC and DC Power Products

1-800-543-2378

A.2 Locations

United States

Vertiv Headquarters

1050 Dearborn Drive

Columbus, OH, 43085, USA

Europe

Via Leonardo Da Vinci 8 Zona Industriale Tognana

35028 Piove Di Sacco (PD) Italy

Asia

7/F, Dah Sing Financial Centre

3108 Gloucester Road

Wanchai, Hong Kong

This page intentionally left blank

Appendix B: Performance Curves

Figure B.1 Vertiv™ Liebert® XDU Performance Test Results—45°C (113°F) LFT

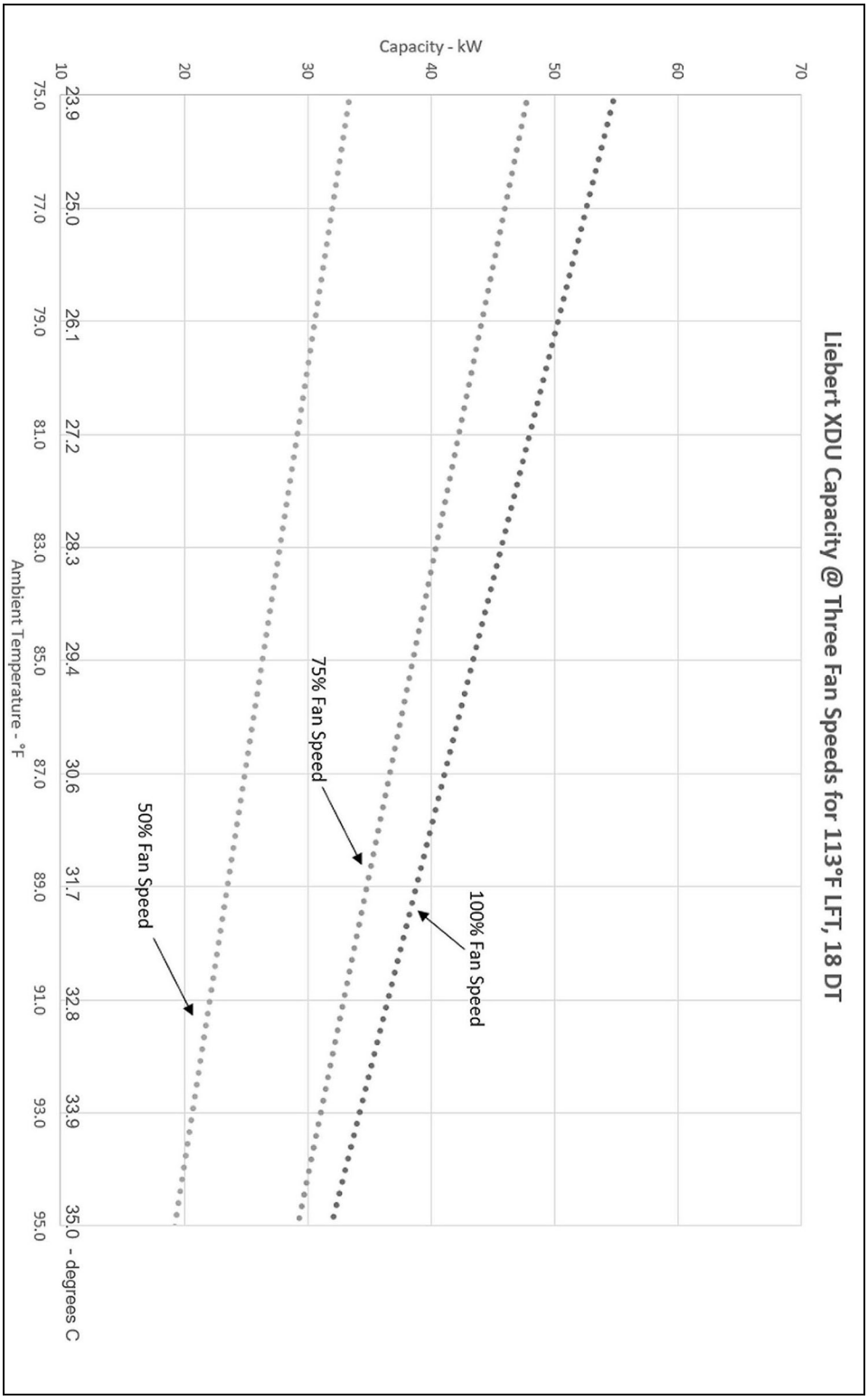


Figure B.2 Vertiv™ Liebert® XDU Performance Test Results—50°C (122°F) LFT

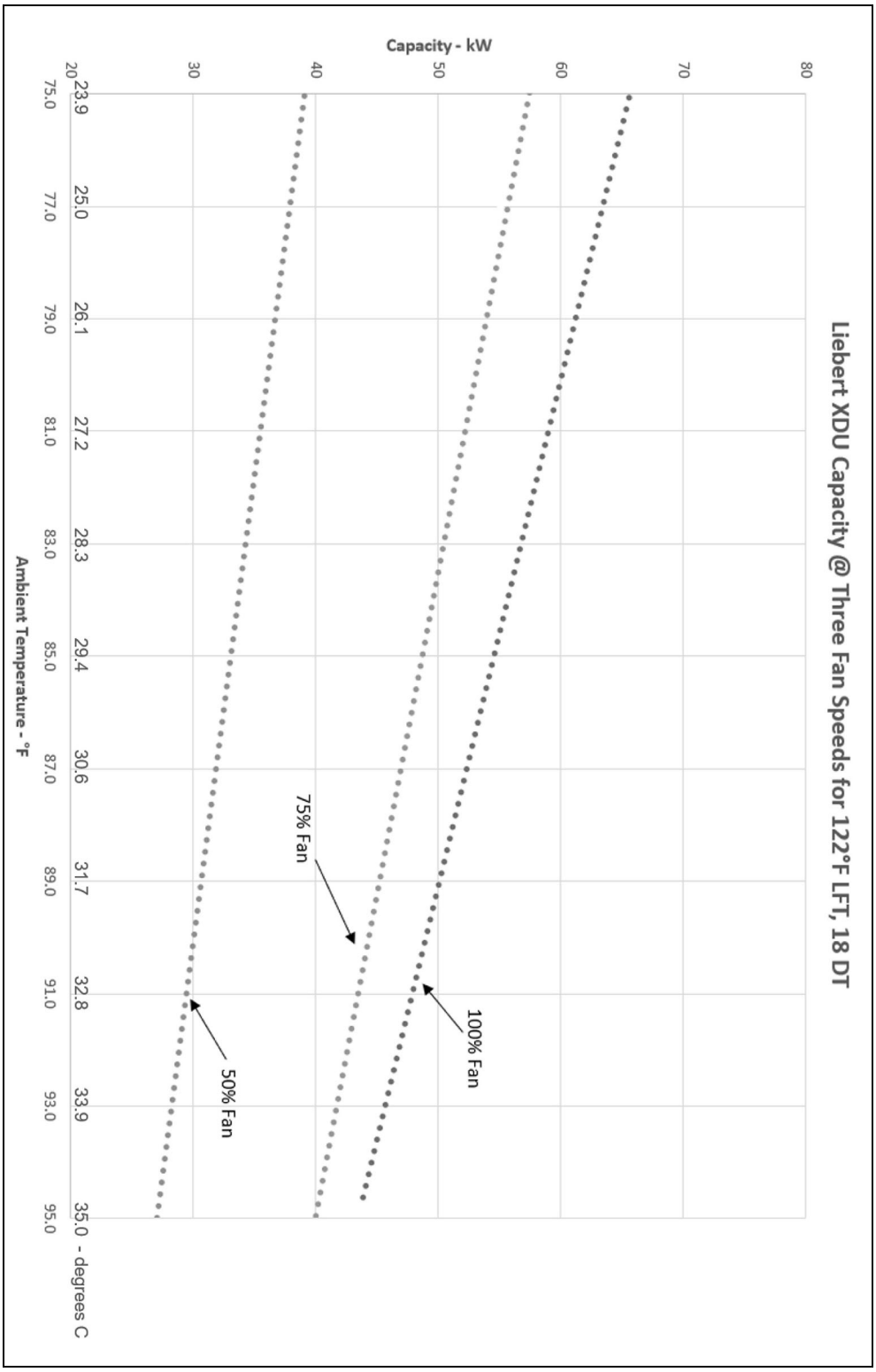
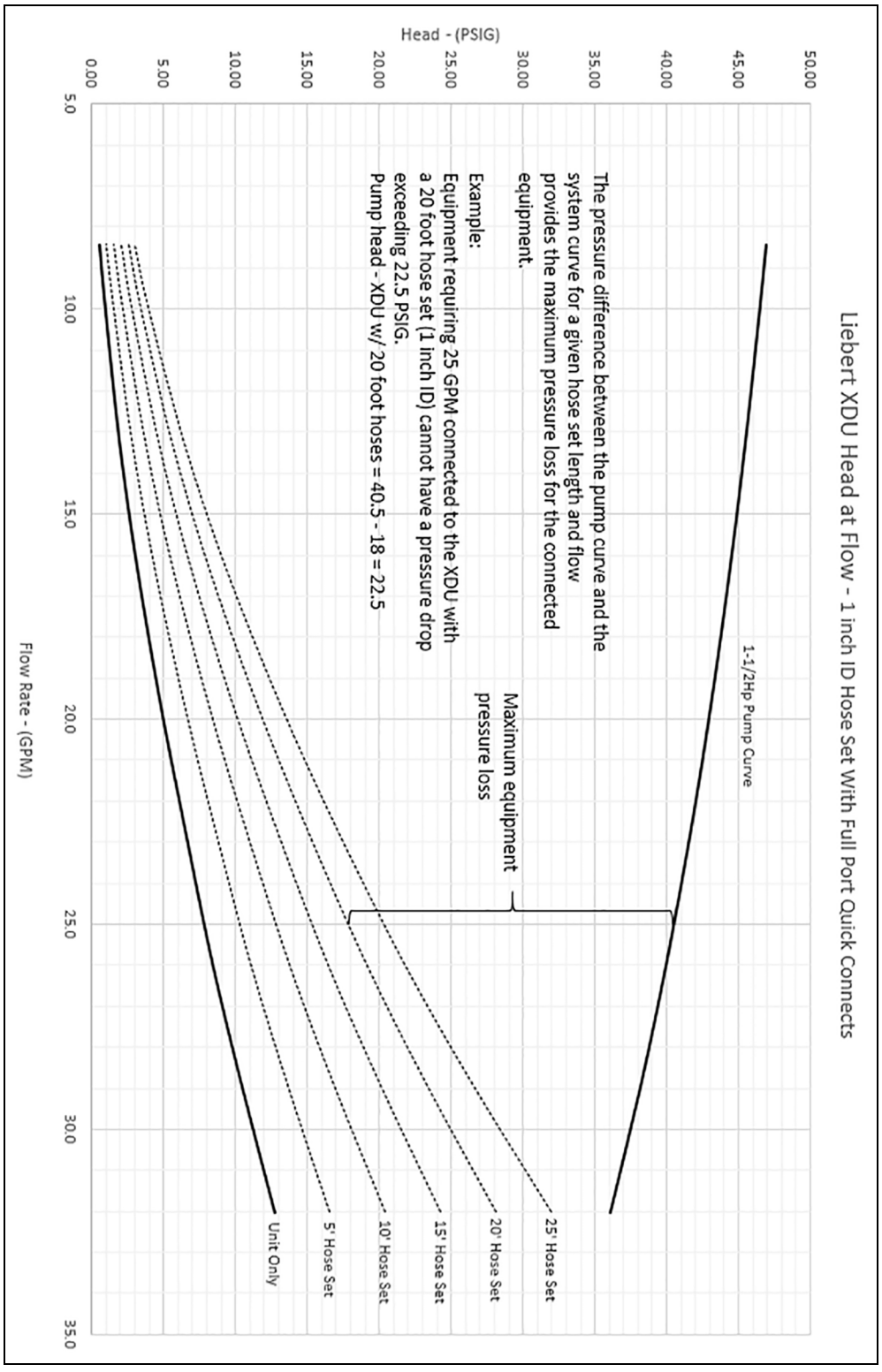


Figure B.3 Vertiv™ Liebert® XDU Flow Test Results



This page intentionally left blank

Appendix C: Technical Specifications

Table C.1 Technical Specifications

Physical Data	
Dimensions	23.6 in. X 45.7 in. X 78.7 in. (600 mm X 1162 mm X 2000 mm)
Weight =/- 5%	Dry 796 lbs. (361 kg), Wet 847 lbs. (384 kg)
Output Capacity	
Maximum Power	3.0 kW (at 100% fan speed)
Nominal Power	1.3 kW (at 50% fan speed)
Performance Data—at 113°F (45°C) Water Delivery and 75°F (24°C) Air Inlet	
