Vertiv™ CoolPhase Perimeter Thermal Management System Low GWP

System Design and User Guide

Downflow, 250 kW (71 ton) and 265 kW (75 ton) Capacity, 50 and 60 Hz

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.

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.

The products covered by this instruction manual are manufactured and/or sold by Vertiv. This document is the property of Vertiv and contains confidential and proprietary information owned by Vertiv. Any copying, use or disclosure of it without the written permission of Vertiv is strictly prohibited.

Names of companies and products are trademarks or registered trademarks of the respective companies. Any questions regarding usage of trademark names should be directed to the original manufacturer.

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 **1**
2 Nomenclature and Components **9**
2.1 Vertiv™ CoolPhase Perimeter Model Number Nomenclature 9
2.2 Component Location 12
2.3 Cooling Configurations 12
2.4 Blower Configurations 13
3 System Data **15**
3.1 Capacity and Performance Data 15
3.2 Physical Data 15
4 Pre-installation Preparation and Guidelines **17**
4.1 Planning Dimensions 18
4.2 Connections and System Setup 19
4.3 Operating Conditions 19
4.3.1 Humidification Control 19
4.4 Shipping Dimensions and Unit Weights 19
4.5 A2L Refrigerant Effective Dispersal Volume Calculation 20
4.5.1 How to Determine the Effective Dispersal Volume of an ITE Area 22
5 Equipment Inspection and Handling **25**
5.1 Packaging Material 26
5.2 Handling the Unit while Packaged 26
5.3 Unpacking the Unit 27
5.4 Removing the Unit from the Skid 28
5.5 Unpacking and Handling the Fan Section 31
5.6 Placing the Unit on a Floor Stand 31
6 Electrical Requirements **33**
6.1 Indoor Unit Electrical Power Requirements 33
6.2 Electrical Field Connections 34
7 Piping and Refrigerant Requirements **39**
7.1 Drain Fluid Piping 40
7.1.1 Field Installed, Gravity Fed Drain Line Requirements 41
7.1.2 Condensate Pump Drain Line Requirements 43
7.2 Refrigerant Piping and Charging 44
7.2.1 Refrigerant Piping Guidelines for Air Cooled Systems 45
7.2.2 Refrigerant Line Sizes and Equivalent Lengths 47
7.2.3 Refrigerant Charge Requirements for Air Cooled Systems 47
7.2.4 Additional Oil Requirements for Digital Scroll Compressors 49

© 2026 Vertiv Group Corp.

All Rights Reserved.

7.2.5 Evacuation, Leak Testing, and Charging Air Cooled Systems 51
7.2.6 Verifying Additional Oil Charge 58
8 Heat Rejection Skid 59
8.1 Planning Dimensions 59
8.2 Vertiv™ CoolPhase Condenser Match-up Selections 59
8.3 Vertiv™ CoolPhase Condenser Electrical Power Requirements 59
9 Checklist for Completed Installation 61
9.1 Moving and Placing Equipment 61
9.2 Electrical Installation Checks 61
9.3 Piping Installation Checks 61
9.4 Other Installation Checks 61
9.5 Refrigerant Leak Mitigation 64
10 Initial Start-up Checks and Commissioning Procedure for Warranty Inspection 65
11 Maintenance 67
11.1 Filters 68
11.1.1 Replacing the Filters 69
11.2 Fan Maintenance 69
11.2.1 Fan Assembly Troubleshooting 69
11.2.2 Fan Impellers 70
11.2.3 Blower Motor Lubrication 71
11.2.4 Removing Fan Assembly 71
11.3 Condensate Drain and Condensate Pump System Maintenance 71
11.3.1 Condensate Drain 71
11.3.2 Condensate Pump 71
11.4 Electronic Expansion Valve (EEV) Maintenance 72
11.5 Compressor Maintenance 72
11.5.1 Compressor Oil 72
11.5.2 Replacement Compressors 73
11.5.3 Unloading Solenoid(s) on a Digital Scroll Compressor 73
11.5.4 Compressor Electrical Failure (Motor Burnout) 73
11.5.5 Replacing a Compressor with Electrical Failure (Motor Burnout) 74
11.5.6 Compressor Mechanical Failure 74
11.5.7 Replacing a Compressor with Mechanical Failure 75
11.6 Evaporator Coil 75
11.7 Air Cooled Condenser Maintenance 76
11.8 Units with a Refrigeration Detection System 76
11.9 Decommissioning 76
11.10 Qualification of Workers 76

© 2026 Vertiv Group Corp.
All Rights Reserved.

11.11 Information on Servicing 77
11.11.1 Checks to the Area 77
11.11.2 Work Procedure 77
11.11.3 General Work Area 77
11.11.4 Checking for Presence of Refrigerant 77
11.11.5 Presence of Fire Extinguisher 77
11.11.6 No Ignition Sources 77
11.11.7 Ventilated Area 77
11.11.8 Checks to the Refrigerating Equipment 78
11.11.9 Checks to Electrical Devices 78
11.11.10 Cabling 78
11.11.11 Detection of Flammable Refrigerants 78
11.11.12 Removal and Evacuation 79
11.11.13 Charging Procedures 79
11.11.14 Decommissioning 80
11.11.15 Labeling 80
11.11.16 Recovery 80
12 Preventive Maintenance Checklist 83
Appendices 89
Appendix A: Technical Support and Contacts 89
Appendix B: DA250 and DA265 Motor Maintenance 91
Appendix C: Submittal Drawings 95
Appendix D: Seismic Submittal Drawings 97
Appendix E: Guide Specifications 99

© 2026 Vertiv Group Corp.

All Rights Reserved.

This page intentionally left blank

© 2026 Vertiv Group Corp.

All Rights Reserved.

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™ CoolPhase Perimeter Thermal Management System Low GWP. Read this manual thoroughly before attempting to install or operate this unit.

This equipment is required to be installed only in locations not accessible to the general public. Installation, service, and maintenance work must be performed only by properly trained, certified, and qualified personnel and in accordance with applicable regulations and manufacturers' specifications.

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.

WARNING! Arc flash and electric shock hazard. Can cause serious injury or death. Building and equipment damage may also result. Disconnect all local and remote electric power supplies and wear appropriate, OSHA-approved personal protective equipment (PPE) per NFPA 70E before working within the electric control enclosure. Customer must provide earth ground to unit, per NEC, CEC and local codes, as applicable.

Verify with a voltmeter that power is Off. The Vertiv™ Liebert® iCOM™ controller does not isolate power from the unit, even in the “Unit Off” mode. Some internal components still require and receive power even during the “Unit Off” mode of the Vertiv Liebert iCOM 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.

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. Follow all local codes.

WARNING! Risk of electric shock. Can cause serious injury or death. Building and equipment damage may also result. Open all local and remote electric power supply disconnect switches and verify that power is off with a voltmeter before working within any electric connection enclosures. The Vertiv Liebert iCOM 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 Vertiv Liebert iCOM controller.

Installation, 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.

© 2026 Vertiv Group Corp.
All Rights Reserved.



WARNING! Risk of short circuits and electric shock. Can cause serious injury or death. Building and equipment damage can result from cut insulation or damaged wires. Can cause overheated wiring, smoke, fire, activation of fire suppression systems and EMS personnel, and loss of power to fans. Verify that all wiring connections are tight and that all wiring is contained within the junction box prior to closing and securing the cover.

Insert CSA-certified or UL-listed bushings into holes and/or knockouts used to route wiring through metal panels to protect the wire insulation from contact with sheet metal edges.



WARNING! Risk of improper wire sizing/rating and loose electrical connections causing overheated wire and electrical connection terminals resulting in smoke or fire. Can cause serious injury or death. Building and equipment damage may also result. 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 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.



WARNING! Risk of over-pressurization of the refrigeration system. Can cause serious injury or death. Building and equipment damage may also result. Can cause explosive discharge of high-pressure refrigerant, loss of refrigerant, or environmental pollution. This unit contains fluids and gases under high pressure. Use extreme caution when charging the refrigerant system. Do not pressurize the system higher than the design pressure marked on the unit's nameplate.



WARNING! Risk of explosive discharge of high-pressure refrigerant. Can cause serious injury or death. Building and equipment damage may also result. The handling, installation, cleaning, servicing, and disposal/reclaim of refrigerant shall be in accordance with ASHRAE 15 in the US and CSA B52 in Canada and all national and local codes.



WARNING! Risk of improper wiring, piping, moving, lifting and handling. Can cause serious injury or death. Building and equipment damage may also result. 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.

© 2026 Vertiv Group Corp.

All Rights Reserved.



WARNING! Risk of improper moving. Can cause serious injury or death. Building and equipment damage may also result. Use only lifting equipment that is rated for the unit weight by an OSHA-certified rating organization. The center of gravity varies depending on the unit size and selected options. The slings must be equally spaced on either side of the center of gravity indicator. Shipping weights and unit weights are listed in **Table 4.2** on page 19 and **Table 4.3** on page 20 . Use the center of gravity indicators on the unit to determine the position of the slings.



WARNING! Risk of improper lifting. Can cause serious injury or death. Building and equipment damage may also result. A spreader bar or equivalent must be used when rigging to ensure the lifting force is completely vertical at these fasteners. Lift points are rated for lifting this section only. Do not lift assembled sections from these lift points.



WARNING! Risk of top-heavy unit falling over when improperly lifted or moved. Can cause serious injury or death. Building and equipment damage may also result. 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. Unit weights are specified in **Table 4.2** on page 19 and **Table 4.3** on page 20 .



WARNING! Risk of extremely heavy fan modules dropping downward suddenly. Can cause serious injury or death. Building and equipment damage may also result. Fan modules weigh in excess of 125-lb (56.7-kg) each. Support fan modules before removing mounting hardware. Use caution to keep all body parts out of the fan module pathway of movement during removal or repositioning. Only properly trained and qualified personnel should work on this equipment.

More than one person may be required to complete the assembly and installation. Installer(s) must be properly trained and qualified to lift, move and manipulate very heavy equipment from floor level to the top of the unit. Wear appropriate, OSHA-approved PPE when moving, lifting, installing, and removing the fan(s) and plenum. Read and follow the lifting equipment and/or ladder manufacturer's operating instructions and safety requirements.



WARNING! Risk of contact with sharp edges, exposed fasteners, and improper handling of very heavy parts. Can cause serious injury or death. Building and equipment damage may also result. Use extreme caution, wear appropriate, OSHA-approved PPE, and install the EC fan(s) and plenum to the unit only as described in these instructions.

More than one person may be required to complete the assembly and installation. Installer(s) must be properly trained and qualified to lift, move and manipulate very heavy equipment from floor level to the top of the unit.

Wear appropriate, OSHA-approved PPE when moving, lifting and installing the fan(s) and plenum.

© 2026 Vertiv Group Corp.

All Rights Reserved.

Equipment used in moving, lifting and installing the fan(s) and plenum must meet OSHA requirements and be rated for the weight of the fan(s) and the plenum. If ladders are used, verify that they are rated for the combined weight of the fan(s), plenum and installer(s) as loaded. EC Fan and plenum weights are specified in **Table 4.2** on page 19 and **Table 4.3** on page 20 .

Read and follow the lifting equipment and/or ladder manufacturer's operating instructions and safety requirements.



CAUTION: Risk of excessive refrigerant line pressure. Can cause equipment damage or injury resulting from tubing and component rupture. Do not close off the refrigerant-line isolation valve for repairs unless a pressure-relief valve is field- installed in the line between the isolation valve and the check valve. The pressure-relief valve must be rated 5% to 10% higher than the system-design pressure. An increase in ambient temperature can cause the pressure of the isolated refrigerant to rise and exceed the system-design pressure rating (marked on the unit nameplate).



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.



CAUTION: Risk of contact with hot surfaces. Can cause injury. Personal burn injury can be the result of touching a compressor, refrigerant discharge lines, and some electrical components that are extremely hot during unit operation. Allow sufficient time for them to cool to a touch-safe temperature before working within the unit cabinet.

Use extreme caution and wear appropriate, OSHA-approved PPE when working on or near hot components.



CAUTION: Risk of improper handling heavy and lengthy parts. Can cause injury. Building and equipment damage may also result. Cabinet panels can exceed 5 ft. (1.5 m) in length and weigh more than 35 lb (15.9 kg). Follow relevant OSHA lifting recommendations and consider using a two-person lift for safe and comfortable removal and installation of cabinet panels. Only properly trained and qualified personnel wearing appropriate, OSHA-approved PPE should attempt to remove or install cabinet panels.



CAUTION: Risk of improper moving, lifting and handling. Can cause injury. Building and equipment damage may also result. Only properly trained and qualified personnel should work on this equipment. Evaporator fan modules weigh in excess of 125-lb (56.7-kg). Use proper lifting techniques and wear appropriate OSHA-approved PPE to avoid injury and dropping the fan module during removal. Equipment used in handling/lifting, and/or installing the fan assembly must meet OSHA requirements. Use handling/lifting equipment rated for the weight of the fan assembly. Use ladders rated for the weight of the fan assembly and technicians if used during installation. Refer to handling/lifting, and/or installation equipment operating manual for manufacturer's safety requirements and operating procedures.

© 2026 Vertiv Group Corp.

All Rights Reserved.

CAUTION: Risk of heavy unit falling into defective raised floor. Can cause injury and equipment damage. Prior to installation, all floor tiles immediately around floor stand are to be removed and inspected. Make sure tiles are not cracked, and ribs have not been cut. If free from defects, re-install. Replace with new tiles if defects are found.

CAUTION: Risk of contact with hot surfaces. Can cause injury. Personal burn injury can be the result of touching an electronics housing, fan motor, and some electrical components that are extremely hot during unit operation. Allow sufficient time for them to cool to a touch-safe temperature before working within the unit cabinet.

Use extreme caution and wear appropriate, OSHA-approved PPE when working on or near hot components, including when replacing or performing maintenance on the fans.

CAUTION: Risk of exposure to harmful noise levels. Can cause hearing injury or loss. Depending on the installation and operating conditions, a sound pressure level greater than 70 dB(A) may arise. Take appropriate technical safety measures. Operating personnel must wear appropriate, OSHA-approved PPE and observe all appropriate hearing protection safety requirements.

NOTICE

Risk of improper electrical connection of three-phase input power. Can cause backward compressor rotation and unit damage. Service technicians should use a gauge set on the system during the initial start up to verify that the three-phase power is connected properly. The EC fans are not a reliable indicator of proper connection. The blowers will rotate the same direction, regardless of the three phase power input. Three phase power must be connected to the unit line voltage terminals in the proper sequence so that the compressors rotate in the proper direction. Incoming power must be properly phased to prevent compressors from running backward. We recommend checking the unit's phasing with proper instrumentation to ensure that the power connections were made correctly. We also recommend verifying discharge and suction pressures during start up to ensure that the compressors are running in the correct direction.

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 startup, 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.

© 2026 Vertiv Group Corp.

All Rights Reserved.

NOTICE

Risk of oil contamination with water. Can cause equipment damage.

Vertiv CoolPhase Perimeter Thermal Management System Low GWP systems require the use of POE (polyolester) oil. POE oil absorbs water at a much faster rate when exposed to air than previously used oils. Because water is the enemy of a reliable refrigeration system, extreme care must be used when opening systems during installation or service. If water is absorbed into the POE oil, it will not be easily removed and will not be removed through the normal evacuation process. If the oil is too wet, it may require an oil change. POE oils also have a property that makes them act as a solvent in a refrigeration system. Maintaining system cleanliness is extremely important because the oil will tend to bring any foreign matter back to the compressor.

NOTICE

Risk of improper refrigerant charging. Can cause equipment damage.

Refrigerant charge must be weighed into air cooled compressorized systems before they are started. Starting digital scroll compressors without proper refrigerant charging can cause the compressors to operate at less than 15°F (–9.4°C) evaporator temperature and at less than 70 psig (483 kPa). Operation for extended periods at less than 70 psig (483 kPa) can cause premature compressor failure.

NOTICE

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

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

Improper installation, application and service practices can result in water leakage from the unit. Water leakage can result in 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 condensate drain line leaks.

NOTICE

Risk of water backing up in the drain line. Leaking and overflowing water can cause equipment and building damage.

Do not install an external trap in the drain line. This line already has a factory-installed trap inside the cabinet. Installation of a second trap will prevent drain-water flow and will cause the water to overflow the drain pan.

Sagging condensate drain lines may inadvertently create an external trap.

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.

© 2026 Vertiv Group Corp.

All Rights Reserved.

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.

NOTICE

Risk of improper control circuits. Can cause equipment damage.

When using jumpers for troubleshooting, always remove jumpers when maintenance is complete. Jumpers left connected could override controls and cause equipment damage.

NOTICE

Risk of improper filter installation. Can cause filter collapse and airflow reduction.

NOTICE

Vertiv CoolPhase Perimeter (DA250-DA265) cannot be operated below 25% load. Operating units below 25% load can have detrimental effects on compressor longevity and reliability. The failure of a compressor increases with low load conditions due to short run time and frequent cycling. Compressor warranty claims are subject to rejection if the unit has been operating below the minimum load of 25%.

NOTICE

Condenser fans should be operated manually if they have not run for an extended time in an outdoor environment. Before enabling the condenser for normal cooling operation fans should be run at full speed for at least three hours once a month to move the bearings and allow any condensate that may have ingressed to evaporate.

Condenser firmware release 1.06.042 & later includes settings to operate condenser fans if they have been inactive for more than 30 days.

NOTICE

Risk of improper component re-installation. Can cause equipment damage.

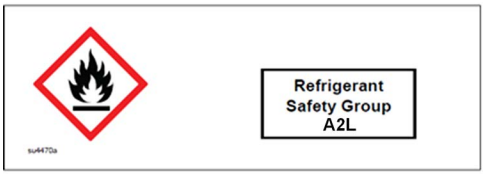
Identify and mark location of suction pressure transducer and discharge pressure switch. These devices look similar and they must be reinstalled in their original location.

NOTICE

This unit is suitable for ITE (Information Technology Equipment) applications, such as data centers, computer rooms, or other ITE areas only.

NOTE: The Vertiv indoor cooling unit has a factory installed, high pressure safety switch in the high side refrigerant circuit. Each refrigerant receiver contains a fusible plug for fire safety purposes. Consult your local building code to determine whether the refrigerant piping will require additional, field provided pressure relief devices.

© 2026 Vertiv Group Corp.
All Rights Reserved.



© 2026 Vertiv Group Corp.
All Rights Reserved.

2 Nomenclature and Components

This section describes the model number for Vertiv CoolPhase Perimeter Thermal Management System Low GWP units and components.

2.1 Vertiv™ CoolPhase Perimeter Model Number Nomenclature

Table 2.2 below describes each digit of the model number.

Table 2.1 Vertiv™ CoolPhase Perimeter Model Number

Model Number Digits 1 to 10										Model Details											Model Number Digits 11 to 14			
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
D	A	2	5	0	D	P	3	A	T	0	2	0	8	1	1	L	0	B	0	P	1	2	3	S

Table 2.2 Vertiv™ CoolPhase Perimeter Model Number Digit Definitions

Digit	Description
Digits 1 and 2 = Product Family	DA = Vertiv CoolPhase Perimeter
Digit 3, 4, 5 = Nominal Cooling Capacity, kW	250 = 250 kW 265 = 265 kW
Digit 6 = Air Discharge	D = Downflow, bottom discharge H = Downflow, horizontal discharge
Digit 7 = System Type	Z = Air Cooled, Vertiv EconoPhase ready R454B
Digit 8 = Airflow (Fan Type)	3 = Direct-drive + VFD (plenum)
Digit 9 = Voltage	A = 460 V - 3 ph - 60 Hz B = 575 V - 3 ph - 60 Hz G = 415 V - 3 ph - 50 Hz *For applications that require less than 400 V/3 ph/50 Hz, please consult your local sales office for assistance.

© 2026 Vertiv Group Corp.
All Rights Reserved.

Table 2.2 Vertiv™ CoolPhase Perimeter Model Number Digit Definitions (continued)

Digit	Description
Digit 10 = Cooling System	
	W = Tandem with digital scroll with Oil Separator
	N = Tandem with digital scroll with Power Factor Correction with Oil Separator
	R = Tandem with digital scroll without Oil Separator
	E = Tandem with digital scroll with Power Factor Correction without Oil Separator
	Notes:
	Indoor unit with compressor options (R, E) can be paired with MCV440 (up to 60 ft. elevation).
	Indoor unit with compressor options (W, N) can be paired with MCV430 (up to 120 ft. elevation).
Digit 11 = Humidifier	
	0 = No humidifier
Digit 12 = Display	
	2 = Vertiv Liebert iCOM (High Definition)
Digit 13 = Reheat	
	0 = None
Digit 14 = Air Filter	
	8 = MERV 8, 4 in .
	9 = MERV 11, 4 in .
Digit 15 = Coil Option	
	1 = Non-coated coil, indoor unit
	2 = Coated coil, indoor unit
Digit 16 = Enclosure Option	
	1 = Color standard
	2 = Color optional
Digit 17 = High voltage option	
	R = Dual locking disconnect, with reversing starter and condenser subfeed
	7 = Dual locking disconnect, with reversing starter, with condensate pump and condenser subfeed
	Y = Dual locking disconnect, with reversing starter and condenser subfeed
	6 = Dual locking disconnect, with reversing starter, with condensate pump and condenser subfeed
	Notes:
	Indoor unit with compressor options (R, 7) to be paired with MCV430 Standard Fans, R-454B.
	Indoor unit with compressor options (Y, 6) to be paired with MCV430 High Airflow Fans, R-454B.
Digit 18 = Option packages	
	0 = None
	L = Option package #1 - low voltage terminal package contact
	D = Low Voltage Terminal Package and Remote Humidifier Contact

© 2026 Vertiv Group Corp.
All Rights Reserved.

Table 2.2 Vertiv™ CoolPhase Perimeter Model Number Digit Definitions (continued)

Digit	Description
Digit 19 = Monitoring	
	B = Base comms and connectivity
Digit 20 = Sensors	
	0 = None
	H = High Temperature Sensor
	S = Smoke Sensor
	F = Smoke Sensor and High Temperature Sensor
Digit 21 = Packaging	
	P = Domestic
	C = Export
Digit 22-24 = Factory Configuration Number	
Digit 25 = Configuration Code	
	A = No SFAs (Any alpha letter except S)
	S = Special feature authorization (SFA). A non-standard configuration or feature of the product that requires the local factory representative to work directly with the factory.

© 2026 Vertiv Group Corp.
All Rights Reserved.

2.2 Component Location

The unit component locations are described in the submittal documents included in the Submittal Drawings on page 95 .

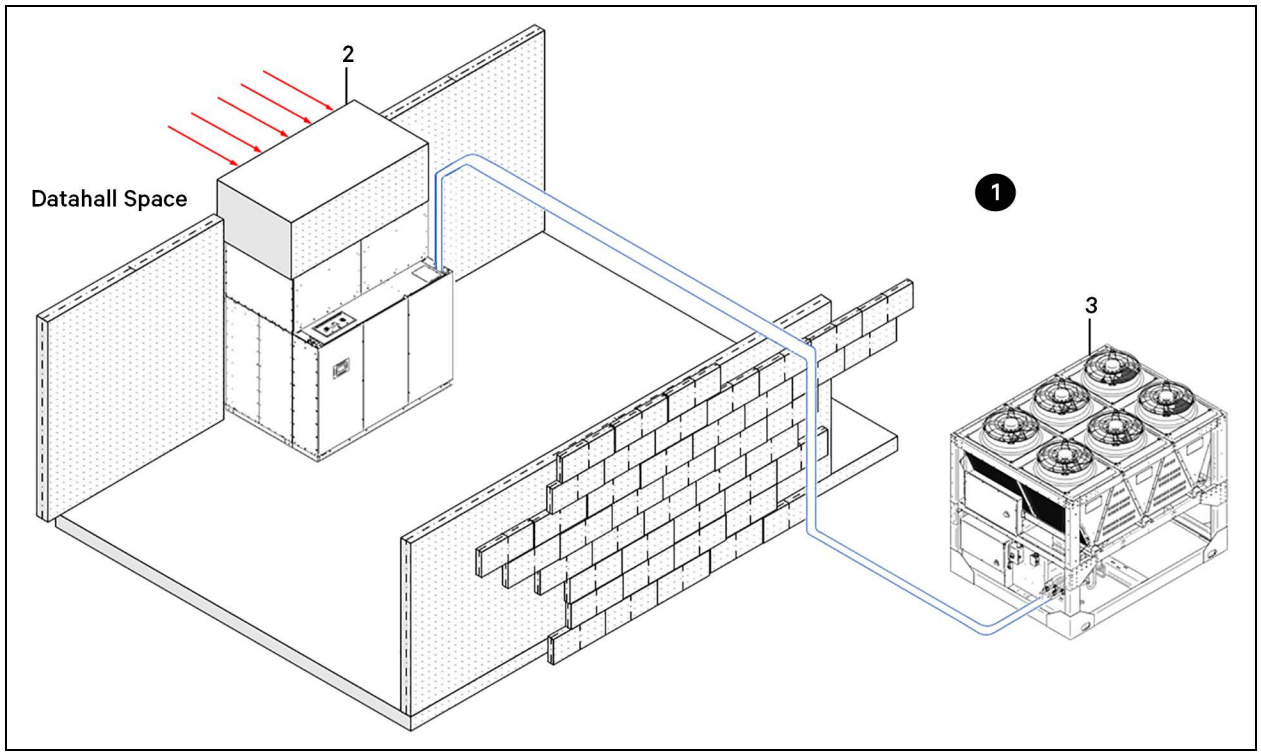
The following table lists the relevant documents by number and title.