Nominal cooling capacity	32.1 kW (at 50% fan speed)
Maximum cooling capacity	52.2 kW (at 100% fan speed)
Nominal fluid flow	12.2 USGPM (46.2 l/min.)
Maximum fluid flow	19.9 USGPM (46.2 l/min)
Nominal air flow	1663 CFM at 50% fan speed (2825 m3/h)
Maximum air flow	3325 CFM (5650 m3/h)
Performance Data—at 122°F (50°C) Water Delivery and 75°F (24°C) Air Inlet*	
Nominal cooling capacity	32.1 kW (at 50% fan speed)
Maximum cooling capacity	63.0 kW (at 100% fan speed)
Nominal fluid flow	14.4 USGPM (54.5 l/min.)
Maximum fluid flow	24.0 USGPM (90.8 l/min)
Nominal air flow	1663 CFM at 50% fan speed (2825 m3/h)
Maximum air flow	3325 CFM (5650 m3/h)
*Performance data was calculated with a 18°F (10°C) water side delta T.	
Additional Features	
Maximum equivalent distance from heat load	25 ft. (7.6m)
Filtration	50 micron filter
Liebert XDU water volume	6.2 gallons

Table C.2 Electrical Data

Voltage	XDU060ACW 208/3~/60	XDU060A2W 380/3~/60	XDU060AMW 380~415/3~/50
FLA	10.3	5.8	5.8
WSA	11.4	6.4	6.4
OPD	15	15	15
FLA = Full Load Amps; WSA = Wire Size Amps; OPD = Maximum Overcurrent Protection Device			