Table 2.3 Component Location Drawings

Document Number	Title
20000330	Vertiv™ CoolPhase Perimeter Component Location Drawing

2.3 Cooling Configurations

Figure 2.1 Vertiv™ CoolPhase Perimeter with Vertiv™ CoolPhase Condenser and Vertiv™ EconoPhase Pumping Unit

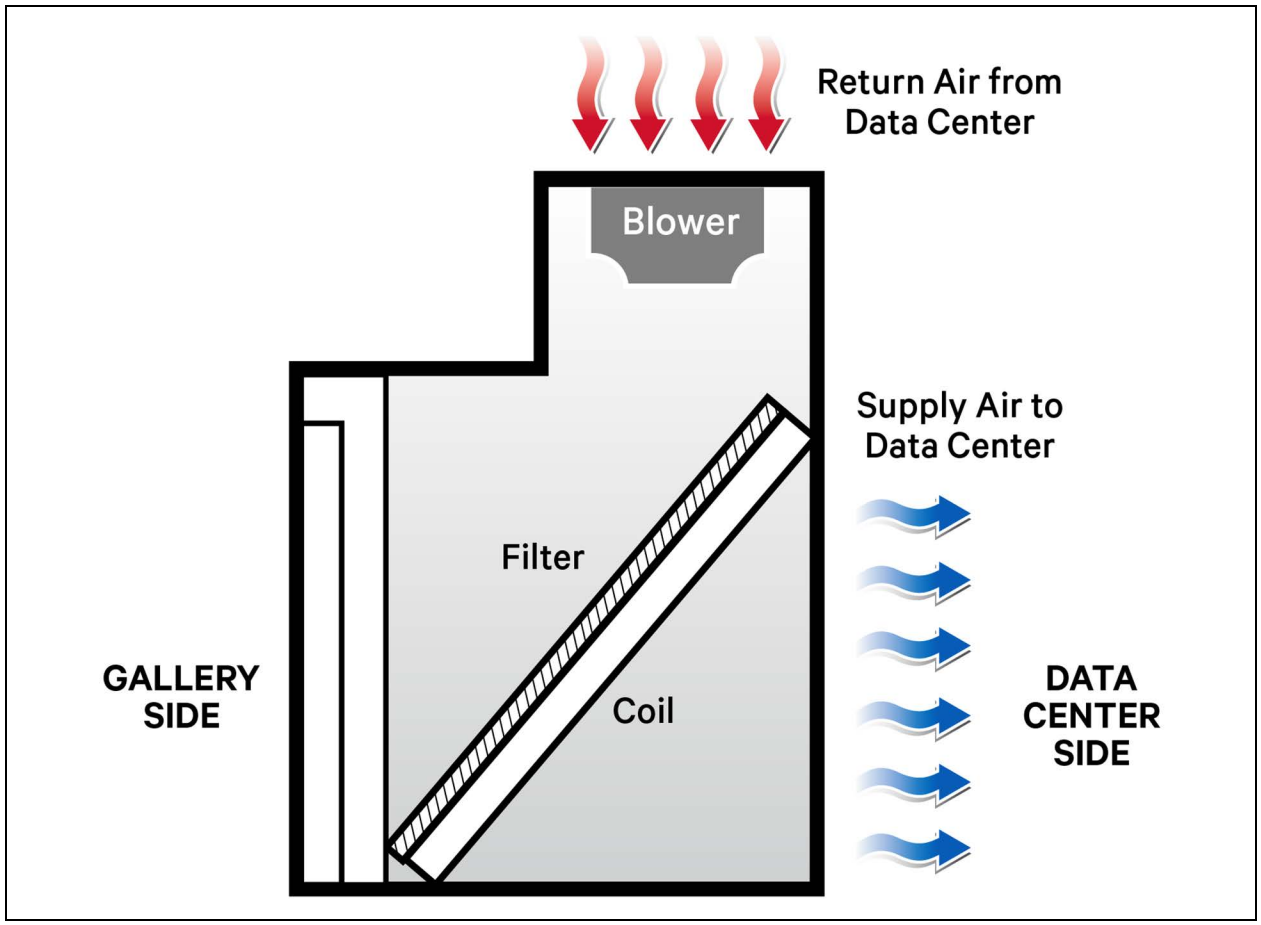


Item	Description
1	Air-cooled with Vertiv CoolPhase Condenser with Vertiv EconoPhase Pumping Unit—All the features of a standard air-cooled system, with the added benefit of an economizer mode that can be used when the outdoor temperature is cold enough to cool the refrigerant enough to suspend use of the compressors.
2	Vertiv CoolPhase Perimeter Thermal Management System
3	Vertiv CoolPhase Condenser with Vertiv EconoPhase Pumping unit and Vertiv CoolPhase Perimeter receivers mounted, wired, and piped on a common heat-rejection skid for ease of job-site deployment. **NOTE: Receivers are not included with model DA265 and MCV440 systems.**

© 2026 Vertiv Group Corp.
All Rights Reserved.

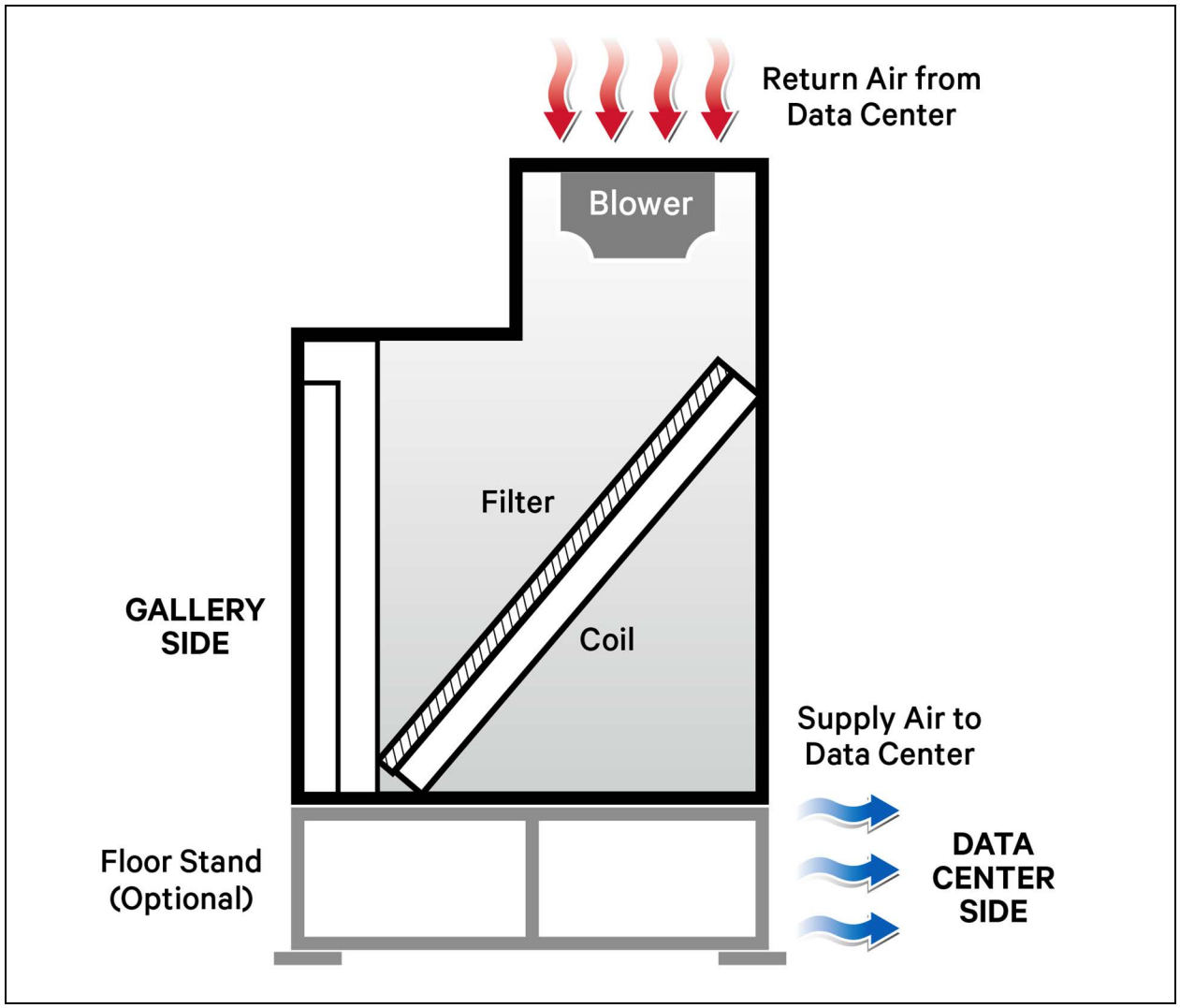
2.4 Blower Configurations

Figure 2.2 Vertiv™ CoolPhase Perimeter DA250-265 Downflow, Horizontal-Discharge Blower Configurations with EC Fans



© 2026 Vertiv Group Corp.
All Rights Reserved.

Figure 2.3 Vertiv™ CoolPhase Perimeter DA250-265 Downflow, Bottom-Discharge Blower Configurations with EC Fans



© 2026 Vertiv Group Corp.
All Rights Reserved.

3 System Data

3.1 Capacity and Performance Data

3.2 Physical Data

Table 3.1 Physical Data for 60/50-Hz Models

Model Size	DA250	DA265
EVAPORATOR COIL- Copper Tube/Aluminum Fin		
Face Area, sq. ft. (sq. m)	67.5 (6.27)	
Rows of Coil	4	5
Face Velocity, FPM (m/s), Std. Air Volume	520 ft/min (2.6 m/s) based on 35,000 CFM (59465 CMH) 540 ft/min (2.7 m/s) based on 36,500 CFM (62,013 CMH) 622 ft/min (3.2 m/s) based on 42,000 CFM (71,358 CMH)	
FILTER SECTION - Disposable Type - Nominal Sizes and Quantities		
Nominal Size, inches (mm)	28 x 22 x 4 (711 x 558 x 102)	
Quantity	15	
UNIT PIPING CONNECTION SIZES (not external line sizes)		
Condensate Drain w/opt Condensate Pump, OD	1/2-in. O.D. Cu	
Condensate Drain, without condensate pump	3/4 in. NPT Female	
Liquid Line, O.D. Cu	1-3/8 in. O.D. Cu	
Hot Gas Line, O.D. Cu	1-5/8 in. O.D. Cu	

© 2026 Vertiv Group Corp.
All Rights Reserved.

This page intentionally left blank

© 2026 Vertiv Group Corp.
All Rights Reserved.

4 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 Table 2.2 on page 9 , and 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 Submittal Drawings on page 95 .

- Verify that the floor is level, solid and sufficient to support the unit. See Shipping Dimensions and Unit Weights on page 19 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).
- Do not install a Vertiv CoolPhase Perimeter Thermal Management System Low GWP in an alcove or at the end of a long, narrow 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.

Engineer of record must ensure the room has the required minimum Effective Dispersal Volume for the refrigerant charge amount of the largest refrigerant circuit. See A2L Refrigerant Effective Dispersal Volume Calculation on page 20 . Allow for additional charge due to appropriate subcooling or receiver site glass charging. If installing the unit in an ITE area with less than the required VED (Effective Dispersal Volume), it is required to have a mechanical ventilation system(s) in accordance with ASHRAE 15.

We recommend installing an under floor water detection system. Contact your Vertiv representative for information.

NOTICE

If the unit is not installed in a conditioned space, the location must be constructed such that should any refrigerant leak occur, it will not stagnate and create a fire or explosion hazard.

WARNING! Auxiliary devices which may be a POTENTIAL IGNITION SOURCE shall not be installed in the duct work. Examples of such POTENTIAL IGNITION SOURCES are hot surfaces with a temperature exceeding 700°C and electric switching devices. Only auxiliary devices approved by Vertiv or declared suitable with the refrigerant shall be installed in connecting ductwork.

WARNING! When appliances connected via an air duct system to one or more rooms with A2L REFRIGERANTS are installed in a room with an EFFECTIVE DISPERSAL VOLUME V_{ED} less than the minimum as determined by A2L Refrigerant Effective Dispersal Volume Calculation on page 20 , that room shall be without continuously operating open flames (e.g. an operating gas appliance) or other POTENTIAL IGNITION SOURCES (for e.g. an operating electric heater, hot surfaces).

© 2026 Vertiv Group Corp.
All Rights Reserved.

4.1 Planning Dimensions

The unit, floor stand, and plenum dimensions are described in the submittal documents included in the Submittal Drawings on page 95 .

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

Table 4.1 Dimension Planning Drawings

Document Number	Title
Evaporator Units	
20000331	Vertiv™ CoolPhase Perimeter DA250-DA265 Cabinet Dimensional Data Horizontal Discharge
20000332	Vertiv™ CoolPhase Perimeter DA250-DA265 Cabinet Dimensional Data Bottom Discharge
20000333	Vertiv™ CoolPhase Perimeter DA250-DA265 Installation and Service Clearance Data
20000334	Vertiv™ CoolPhase Perimeter DA250-DA265 Floor Planning for Adjacent Units
Floor Stands	
20000335	Vertiv™ CoolPhase Perimeter DA250-DA265 Floor Stand Dimensional Data
Airflow Schematic	
20000336	Vertiv™ CoolPhase Perimeter DA250 Downflow Cabinet and Plenum Airflow Schematic Horizontal Discharge
20000337	Vertiv™ CoolPhase Perimeter DA250 Downflow Cabinet and Plenum Airflow Schematic Bottom Discharge
Dimension Planning Drawings - Condenser Units	
20000506	MCV440 Single Skid Cabinet Dimensional Data
20000507	MCV440 Dual Skid Cabinet Dimensional Data
20000508	Vertiv™ CoolPhase Condenser MCV430 + Vertiv™ EconoPhase + Base Assembly Cabinet & Anchor Dimensional Data
20000509	Vertiv™ CoolPhase Condenser MCV430 (2) + Vertiv™ EconoPhase (2) + Base Assembly Cabinet & Anchor Dimensional Data

© 2026 Vertiv Group Corp.
All Rights Reserved.

4.2 Connections and System Setup

- The unit requires a drain, which must comply with all applicable codes.
- If seismic requirements apply, consult your Vertiv representative for information about a seismic rated floor stand.

NOTE: Seal openings around electrical connection to prevent air leakage. Failure to do so could reduce the unit's cooling performance.

The Vertiv CoolPhase Perimeter Thermal Management System Low GWP controls superheat with an electronic expansion valve (EEV). The EEV controller adjusts the orifice based on suction pressure and temperature. The EEV control will drive the valve to maintain the superheat setpoint, set in the Vertiv Liebert iCOM, using a Proportional, Integral, Derivative (PID) routine. The PID control values are set at the factory for most applications. These default values PID will allow stable superheat control of the unit.

4.3 Operating Conditions

The Vertiv CoolPhase Perimeter Thermal Management System Low GWP must be operated in a conditioned space within the operating envelope that ASHRAE recommends for data centers. Operating the Vertiv CoolPhase Perimeter Thermal Management System Low GWP outside of this envelope can decrease equipment reliability. Refer to ASHRAE's publication, "Thermal Guidelines for Data Processing Environments."

The recommended maximum for return air temperature is 105°F (40°C) and maximum dew point is 59°F (15°C). The recommended minimum return air temperature setpoint for the Vertiv CoolPhase Perimeter Thermal Management System Low GWP is 85°F (29.4°C).

NOTE: If running in supply-air control, the minimum supply-air setpoint is 65°F (18.3°C).

4.3.1 Humidification Control

The humidifier option is not available on the DA250 or DA265. A remote humidifier contact is available for a standalone humidifier.

4.4 Shipping Dimensions and Unit Weights

Table 4.2 Downflow Unit Domestic and Export Shipping Dimensions and Weights

Model #	Domestic Packaging		Export Packaging		Dry Weight, lb (kg)
	Ship Weight, lb (kg)	Shipping Dimensions, in. (mm)	Ship Weight, lb (kg)	Shipping Dimensions, in. (mm)	
DA250, DA265 Coil section	6,160 (2,794)	90 x 128 x 97 (2,286 x 3,251 x 2,464)	6,540 (2,966)	90.5 x 128.5 x 99 (2,299 x 3,264 x 2,515)	4,761 (2,159)
DA250, DA265 Fan section	3,281 (1,488)	90 x 128 x 54 (2,286 x 3,251 x 1,372)	3,676 (1,667)	90.5 x 128.5 x 99 (2,299 x 3,264 x 2,515)	2,325 (1,055)

Source: DPN003084, Rev. B

© 2026 Vertiv Group Corp.
All Rights Reserved.

Table 4.3 Vertiv™ CoolPhase Condenser Unit Domestic and Export Shipping Dimensions and Weights

Model #	Domestic Packaging		Export Packaging		Dry Weight, lb (kg)	Max. Operation Weight, lb (kg)
	Ship Weight, lb (kg)	Shipping Dimensions, in. (mm)	Ship Weight, lb (kg)	Shipping Dimensions, in. (mm)		
MCV440 [2] (single skid) 8-fan + PRE	5,998 (2,721)	175 X 101 X 111 (4,445 X 2,572 X 2,819)	6,115 (2,774)	181 X 112 X 111 (4,597 X 2,851 X 2,826)	5,880 (2,667)	6,004 (2,723)
MCV440 [2] (dual skid) 16-fan + PRE (qty. 2)	11,766 (5,337)	350 X 101 X 111 (8,890 X 2,572 X 2,819)	12,003 (5,444)	356 X 112 X 111 (9,042 X 2,851 X 2,826)	11,560 (5,243)	11,808 (5,356)
MCV430 (single skid) 6-fan + PRE	6,045 (2,742)	132 X 101 X 124 (3,353 X 2,572 X 3,137)	6,236 (2,829)	134 X 112 X 124 (3,404 X 2,851 X 3,143)	5,990 (2,717)	6,294 (2,855)
MCV430 (dual skid) 12-fan + PRE (qty. 2)	12,056 (5,469)	265 X 101 X 124 (6,7 X 2,572 X 3,137)	12,399 (5,624)	266 X 112 X 124 (6,756 X 2,851 X 3,143)	11,980 (5,434)	12,208 (5,537)

NOTE: DA250 is matched with Vertiv CoolPhase Condenser with receivers. DA265 is matched with Vertiv CoolPhase Condenser without receivers.

[1]Vertiv CoolPhase Perimeter DA250 is matched with Vertiv CoolPhase Condenser with receivers. Vertiv CoolPhase Perimeter DA265 is matched with Vertiv CoolPhase without receivers.

[2]Unit with and without receiver.

Source: DPN003081, Rev D

4.5 A2L Refrigerant Effective Dispersal Volume Calculation

Engineer of record to determine the Refrigerant Charge m_c and required minimum Effective Dispersal Volume V_{ED} of the space to which the appliance can be utilized for the cooling of ITE areas.

The required minimum Effective Dispersal Volume V_{ED} is a function of the refrigerant charge, m_c and is represented by the following equation:

$V_{ED} = m_c / (0.5 \times LFL)$

V_{ED} = the minimum Effective Dispersal Volume in ft^3 (m^3)

m_c = the refrigerant charge of the largest single circuit of a unit in lbs (kg)

0.5 = the concentration factor

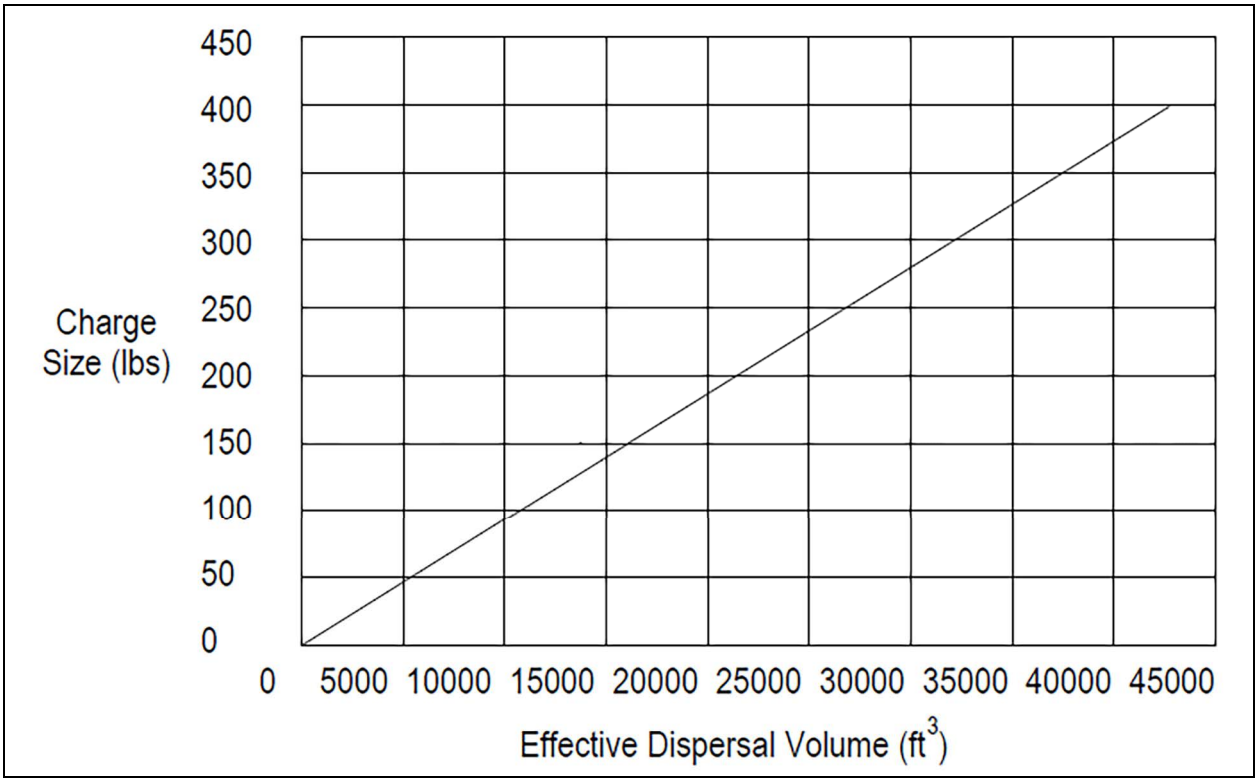
LFL = the Lower Flammability Limit in lbs/1000 ft^3 (kg/m^3)

NOTE: The LFL of R-454B is 18.5 lbs/1000 ft^3 (296.8 g/m^3) according to ASHRAE 34-2024.

© 2026 Vertiv Group Corp.
All Rights Reserved.

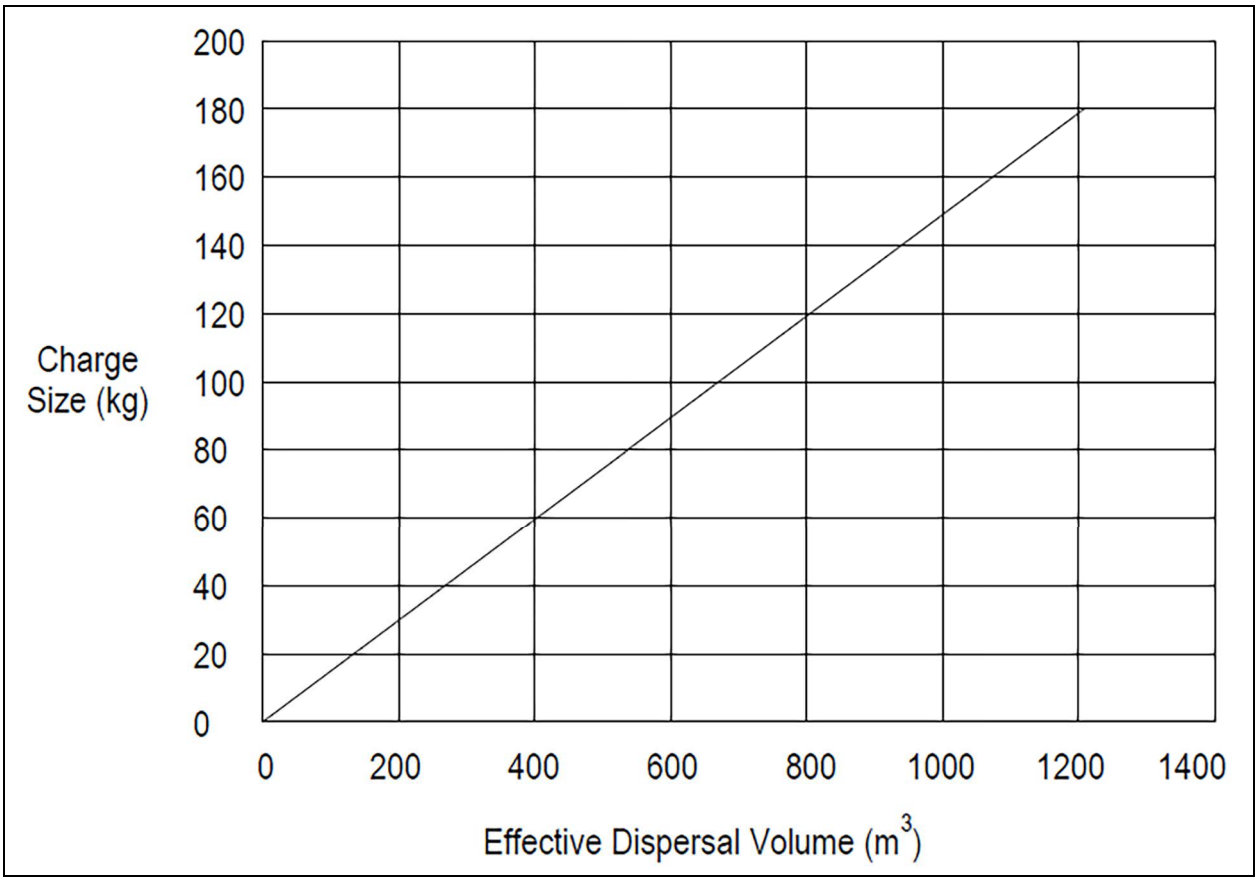
Minimum Effective Dispersal Volume V_{ED} of the space shall be based on altitude of the installation location. For locations above sea level, the engineer of record will need to adjust the value of LFL in accordance with ANSI/ASHRAE 34 before applying it to the equation for determining the required minimum Effective Dispersal Volume V_{ED}.

Figure 4.1 Change Size vs Effective Dispersal Volume



© 2026 Vertiv Group Corp.
All Rights Reserved.

Figure 4.2 Charge Size vs Effective Dispersal Volume



4.5.1 How to Determine the Effective Dispersal Volume of an ITE Area

Volume Calculations shall be based on the overall volume of space available to which the refrigerant disperses within the Circulation Airflow in the event of a refrigerant leak. This overall volume shall be modified with the appropriate deductions. For the purposes of determining the Effective Dispersal Volume of an ITE area the following shall apply:

a. The Effective Dispersal Volume shall only include the circulated airflow of the system.
b. The Effective Dispersal Volume shall initially include the ITE area enclosed by the floor, walls, and ceiling of that space.
c. When the Circulation Airflow includes underfloor spaces, suspended ceiling spaces, or other partitioned spaces, such as equipment galleries, the volume of those spaces may be included.

In general, the volume of equipment, piping, wiring, or other apparatus that consume space within and are isolated from the Circulation Airflow shall be deducted from the Effective Dispersal Volume. The following deductions shall be applied:

a. When the Circulation Airflow has been fully contained on both hot and cold sides of the aisle, via ducts or other apparatus, any room volume outside of that containment shall not be included when calculating the Effective Dispersal Volume.