Table C.3 Operating Ranges

Operating Ranges	Minimum	Maximum
Ambient Temperature	Above freezing	104°F (40°C)
Fluid Temperature	Above freezing	150°F (65.6°C)
Fluid Pressure	8 psig (55 kPa)	100 psig (689 kPa)

Appendix D: Submittal Drawings

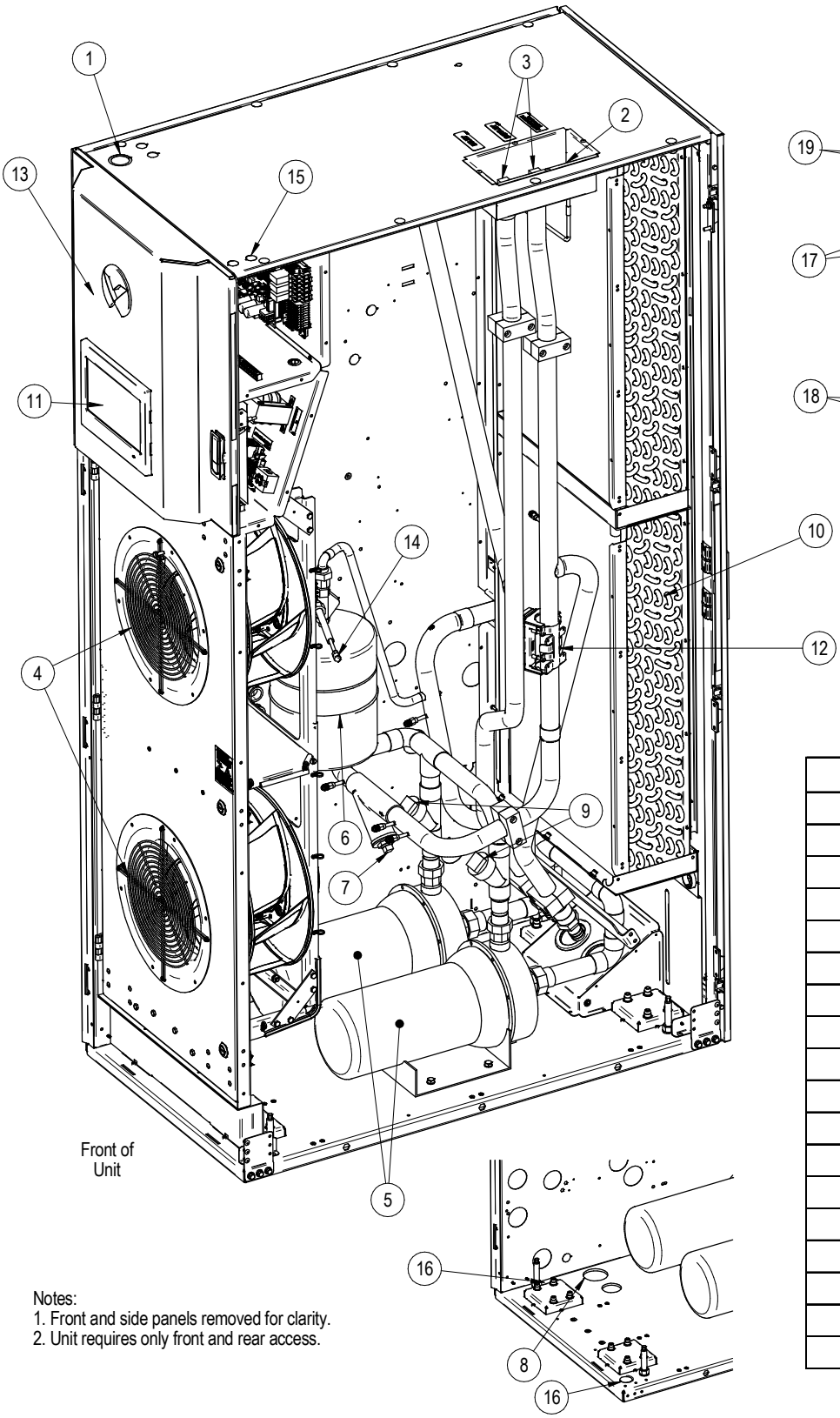
Table D.1 Submittal Drawings Contents

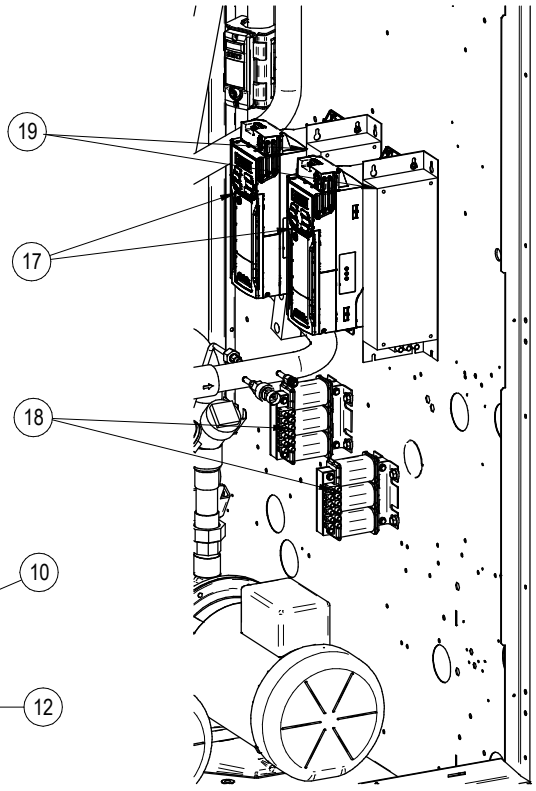
Document Number	Title
Component Locations	
DPN004931	Component Location Diagram Liquid to Air 60 kW, 600 mm (24 in.) Model
XDU Planning Dimensions	
DPN004930	Cabinet Dimensional Data Liquid to Air 60 kW, 600 mm (24 in.) Model
Floor Stand Planning Dimensions	
DPN004933	Floorstand Dimensional Data 600 mm (24 in.) Model
Piping Schematics	
DPN004928	Piping Arrangement, Liquid to Air 60 kW 600 mm (24 in.) Model
Piping Connections	
DPN004932	Primary Connection Locations Liquid to Air 60 kW, 600 mm (24 in.) Model
Electrical Connections	
DPN004935	Electrical Field Connections Descriptions 60 kW, 600 mm (24 in.) Models