© 2026 Vertiv Group Corp.
All Rights Reserved.

b. When the overall volume of space available, or a partitioned portion of that volume includes ducted openings from partially ducted systems, some volume of that space may require a deduction. No volume greater than four feet away in height from the upper most supply or return duct opening in the space may be included when calculating the Effective Dispersal Volume, unless an analysis of the airflow has been conducted to show that the volume of air has effective movement for the mixing of a leaked refrigerant.
c. Obstructions of tubing, piping, wiring, etc., consuming more than 0.0071 m^3 (0.25 ft^3) of space shall be included in the deductions from the overall volume.
d. The ITE within the circulated airflow shall be evaluated for their deduction from the Effective Dispersal Volume. The deducted volume of the ITE shall be based on the designed maximum capacity or fill of the servers.
e. As a maximum value, no more than 75 % of the ITE's volume shall be included as circulating air space in the Effective Dispersal Volume. The total volume of the ITE shall be defined by the overall dimensions of its ITE enclosure. Small gaps in between individual server racks shall not be included in the Effective Dispersal Volume.
f. Any other volume within the circulation airflow that is otherwise enclosed or partitioned off from the airflow shall be deducted in the calculation of the Effective Dispersal Volume.

© 2026 Vertiv Group Corp.
All Rights Reserved.

This page intentionally left blank

© 2026 Vertiv Group Corp.
All Rights Reserved.

5 Equipment Inspection and Handling

WARNING! Risk of improper wiring, piping, moving, lifting and handling. Can cause serious injury or death. Building and equipment damage may also result. 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 moving. Can cause serious injury or death. Building and equipment damage may also result. Use only lifting equipment that is rated for the unit weight by an OSHA-certified rating organization. The center of gravity varies depending on the unit size and selected options. The slings must be equally spaced on either side of the center of gravity indicator. Shipping weights and unit weights are listed in Table 4.2 on page 19 and Table 4.3 on page 20 . Use the center of gravity indicators on the unit to determine the position of the slings.

WARNING! Risk of improper lifting. Can cause serious injury or death. Building and equipment damage may also result. A spreader bar or equivalent must be used when rigging to ensure the lifting force is completely vertical at these fasteners. Lift points are rated for lifting this section only. Do not lift assembled sections from these lift points.

WARNING! Risk of top-heavy unit falling over when improperly lifted or moved. Can cause serious injury or death. Building and equipment damage may also result. 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. Unit weights are specified in Table 4.2 on page 19 and Table 4.3 on page 20 .

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.

© 2026 Vertiv Group Corp.
All Rights Reserved.

NOTICE

Risk of improper storage. Keep the unit upright, indoors and protected from dampness, freezing temperatures and contact damage.

NOTE: Access panel screws have a maximum torque value of 40 in-lbs.

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
- Slings
- Spreader bars
- Beam trolleys
- Chain hoists
- Gantries

5.1 Packaging Material



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

5.2 Handling the Unit while Packaged

If possible, transport the unit with a forklift

When using a forklift:

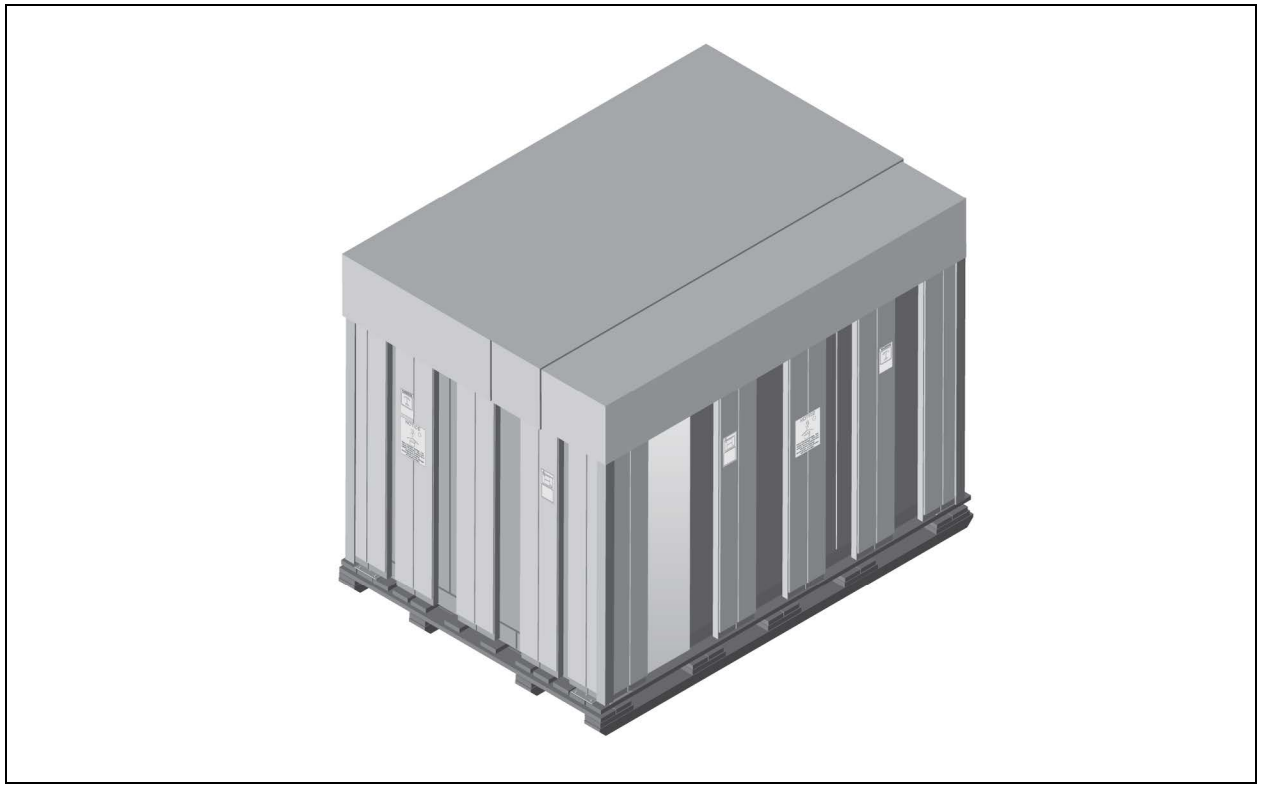
- Make sure that the lift has adjustable forks, and are spread to the widest allowable distance to still fit under the skid.
- Make sure that the fork length is suitable for the skid length. Skid length is 128 in. (3251 mm).
- If the unit must be lifted higher than 2 in. (51 mm) to 4 in. (102 mm), all personnel not directly involved in moving the unit must be 20 ft. (5 m) or farther from the unit.

© 2026 Vertiv Group Corp.
All Rights Reserved.

5.3 Unpacking the Unit

Remove exterior package material from around, and on top of the unit.

Figure 5.1 Unpacking the Unit



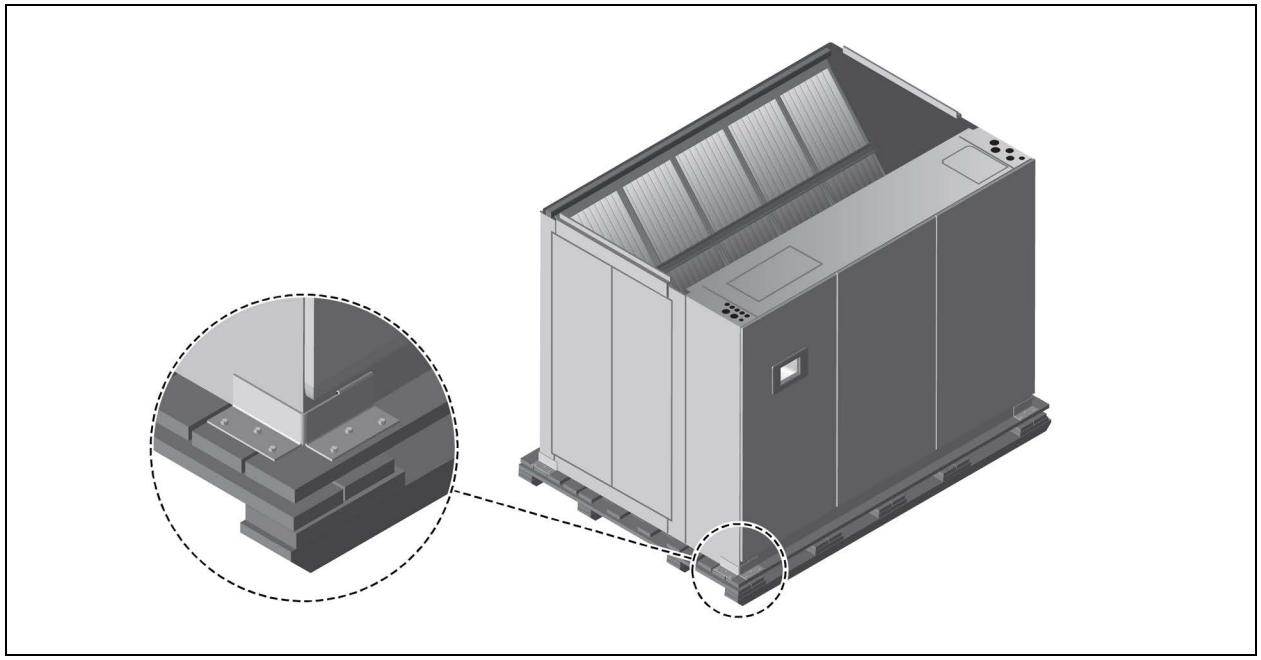
© 2026 Vertiv Group Corp.
All Rights Reserved.

5.4 Removing the Unit from the Skid

NOTE: If you do not follow these steps, damage could occur to the panels and base of the unit.

1. Referring to Figure 5.2 below , use a 9/16 in. socket driver to remove the lag screws (24 total) from the four corner brackets to detach the unit from the skid.

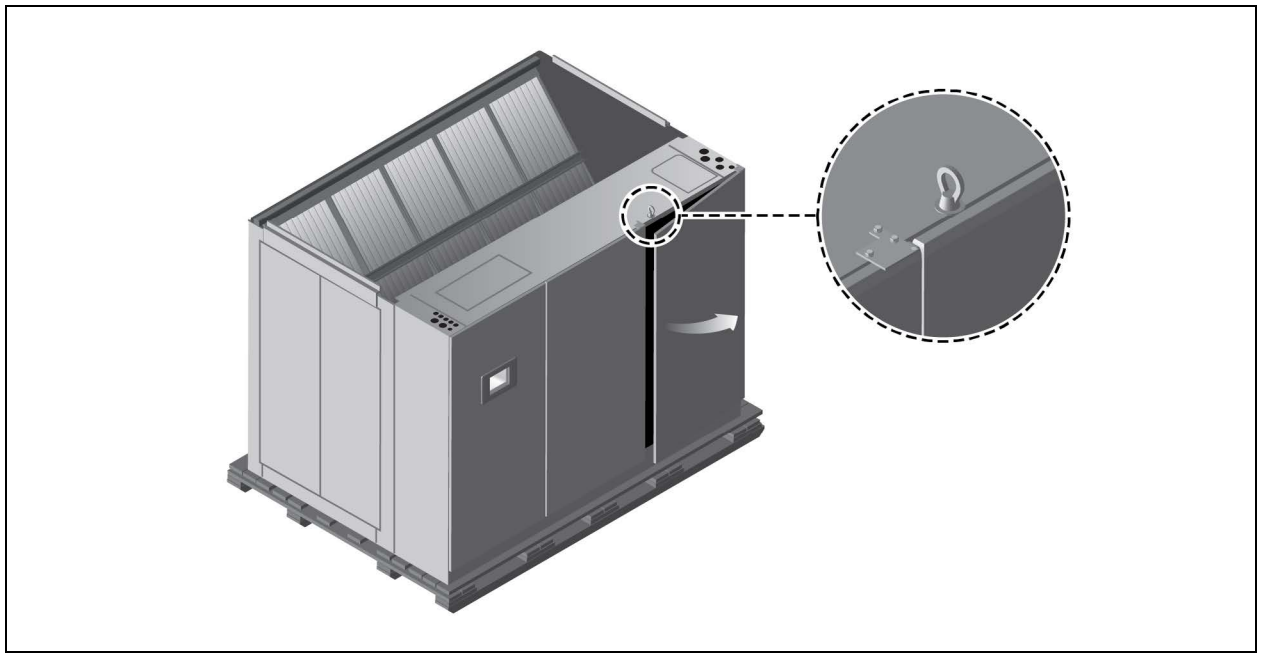
Figure 5.2 Remove Corner Brackets



© 2026 Vertiv Group Corp.
All Rights Reserved.

2. Open the door indicated in Figure 5.3 below , and locate the rigging fastener kit that is secured to the bottom base inside the door.
3. Using the instructions included in the kit, install the rigging hardware for lifting the unit from the skid. Figure 5.3 below shows an example of one of the eye nuts installed.