This page intentionally left blank

LIEBERT® XDU

COMPONENT LOCATION DIAGRAM
LIQUID TO AIR 60kW, 600mm (24in.) MODEL





Front of Unit, Inside Fan Panel

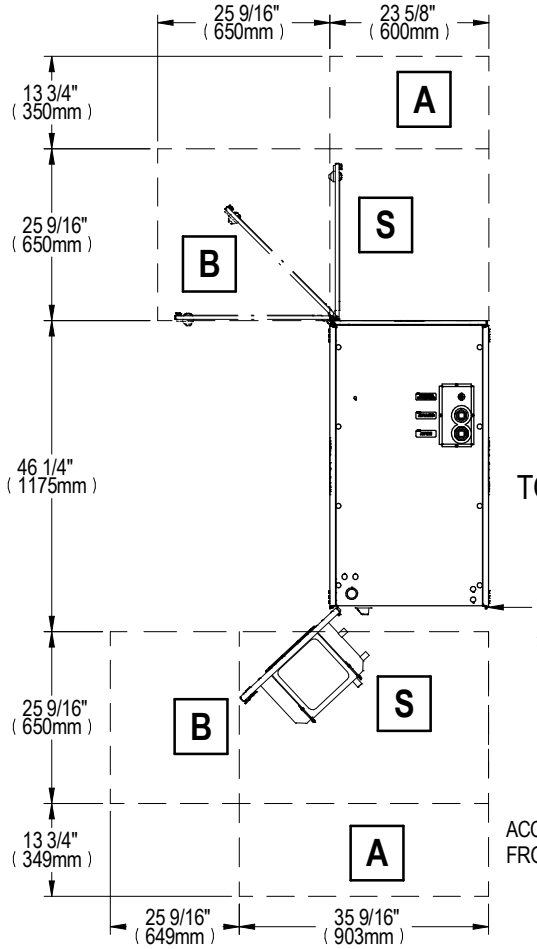
1	Top High Voltage Entrance
2	Air Bleed Valve
3	Top Supply & Return Connections
4	EC Plug Fans
5	Pump (qty 2)
6	Expansion Tank
7	Y-strainer
8	Bottom High Voltage Entrance
9	Check Valves
10	Fluid Coil
11	Liebert® iCOM™ Display
12	Fluid Flow Meter
13	Serial Tag (located inside door)
14	System Fluid Fill Line Connection
15	Top Low Voltage Entrance
16	Bottom Low Voltage Entrance
17	Variable Speed Drive
18	Line Reactor
19	EMI Filter (50Hz only)

Notes:
1. Front and side panels removed for clarity.
2. Unit requires only front and rear access.

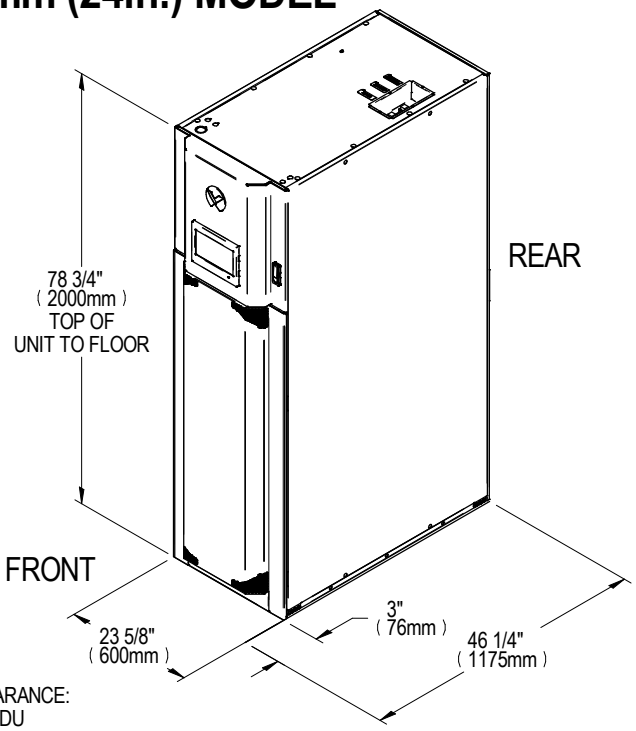
LIEBERT® XDU

CABINET DIMENSIONAL DATA
LIQUID TO AIR 60kW, 600mm (24in.) MODEL

ACCESS REQUIRED TO SERVICE THE XDU UNIT WITHIN THE ROW
REAR SERVICE AREA IS S+B OR S+A WHEN B IS NOT AVAILABLE



TOP VIEW

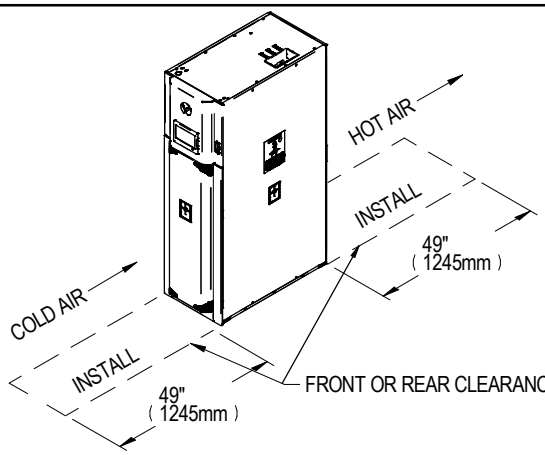


TO PROVIDE MAXIMUM SERVICE CLEARANCE: ALIGN THE FRONT CORNER OF THE XDU WITH THE FRONT CORNER OF NEIGHBORING SERVER RACKS.

NOTE: LIEBERT® iCOM™ DOOR AND PERFERATED AIR INLET PANEL REMOVED FOR CLARITY.

ACCESS REQUIRED TO SERVICE THE XDU UNIT WITHIN THE ROW
FRONT SERVICE AREA IS S+B OR S+A WHEN B IS NOT AVAILABLE

ACCESS REQUIRED FOR INSTALLATION OF THE XDU UNIT WITHIN THE ROW.

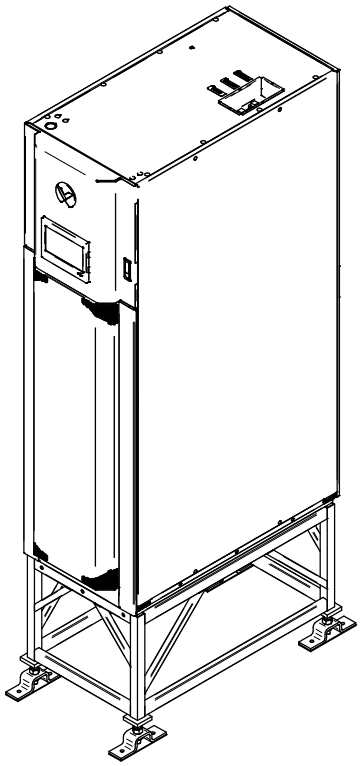


XDU060 UNIT WEIGHT ±5% - Lbs (kg)		
MODEL	DRY	OPERATING (WATER)
XDU060	796 (361)	847 (384)

All service and maintenance is performed through the front and rear of the unit; including any component removal. No side access is required All electrical and hose connections are made through the top and/or bottom of the unit. Bottom hose connections are made from the service access panel below the coil on the rear of the unit.

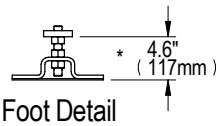
LIEBERT® XDU

FLOORSTAND DIMENSIONAL DATA
600mm (24in.) MODEL



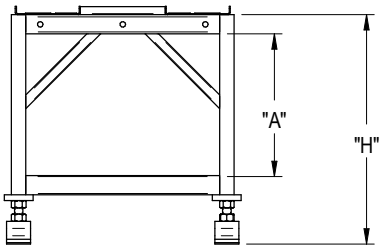
Notes:
1. To level the unit, lower the four stabilizing feet until they make contact with the floorstand.
2. DO NOT use this document for installation, see the XDU060 manual.