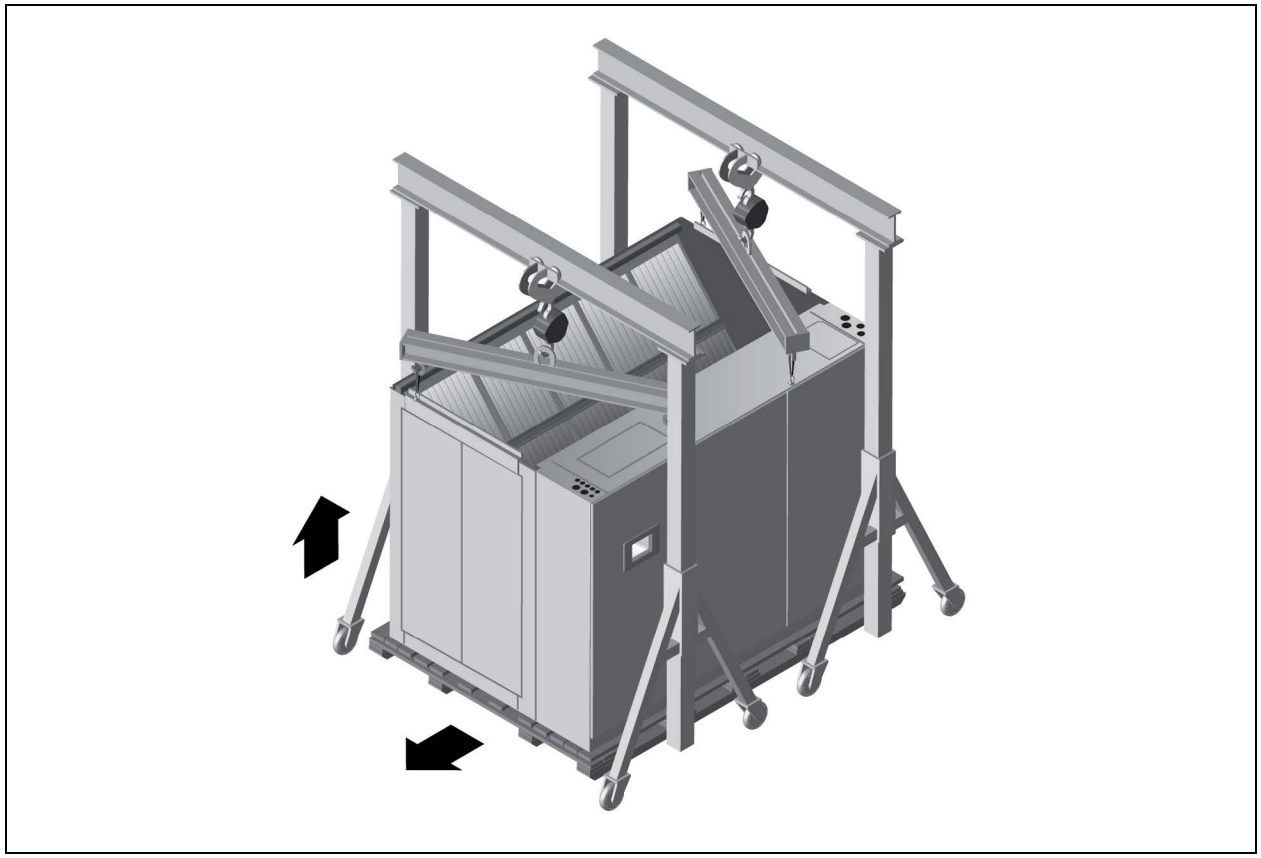
Figure 5.3 Locate the Rigging Fastener Hardware Kit



© 2026 Vertiv Group Corp.
All Rights Reserved.

4. Attach the recommended rigging equipment to the eye nuts installed in Step 3 .
5. Using the rigging equipment, lift the unit from the skid, and remove the skid from under the unit, see Figure 5.4 below .

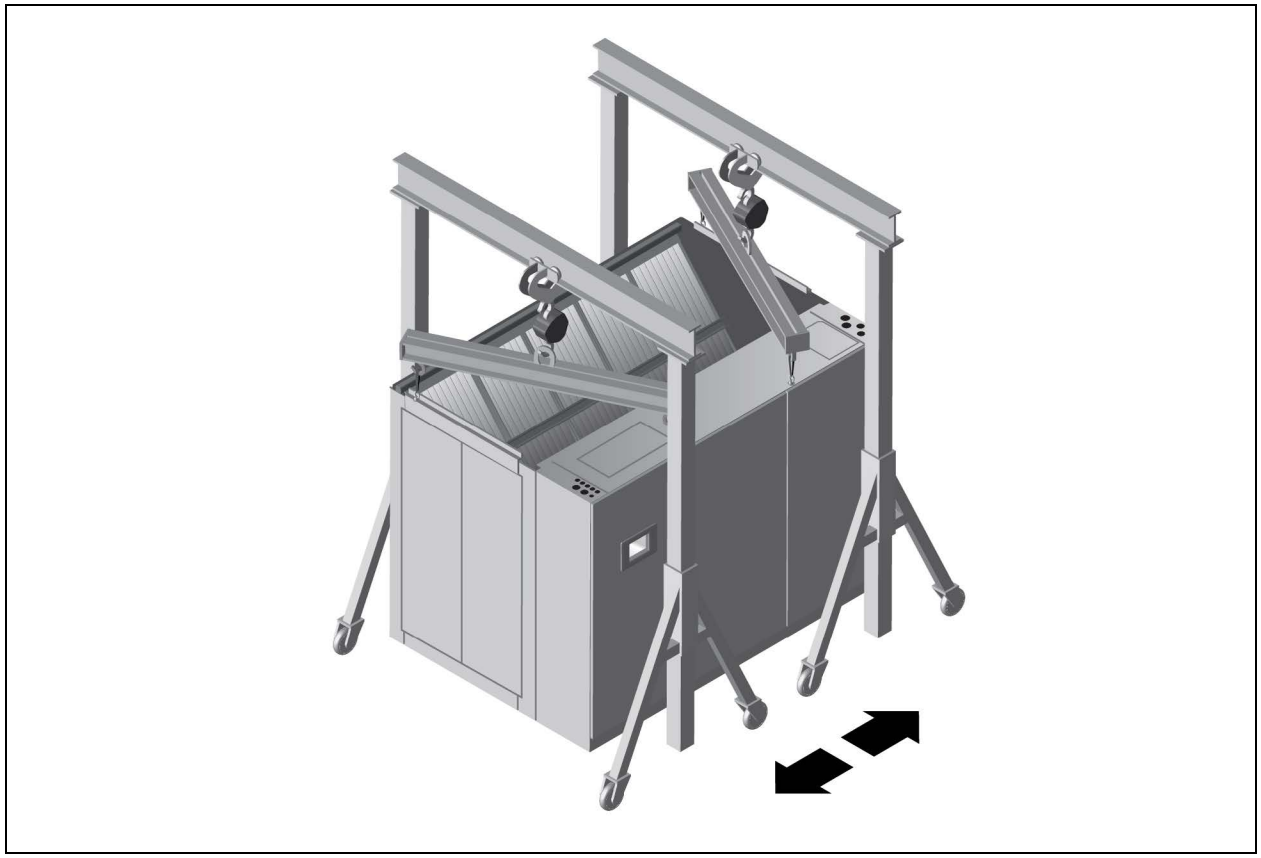
Figure 5.4 Lifting Unit and Removing Skid



© 2026 Vertiv Group Corp.
All Rights Reserved.

6. Use the rigging equipment to move the unit to the final installation location, see Figure 5.5 below .

Figure 5.5 Moving the Unit with Rigging



5.5 Unpacking and Handling the Fan Section

Refer to drawing number 20000648 "Instructions Handling/Installation of Fan Section CW/CoolPhase Perimeter" that is included in the fan plenum packaging for instructions on uncrating and handling the fan section.

5.6 Placing the Unit on a Floor Stand

CAUTION: Risk of heavy unit falling into defective raised floor. Can cause injury and equipment damage. Prior to installation, all floor tiles immediately around floor stand are to be removed and inspected. Make sure tiles are not cracked, and ribs have not been cut. If free from defects, re-install. Replace with new tiles if defects are found.

Unit to be placed onto floor stand using process that will provide safest method based on site layout. Professional installers to be used when placing unit. Unit may require lift onto a floor stand if elevated flooring has not been installed. If flooring is installed, unit will be placed over floor opening containing floor stand.

© 2026 Vertiv Group Corp.
All Rights Reserved.

This page intentionally left blank

© 2026 Vertiv Group Corp.
All Rights Reserved.

6 Electrical Requirements

6.1 Indoor Unit Electrical Power Requirements

Table 6.1 Electrical Data-DA250 and DA265

Unit Voltage Rating		
460 V/60 Hz	FLA	165.4
	WSA	171.8
	OPD	175
575 V/60 Hz	FLA	127.8
	WSA	132.6
	OPD	150

1. FLA = Full-load Amps; WSA = Wire Size Amps; OPD = Maximum Overcurrent Protection Device.
2. Full-load amperage values do not reflect operating amperage values.
3. For 380V/50Hz application, consult the factory for SFA.

Source: DPN002863, Rev. 6

Table 6.2 Electrical Data-Single Point, DA250 or DA265 + MCV440 + PRE

Unit Voltage Rating		
460 V/60 Hz	FLA	187.8
	WSA	194.2
	OPD	200
575 V/60 Hz	FLA	145.7
	WSA	150.5
	OPD	175

1. FLA = Full-load Amps; WSA = Wire Size Amps; OPD = Maximum Overcurrent Protection Device.
2. Full-load amperage values do not reflect operating amperage values.
3. For 380V/50Hz application, consult the factory for SFA.

Source: DPN002863, Rev. 6

© 2026 Vertiv Group Corp.
All Rights Reserved.

Table 6.3 Electrical Data-Single Point Power, DA250/DA265 + MCV430 (STD) + PRE

Unit Voltage Rating		
460 V/60 Hz	FLA	182.2
	WSA	188.6
	OPD	200
575 V/60 Hz	FLA	141.2
	WSA	146
	OPD	150

1. FLA = Full load amps; WSA = Wire size amps; OPD = Maximum overcurrent protection device.
2. Full load amperage values do not reflect operating amperage values.
3. For 380 V/50 Hz application, consult the factory for SFA.

Source: DPN002863, Rev. 6

Table 6.4 Electrical Data - Single Point Power, DA250/DA265 + MCV430 (DA) + PRE

Unit Voltage Rating		
460V/60Hz	FLA	192.4
	WSA	198.8
	OPD	200
575V/60Hz	FLA	149.4
	WSA	154.2
	OPD	175

1. FLA = Full load amps; WSA = Wire Size Amps; OPD = Maximum Overcurrent Protection Device.
2. Full load amperage values do not reflect operating amperage values.

6.2 Electrical Field Connections

WARNING! Arc flash and electric shock hazard. Can cause serious injury or death. Building and equipment damage may also result. Disconnect all local and remote electric power supplies and wear appropriate, OSHA-approved personal protective equipment (PPE) per NFPA 70E before working within the electric control enclosure. Customer must provide earth ground to unit, per NEC, CEC and local codes, as applicable.

Verify with a voltmeter that power is Off. The Vertiv Liebert iCOM controller does not isolate power from the unit, even in the "Unit Off" mode. Some internal components still require and receive power even during the "Unit Off" mode of the Vertiv Liebert iCOM 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.

© 2026 Vertiv Group Corp.
All Rights Reserved.

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. Follow all local codes.

WARNING! Risk of electric shock. Can cause serious injury or death. Building and equipment damage may also result. Open all local and remote electric power supply disconnect switches and verify that power is off with a voltmeter before working within any electric connection enclosures. The Vertiv Liebert iCOM 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 Vertiv Liebert iCOM controller.

Installation, 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 short circuits and electric shock. Can cause serious injury or death. Building and equipment damage can result from cut insulation or damaged wires. Can cause overheated wiring, smoke, fire, activation of fire suppression systems and EMS personnel, and loss of power to fans. Verify that all wiring connections are tight and that all wiring is contained within the junction box prior to closing and securing the cover.

Insert CSA-certified or UL-listed bushings into holes and/or knockouts used to route wiring through metal panels to protect the wire insulation from contact with sheet metal edges.

WARNING! Risk of improper wire sizing/rating and loose electrical connections causing overheated wire and electrical connection terminals resulting in smoke or fire. Can cause serious injury or death. Building and equipment damage may also result. 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.

NOTICE

Risk of improper electrical connection of three phase input power. Can cause backward compressor rotation and unit damage. Service technicians should use a gauge set on the system during the initial startup to verify that the three phase power is connected properly. Three phase power must be connected to the unit line voltage terminals in the proper sequence so that the compressors rotate in the proper direction. Incoming power must be properly phased to prevent compressors from running backward. We recommend checking the unit's phasing with proper instrumentation to ensure that power connections were made correctly. We also recommend verifying discharge and suction pressures during startup to ensure that the compressors are running in the correct direction.

© 2026 Vertiv Group Corp.
All Rights Reserved.

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 startup, 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.

See transformer label for primary tap connections. Installer will need to change transformer primary taps if applied unit voltage is other than pre-wired tap voltage.

NOTE: Seal openings around piping and electrical connection to prevent air leakage. Failure to do so could reduce the unit's cooling performance.