*NOMINAL	in (mm)		in (mm)	
	*H		*A	
12	12	305	8 3/4	222
18	18	457	14 3/4	375
24	24	610	20 3/4	527

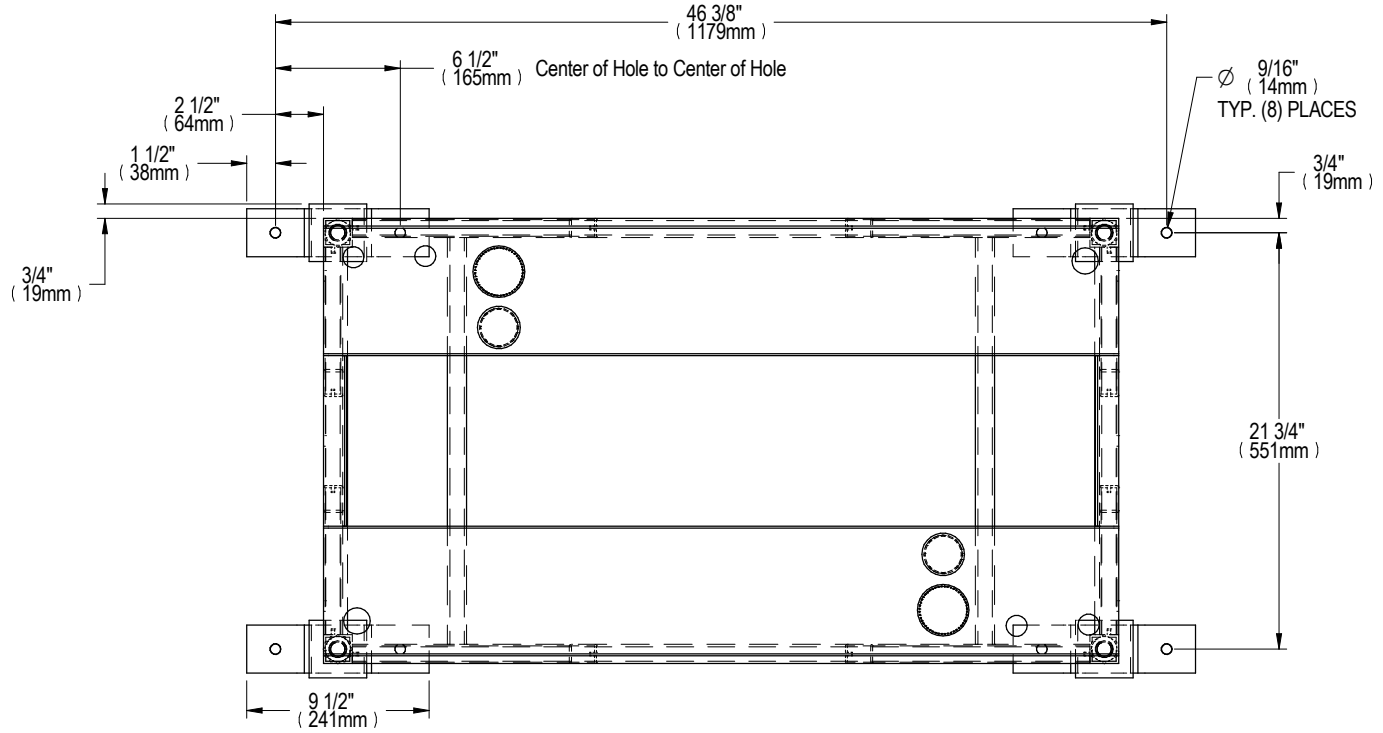


Foot Detail

* Foot provides ±0.25in (6.4mm) of adjustment from nominal height "H".



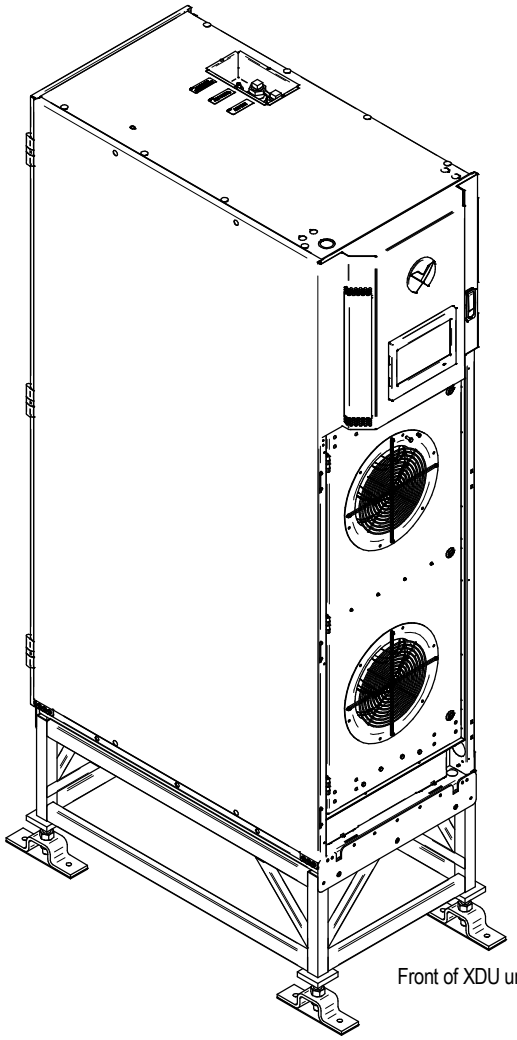
ISO VIEW OF UNIT ON FLOORSTAND



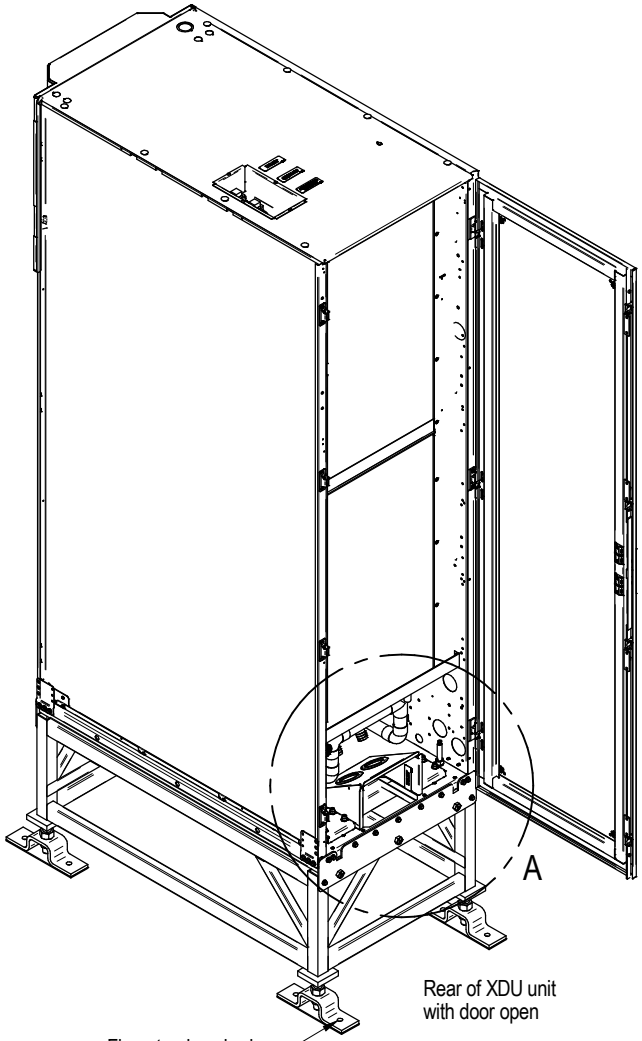
FLOORSTAND ANCHORING DIMENSIONS TOP VIEW

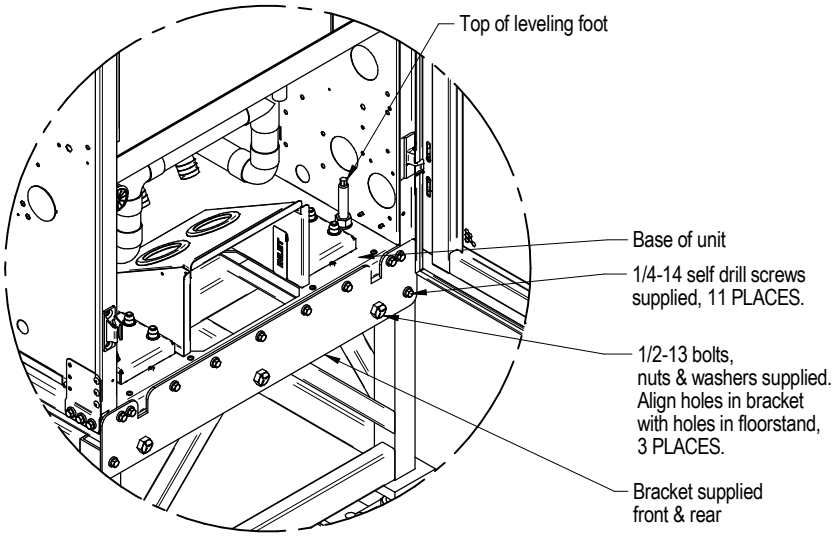
FLOORSTAND DIMENSIONAL DATA

600mm (24in.) MODEL



Front of XDU unit



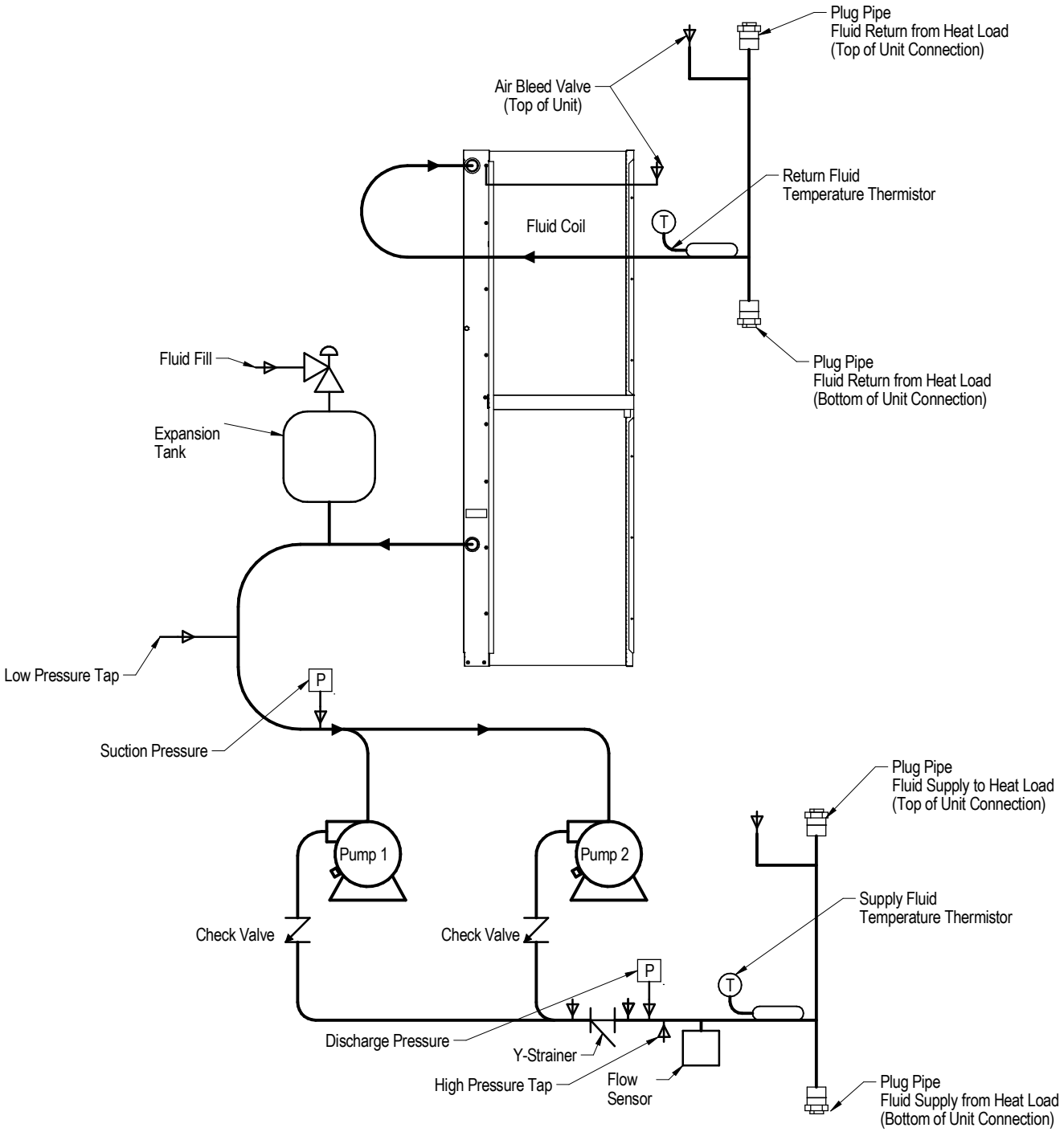


DETAIL A

Notes:
1.) To level the unit, lower the four stabilizing feet until they make contact with the floorstand. (SEE DETAIL "A")
2.) Anchor the bracket to the unit and the floorstand using the screws that are provided (SEE DETAIL "A").
3.) The same mounting bracket is used in the front and rear of the unit.
4.) This document is not to be used for field installation, see LIEBERT® XDU manual.

LIEBERT® XDU

GENERAL ARRANGEMENT DIAGRAM
LIQUID TO AIR 60kW, 600mm (24in.) MODEL

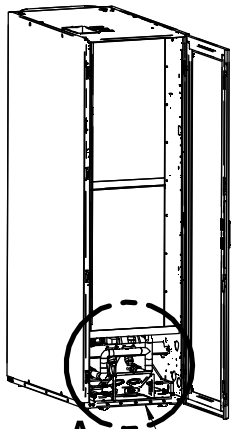


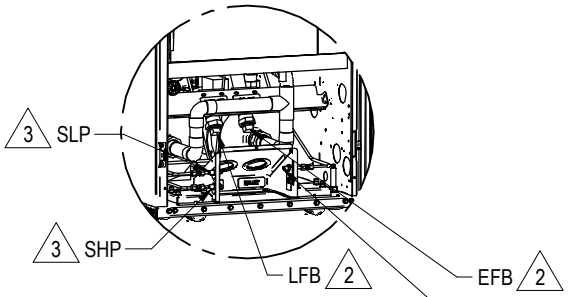
SERVICE / SCHRADER (ACCESS) CONNECTION WITH VALVE CORE.