Three phase electrical service is required for all models. Electrical service must conform to national and local electrical codes. Refer to equipment nameplate regarding wire size and circuit protection requirements. Refer the appropriate submittal drawing, listed in Table 6.5 on the facing page , for electrical service entrances into unit

- Vertiv CoolPhase Perimeter Thermal Management System Low GWP voltage should be verified with available power supply before installation. Refer to the unit's electrical schematic and serial tag for specific electrical requirements. Line voltage electrical service is also required for all condensers at the location of the condenser.
- For the most reliable operation of the system, the indoor unit and the Vertiv CoolPhase Condenser should be on the same power source. The Vertiv CoolPhase Perimeter Thermal Management System Low GWP system offers an option for a power feed from the active source on the indoor unit to the outdoor condenser. This configuration provides the greatest reliability and fastest recovery during power loss or source change. See DPN005196 for details on the Automatic Transfer Switch control which is included with the dual power feed option.
- When powering the outdoor condenser from the indoor unit, there is a breaker/fuse on the indoor unit.
- A unit disconnect is standard on the Vertiv CoolPhase Condenser skid. However, a site disconnect may be required per local code to isolate the unit for maintenance. Refer to the unit's serial tag for specific condenser electrical requirements.
- Route the supply power to the site disconnect switch and then to a factory provided high voltage enclosure located on the Vertiv CoolPhase Condenser heat rejection skid.
- A manual electrical disconnect switch should be installed in accordance with local codes and distribution system. Consult local codes for external disconnect requirements.

The electrical and unit to unit connections are described in the submittal documents included in the Submittal Drawings on page 95 .

Table 6.5 on the facing page and Table 6.6 on the facing page list the relevant documents by number and title.

© 2026 Vertiv Group Corp.

All Rights Reserved.

Table 6.5 Electrical Field Connection Drawings

Document Number	Title
20000338	Vertiv™ CoolPhase Perimeter DA250-DA265 Downflow Electrical Field Connections
20000339	Vertiv™ Heat Rejection Skid CANbus and Interlock Connections Vertiv™ CoolPhase Condenser and Vertiv™ Econophase and Base Assembly
20000364	Automatic Transfer Switch
Unit to Unit Networking	
20000347	Vertiv™ Liebert® iCOM™ Unit to Unit Network Connections (Vertiv™ CoolLoop Perimeter, Vertiv™ CoolLoop Thermal Wall, Vertiv™ CoolPhase Perimeter)

Table 6.6 Vertiv™ CoolPhase Condenser Heat Rejection Skid Field Connection Drawings

Document Number	Title
20000301	MCV440 Single Skid Condenser Connection Data
20000302	MCV440 Dual Skid Condenser Connection Data
20000510	Vertiv™ CoolPhase Condenser MCV430 + Vertiv™ EconoPhase + Base Assembly Primary Connection Locations
20000511	Vertiv™ CoolPhase Condenser MCV430 (2) + Vertiv™ EconoPhase (2) + Base Assembly Primary Connection Locations

© 2026 Vertiv Group Corp.
All Rights Reserved.

This page intentionally left blank

© 2026 Vertiv Group Corp.
All Rights Reserved.

7 Piping and Refrigerant Requirements

WARNING! Risk of improper wiring, piping, moving, lifting and handling. Can cause serious injury or death. Building and equipment damage may also result. 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.

NOTICE

Field installed piping, including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.

All fluid and refrigeration connections to the unit are sweat copper. Factory installed piping brackets must not be removed. 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 located so that it offers the least resistance to air flow. Careful planning of the piping layout under the raised floor is required to prevent the air flow from being blocked. When installing piping on the subfloor, we recommend that the pipes be mounted in a horizontal plane rather than stacked one above the other. Whenever possible, the pipes should be run parallel to the air flow.

The following pipe connections are required:

- A drain line from the unit.
- A drain line from the secondary drain pan (if applicable).
- Refrigerant piping connections between the evaporator unit and the MCV440 heat rejection skid. See Refrigerant Piping and Charging on page 44 .

The pipe connection locations, piping general arrangement and schematics are described in the submittal documents included in the Submittal Drawings on page 95 .

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

Table 7.1 Piping General Arrangement Drawings

Document Number	Title
20000340	Vertiv™ CoolPhase Perimeter DA250-DA265 Piping Schematic with Optional Oil Separator with Vertiv™ CoolPhase Condenser without Receivers
Piping Arrangement - Vertiv™ CoolPhase Condenser and Vertiv™ EconoPhase Pump Locations	
20000341	Vertiv™ CoolPhase Condenser Mounting Considerations Above/Same Level as Vertiv™ CoolPhase Perimeter DA125-DA265 with Receivers
20000342	Vertiv™ CoolPhase Condenser Mounting Considerations Above/Same Level as Vertiv™ CoolPhase Perimeter DA125-DA265 without Receivers
20000343	Vertiv™ CoolPhase Perimeter DA250-DA265 Gravity Condensate Piping

© 2026 Vertiv Group Corp.
All Rights Reserved.

Table 7.2 Piping Connection Drawings

Document Number	Title
20000344	Vertiv™ CoolPhase Perimeter DA250-DA265 Primary Connection Locations
20000506	MCV440 Single Skid Condenser Connection Data
20000507	MCV440 Dual Skid Condenser Connection Data
20000510	Vertiv™ CoolPhase Condenser MCV430 + Vertiv™ EconoPhase + Base Assembly Primary Connection Locations
20000511	Vertiv™ CoolPhase Condenser MCV430 (2) + Vertiv™ EconoPhase (2) + Base Assembly Primary Connection Locations

7.1 Drain Fluid Piping

NOTICE

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

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

Improper installation, application and services 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 condensate drain-line leaks.

© 2026 Vertiv Group Corp.
All Rights Reserved.

7.1.1 Field Installed, Gravity Fed Drain Line Requirements

NOTICE

Risk of water backing up in the drain line. Leaking and overflowing water can cause equipment and building damage.

Do not install an external trap in the drain line. This line already has a factory installed trap inside the cabinet. Installation of a second trap will prevent drain water flow and will cause the water to overflow the drain pan.

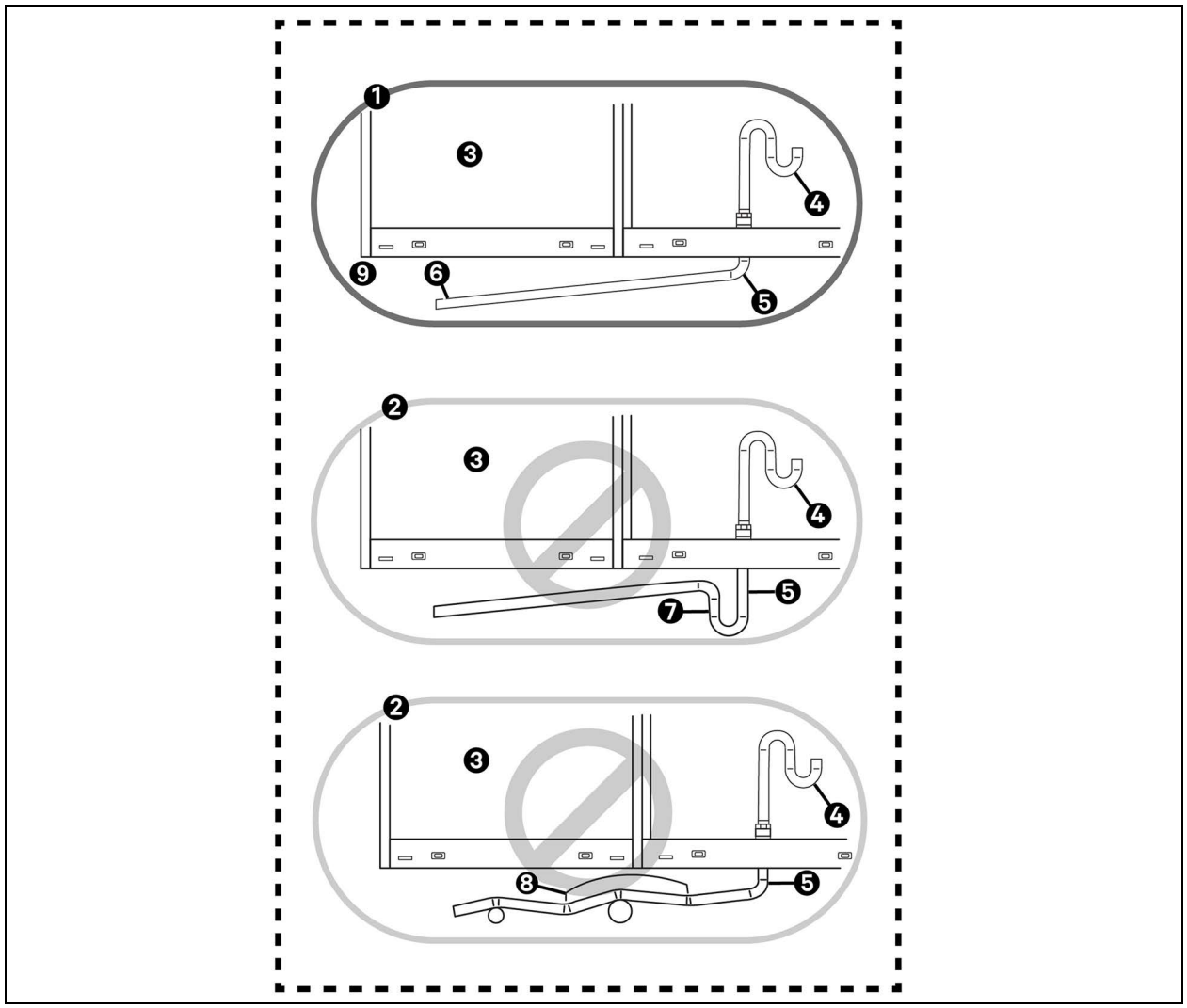
Sagging condensate drain lines may inadvertently create an external trap.

Observe the following requirements when installing and routing the drain line:

- The drain line must be sized for 2 gpm (7.6 L/m) flow.
- The drain line must be located so it will not be exposed to freezing temperatures.
- The drain should be the full size of the drain connection.
- The drain line must slope continuously away from the unit. Pitch drain line toward drain a minimum of 1/8 in. (3 mm) per 1 ft (305 mm) of length.
- Drain is trapped internally. Do not externally trap the drain line.
- The drain line must be rigid enough that it does not sag between supports, which unintentionally creates traps.
- The drain line must comply with all applicable codes.
- We recommend installing monitored, under floor leak detection equipment.

© 2026 Vertiv Group Corp.
All Rights Reserved.

Figure 7.1 Correct and Incorrect Gravity Drains for Downflow Units



© 2026 Vertiv Group Corp.
All Rights Reserved.

Table 7.3 Gravity Fed Drain Line Figure Descriptions

Item	Description
1	Correct drain installation
2	Incorrect drain installation
3	Vertiv CoolPhase Perimeter unit
4	Internal drain
5	External drain
6	Continuous downward slope
7	External trap. Do not trap externally.
8	External trap, although unintentional. Lines must be rigid enough to not bow over the top of other objects.
9	Floor stand required

7.1.2 Condensate Pump Drain Line Requirements

NOTICE

Risk of water backing up in the drain line. Leaking and overflowing water can cause equipment and building damage.

Do not install an external trap in the drain line. This line already has a factory installed trap inside the cabinet. Installation of a second trap will prevent drain water flow and will cause the water to overflow the drain pan.

Sagging condensate drain lines may inadvertently create an external trap.

Observe the following requirements when installing and routing the drain line:

- The drain line must be located so it will not be exposed to freezing temperatures.
- Size the piping based on the available condensate head.
- Drain is trapped internally. Do not externally trap the drain line.
- The drain line must be rigid enough that it does not sag between supports, which unintentionally creates traps.
- We recommend installing monitored, under floor leak detection equipment.

Factory Installed Condensate Pump



WARNING! Risk of electric shock. Can cause serious injury or death. Open all local and remote electric power supply disconnect switches and verify that power is off with a voltmeter before working within any electric connection enclosures. The Vertiv Liebert iCOM controller does not isolate power from the unit, even in the "Unit Off" mode. Condensate pump will stay energized and has the potential to operate even in the “Unit Off” mode.

Installation, 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.

© 2026 Vertiv Group Corp.
All Rights Reserved.

If your unit includes an optional condensate pump, the pump is factory installed inside the unit and a 3/4 in. copper sweat connection is provided on the unit.

7.2 Refrigerant Piping and Charging

WARNING! Risk of over-pressurization of the refrigeration system. Can cause serious injury or death. Building and equipment damage may also result. Can cause explosive discharge of high-pressure refrigerant, loss of refrigerant, or environmental pollution. This unit contains fluids and gases under high pressure. Use extreme caution when charging the refrigerant system. Do not pressurize the system higher than the design pressure marked on the unit's nameplate.

WARNING! Risk of explosive discharge of high-pressure refrigerant. Can cause serious injury or death. Building and equipment damage may also result. The handling, installation, cleaning, servicing, and disposal/reclaim of refrigerant shall be in accordance with all national and local codes.

CAUTION: Risk of excessive refrigerant line pressure. Can cause equipment damage or injury resulting from tubing and component rupture. Do not close off the refrigerant-line isolation valve for repairs unless a pressure-relief valve is field-installed in the line between the isolation valve and the check valve. The pressure-relief valve must be rated 5% to 10% higher than the system-design pressure. An increase in ambient temperature can cause the pressure of the isolated refrigerant to rise and exceed the system-design pressure rating (marked on the unit nameplate).

CAUTION: Risk of contact with hot surfaces. Can cause injury. Personal burn injury can be the result of touching a compressor, refrigerant discharge lines, and some electrical components that are extremely hot during unit operation. Allow sufficient time for them to cool to a touch-safe temperature before working within the unit cabinet.

Use extreme caution and wear appropriate, OSHA-approved PPE when working on or near hot components.

NOTICE

LEAK DETECTION SYSTEM INSTALLED. This unit is equipped with electrically powered safety measures. To be effective, the unit must be electrically powered at all times after installation, other than when servicing.

NOTICE

Field installed piping, including piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.