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

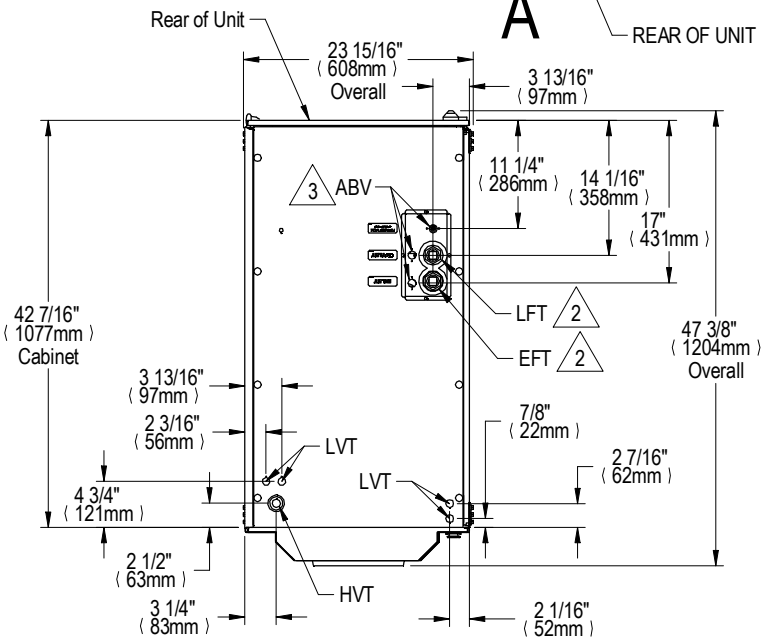
LIEBERT® XDU

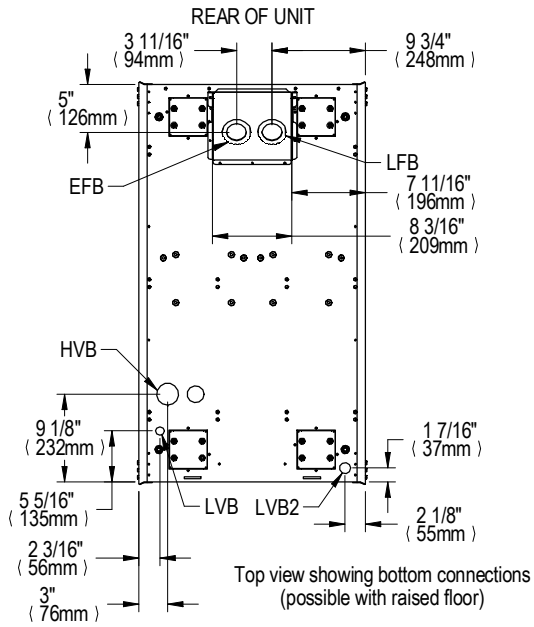
PRIMARY CONNECTION LOCATIONS
Liquid to Air 60kW, 600mm (24in.) MODEL





DETAIL A





Notes:
1. Piping and Electrical connections available through the top or bottom of the unit. not shown for clarity.
2. Top and bottom fluid connections are factory sealed using 1.00" (25mm) NPT plugs.
3. System pressure and fill taps are 1/4" SAE flare connections with schrader valve.

Unit Connections			
LFT	Top Supply Connection to Heat Load 2	LVT	Low Voltage Top Connection K.O. Ø7/8" (22mm) 4 places
LFB	Bottom Supply Connection to Heat Load 2		
EFT	Top Return Connection to Heat Load 2	LVB	Low Voltage Bottom Connection K.O. Ø7/8" (22mm)
EFB	Bottom Return Connection to Heat Load 2		
HVT	High Voltage Top Connection 1-3/8" (35mm) and 1-3/4" (45mm)	LVB2	Low Voltage Bottom Connection K.O. Ø1-3/8" (35mm)
HVB	High Voltage Bottom Connection 2-1/2" (64mm)	ABV	Air Bleed Valve 3
SLP	System Low Pressure Tap 3	FILL	System Fluid Fill Connection 3
SHP	System High Presseure Tap 3		

ELECTRICAL FIELD CONNECTIONS
60kW, 600mm (24in.) MODEL

STANDARD ELECTRICAL CONNECTIONS

1) **High voltage connection through bottom of electric panel** - 1-3/8" (35mm) & 1-3/4" (45mm) diameter concentric knockout.
2) **Low voltage connection through bottom of electric panel** – Quantity (2) 7/8" (22mm) diameter knockouts.
3) **High voltage connection through top of unit** – 1-3/8" (35mm) & 1-3/4" (45mm) diameter concentric knockout.
4) **Low voltage connection through top of unit** – Quantity (4) 7/8" (22mm) diameter knockouts.
5) **Three Phase Electrical Service** – Connect to terminals on disconnect switch. Three phase service not by Vertiv.
6) **Factory installed locking disconnect switch**
7) **Earth ground** – Terminal for field supplied earth grounding wire.
8) **Remote unit shutdown** – Replace existing jumper between terminals 37 & 38 with field supplied normally closed switch having a minimum 75VA, 24VAC rating. Use field supplied Class 1 wiring.
9) **Common alarm** – On any alarm, normally open dry contact is closed across terminals 75 & 76 for remote indication. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
10) **Base-comms cable – ethernet** – Cable provided by others for connection to the BMS. No special considerations are required when using Cat5e/Cat6 for connection between the unit and BMS which is not greater than 328ft (100m). If the 328ft (100m) must be exceeded, an active component will be required. For network lengths greater than 328ft (100m) call the Factory.
11) **RS485** – Cable provided by other connection to the BMS. No special considerations are required for connection between the unit and BMS which is not greater than 4000ft (1220m). If the 4000ft (1220m) must be exceeded, a repeater will be required.
12) **Cable must have the following specifications**:

Braided shield or foil shield with drain wire.

- Shield must be wired to ground at indoor unit.
- 22-18AWG stranded tinned copper
- Twisted pair (minimum 4 twists per foot)
- Low Capacitance (15pF/FT or less)
- Must be rated to meet local codes and conditions.
- EXAMPLES FOR RS485: BELDEN 89207 (PLENUM RATED), OR ALPHA WIRE 6454
- EXAMPLES FOR CATEGORY 5/6: CATEGORY 5, 5E, 6, OR HIGHER

Do not run in same conduit, raceway, or chase as high voltage wiring

ELECTRICAL FIELD CONNECTIONS
60kW, 600mm (24in.) MODEL

ELECTRICAL CONNECTIONS FOR OPTIONAL FEATURES

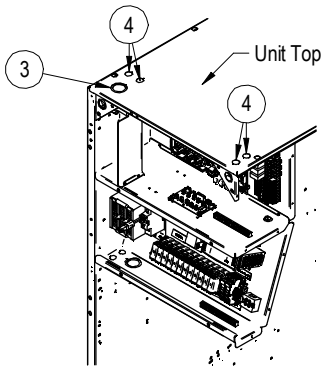
13) **Liebert® LiquiTect™ shutdown and dry contact** (available when optional Liebert® LiquiTect™ sensor is installed) **–** On Liebert® LiquiTect™ activation, normally open dry contact is closed across terminals 58 & 59 for remote indication. The Liebert® LiquiTect™ sensor notifies Liebert® iCOM™ of indication through terminals 60 & 61. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.

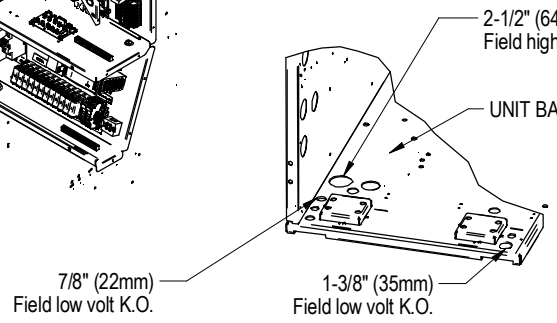
14) **Customer alarm inputs -** Terminals for field supplied, normally closed contacts, having a minimum 75VA, 24VAC rating, between terminals 24, 50, 51, 55, or 56. Use field supplied Class 1 wiring. The terminals are available for customer alarm inputs, such as; smoke sensors and building fire alarms.

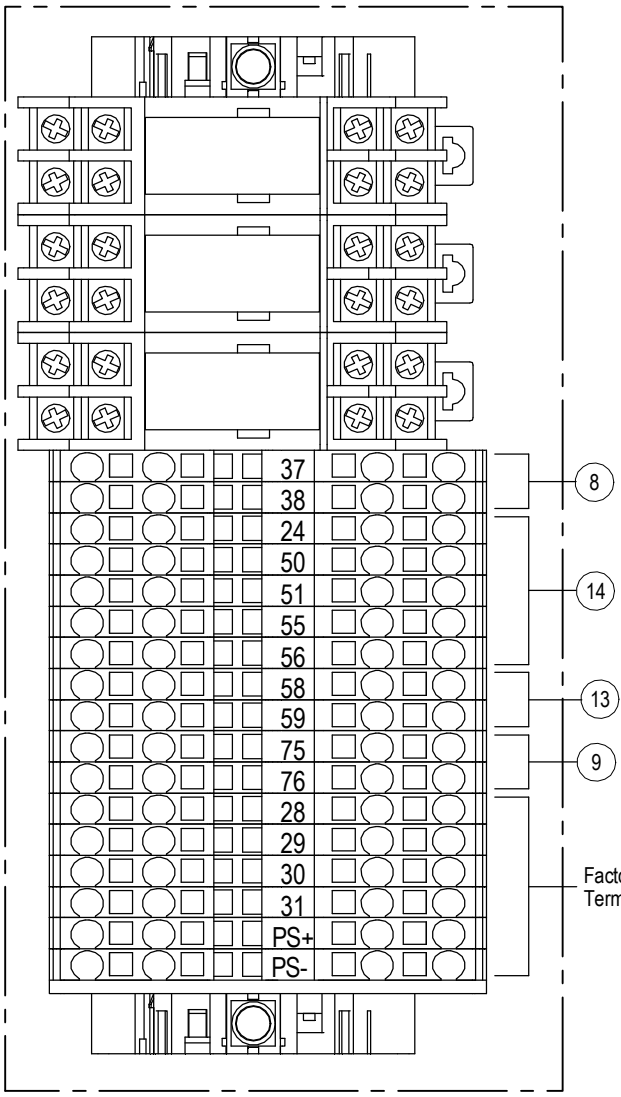
NOTE: Refer to specification sheet for total unit full load amps, wire size amps and max overcurrent protective device size.

ELECTRICAL FIELD CONNECTIONS

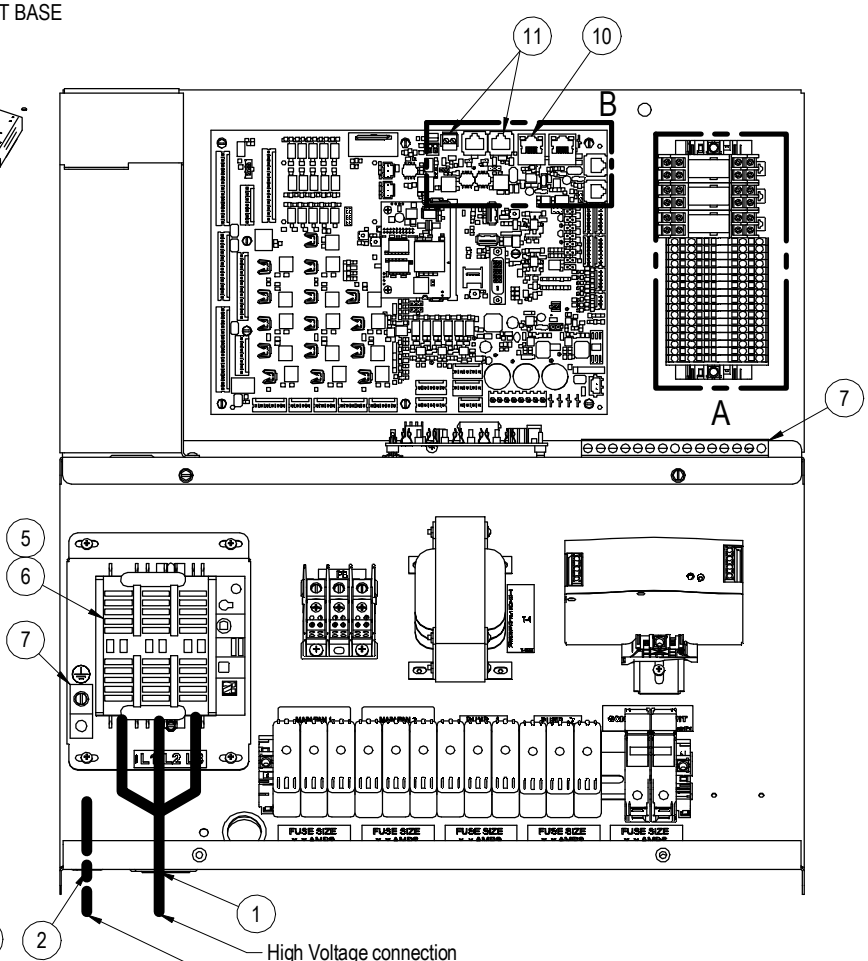
60kW, 600mm (24in.) MODEL

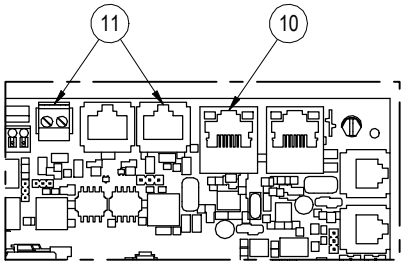






DETAIL A
Field Connections





DETAIL B
COMMs Connections

Connect with Vertiv on Social Media


https://www.facebook.com/vertiv/


https://www.instagram.com/vertiv/


https://www.linkedin.com/company/vertiv/


https://www.twitter.com/Vertiv/

Vertiv.com | Vertiv Headquarters, 1050 Dearborn Drive, Columbus, OH, 43085, USA

SL-70405_Rev2_9-21