Consult local building and plumbing codes for installation requirements of additional pressure relief devices when isolation valves are field installed. Do not isolate any refrigerant circuits from over pressurization protection.

© 2026 Vertiv Group Corp.
All Rights Reserved.

Table 7.4 System Refrigerant Pressures

High Pressure Cut Out Safety Switch	540 psig	3,723 kPa	Noted on the unit serial tag
Source: DPN000788, Rev. 21			

NOTICE

Risk of oil contamination with water. Can cause equipment damage.

Vertiv CoolPhase Perimeter Thermal Management System Low GWP systems require the use of POE (polyolester) oil. POE oil absorbs water at a much faster rate when exposed to air than previously used oils. Because water is the enemy of a reliable refrigeration system, extreme care must be used when opening systems during installation or service. If water is absorbed into the POE oil, it will not be easily removed and will not be removed through the normal evacuation process. If the oil is too wet, it may require an oil change. POE oils also have a property that makes them act as a solvent in a refrigeration system. Maintaining system cleanliness is extremely important because the oil will tend to bring any foreign matter back to the compressor.

NOTICE

Risk of improper refrigerant charging. Can cause equipment damage.

Refrigerant charge must be weighed into air-cooled compressorized systems before they are started. Starting scroll and digital scroll compressors without proper refrigerant charging can cause the compressors to operate at less than 15°F (–9.4°C) evaporator temperature and at less than 70 psig (483 kPa). Operation for extended periods at less than 70 psig (483 kPa) can cause premature compressor failure.

NOTICE

Units should never be operated with no refrigerant charge, a holding charge, a proper load or without additional oil as required added. Tag out system to prevent unauthorized personnel from accidentally starting equipment and damaging compressors if any of these conditions exist.

7.2.1 Refrigerant Piping Guidelines for Air Cooled Systems

- Field installed interconnecting piping should be properly selected based on local codes and unit labeling.
- Air cooled units ship with a nitrogen holding charge. Do not vent the charge until all refrigerant piping is in place, ready for connection to the unit and condenser.
- Use copper piping with a brazing alloy with a minimum temperature of 1350°F (732°C), such as Sil-Fos. Avoid soft solders, such as 50/50 or 95/5.
- Use a flow of dry nitrogen through the piping during brazing to prevent formation of copper oxide scale inside the piping. When copper is heated in the presence of air, copper oxide forms. POE oils will dissolve these oxides from inside the copper pipes and deposit them throughout the system, clogging filter driers and affecting other system components.
- A pure dry nitrogen flow of 1-3 ft^3/min (0.5-1.5 L/s) inside the pipe during brazing is sufficient to displace the air. Control the flow using a suitable measuring device.
- Ensure that the tubing surfaces to be brazed are clean and that all burrs have been removed from the ends of the tubes.
- Ensure that all loose material has been cleaned from inside the tubing before brazing.

© 2026 Vertiv Group Corp.
All Rights Reserved.

- Protect all refrigerant line components within 18 in. (460 mm) of the brazing site by wrapping them with a wet cloth or with a suitable heat sink compound.
- Isolate piping from building using vibration isolating supports.
- The Vertiv CoolPhase Condenser heat rejection skid cannot be installed below the evaporator.
- The DA250 is used with a Vertiv CoolPhase Condenser heat rejection skid with receiver tanks. For this system, the outlet of the receivers on the outdoor Vertiv CoolPhase Condenser heat rejection skid must be higher than the elevation of the electronic expansion valves (EEVs) inside of the indoor unit. If the vertical height of the receiver outlet is greater than 60 ft. (18.3 m) above the EEV, an optional oil separator can be utilized for elevation rises up to 120 ft. Refer to 20000341 in Submittal Drawings on page 95 .
- The DA265 is used with a Vertiv CoolPhase Condenser heat rejection skid without receiver tanks. For this system, the bottom of the condenser coil on the outdoor Vertiv CoolPhase Condenser heat rejection skid must be higher than the elevation of the EEV inside of the indoor unit. If the vertical height between the condenser coil bottom and the EEV is greater than 60 ft. (18.3 m), an optional separator can be utilized for elevation rise up to 120 ft. Refer to 20000342 in Submittal Drawings on page 95 .
- Install traps on hot gas (discharge) lines at the base of vertical risers over 5 ft. (1.5 m) and then for vertical rises over 25 ft. (7.6 m), install a trap in 20 ft (6 m) increments or evenly-divided over the vertical rise. The DA250 with piping out the top of the unit has internally installed traps on the hot gas lines.
- Pitch horizontal hot gas piping down at a minimum rate of 1/2 in. per 10 ft. (42 mm per 10 m) so that gravity will aid in moving oil in the direction of refrigerant/oil flow.
- If piping run exceeds 200 ft. (61 m) linear length or 300 ft. (91 m) equivalent length an optional oil separator can be utilized for piping runs up to 450 ft. (137 m) linear length, or 550 ft. (168 m) equivalent length.
- Keep piping clean and dry, especially on units with R-454B refrigerant.
- Avoid piping runs through noise-sensitive areas.
- Do not run piping directly in front of discharge air stream.
- Refrigerant oil – do not mix oil types (see **Table 11.3** on page 73).

Refer to ASHRAE Refrigeration Handbook for general, good-practice refrigeration piping. The indoor cooling unit has a factory installed high pressure safety switch in the high side refrigerant circuit. A fusible plug is installed in each Vertiv CoolPhase Perimeter receiver.

NOTE: All indoor field refrigerant piping must be insulated, 1/2 in. minimum thickness. All outdoor field refrigeration piping does not need to be insulated. The installing contractor is responsible for the insulating, securing, protecting and the proper installation of all field refrigerant piping, observing the details outlined by the Engineer of Record.

- Refer to Refrigerant Line Sizes and Equivalent Lengths on the facing page , for recommended refrigerant piping sizes based on equivalent pipe lengths.
- Refer to Refrigerant Charge Requirements for Air Cooled Systems on the facing page , for the refrigerant-charge requirements of the system.
- Refer to Charging DA250 Air Cooled Systems (Vertiv™ MCV440 with Receivers) on page 53 , for charging information.

© 2026 Vertiv Group Corp.
All Rights Reserved.

7.2.2 Refrigerant Line Sizes and Equivalent Lengths

Table 7.5 Recommended Refrigerant Line Sizes, OD Copper

Model	DA250 DA265	
Equivalent Length	Hot Gas Line, in.	Liquid Line, in.
50 ft. (15 m)	1-5/8	1-3/8
100 ft. (30 m)	1-5/8	1-3/8
150 ft. (45 m)	1-5/8*	1-3/8*
300 ft. (91 m)	1-5/8*	1-3/8*

*Vertiv CoolPhase Perimeter unit can be extended to max 200 ft (61 m) linear or 300 ft. (91 m) equivalent. If piping run exceeds these limits, the Vertiv CoolPhase Perimeter is available with an optional oil separator that can be utilized for piping runs up to 450 ft (137 m) linear length or 550 ft (168 m) equivalent length.

Source: DPN000788, Rev. 22

NOTE: See the piping schematics for your system in Submittal Drawings on page 95 . For installations using pre-fabricated heat rejection skids, included piping must be factored into total equivalent length calculation. Please consult factory for details.

7.2.3 Refrigerant Charge Requirements for Air Cooled Systems

The following tables provide the refrigerant charge requirements for the Vertiv CoolPhase Perimeter Thermal Management System Low GWP, connected piping, and condenser options.

Table 7.6 Indoor Unit Approximate Refrigerant Charge for R-454B Per Circuit

Indoor Unit Type	Model	Circuit 1 (outer circuit), lb (kg)	Circuit 2 (inner circuit), lb (kg)
Air cooled	DA250	22.5 (10.2)	22.5 (10.2)
Air cooled	DA265	22.5 (10.2)	31.5 (14.3)

*System Charge: Indoor unit, MCV440 heat rejection skid with Vertiv EconoPhase (PRE) and refrigerant lines.

For system charges over 200 lb. (90.7kg), consult your Vertiv representative.

See Table 11.3 on page 73 for the recommended oil for the system.

The values in this table and in the following tables are needed in order to calculate the full system charge:

- Table 7.7 on the next page
- Table 7.8 on the next page

Source: DPN003083, Rev. B

© 2026 Vertiv Group Corp.
All Rights Reserved.

Table 7.7 Vertiv™ CoolPhase Condenser Heat Rejection Skid Refrigerant Charge for R-454B per Circuit Including PRE

Heat Rejection Skid*	System #	Circuit Number	Charge per Circuit, lb (kg) (with or without Receivers)
MCV430 or MCV440 Single skid with (1) PRE unit	1	1	55.8 (25.3)
		2	55.8 (25.3)
MCV430 or MCV440 Dual skid with (2) PRE units	1	1	55.8 (25.3)
		2	55.8 (25.3)
	2	1	55.8 (25.3)
		2	55.8 (25.3)

*The heat rejection skid contains Vertiv CoolPhase Condenser condenser(s), Vertiv CoolPhase Perimeter receiver(s) when used with a DA250 system, Vertiv EconoPhase PRE units, and all internal piping. Vertiv CoolPhase Perimeter receivers are not used with a DA265 system.

Source: DPN003083, Rev. B

Table 7.8 Interconnecting Piping Refrigerant Charge for R-454B, lb per 100 ft (kg per 30 m)

Line Size, OD, in.	Liquid Line	Hot Gas Line
1-3/8	49.2 (22.3)	4.5 (2.0)
1-5/8	—	6.4 (2.9)

Source: DPN003099, Rev. 2

Table 7.9 Vertiv Pump Module Refrigerant Charge for R-454B Per Circuit

System Type	Model	Charge per Circuit, lb. (kg)
Vertiv EconoPhase Pumping Unit	PR250	8.8 (4.0)

Source: DPN003082, Rev. B

© 2026 Vertiv Group Corp.
All Rights Reserved.

7.2.4 Additional Oil Requirements for Digital Scroll Compressors

NOTICE

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

Failure to use oil types, viscosities and quantities recommended by the compressor manufacturer may reduce compressor life and void the compressor warranty. See Table 11.3 on page 73 , for the recommended oil for the system.

- Do not mix polyolester (POE) and mineral-based oils.
- Do not mix oils of different viscosities.
- Consult your Vertiv sales representative, visit https://www.Vertiv.com/en-us/support/, or contact the compressor manufacturer if questions arise.

See Table 11.3 on page 73 , for the amount required for various system charge levels.

In addition to oil added based on system charge, additional oil is required for discharge line field installed traps. Standard formed tube traps are required, see Figure 7.2 on the next page , and Table 7.11 on page 51 , because straight tubes and fittings used as traps require much more oil and the length of the straight tube can vary.

With the total calculated refrigerant charge for each circuit, see Table 7.10 on the next page for the refrigerant charge amount that was calculated and follow that line to the right to see how much additional compressor oil is required for each circuit.

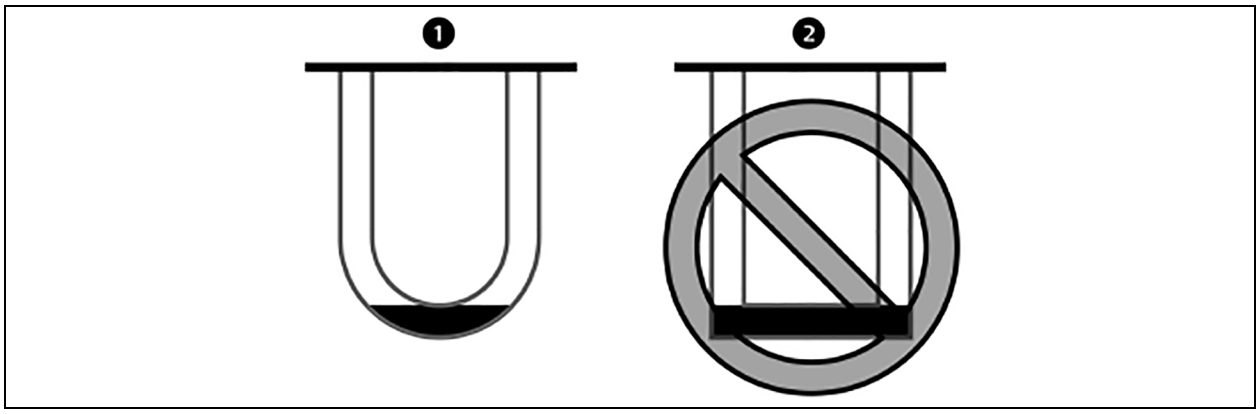
Count the numbers of traps in each circuit. See Table 7.11 on page 51 for the discharge line pipe diameter. Follow the line to the right to see how much oil is needed per trap. Multiply the number of traps per circuit by the oil volume.

Add the additional compressor oil amount and the trap oil volume together. This will be the total amount of oil that will need to be added before the refrigerant is added to each circuit.

The amount of oil added by field service must be recorded on the tag marked “Oil Added Field Service Record,” attached to each compressor. The date of oil addition must be included as well.

© 2026 Vertiv Group Corp.
All Rights Reserved.

Figure 7.2 Standard Formed Tube Trap Versus Straight Tubes and Fittings Trap



Item	Description
1	Standard formed tube trap
2	Straight tubes and fittings trap

Table 7.10 Additional Oil Required per Refrigerant Charge

Refrigerant System Charge Per Circuit, lb (kg) *	Model
	DA250, DA265
	Additional Oil Required Per Circuit, oz (ml)
< 40 (18.1)	0
40 (18.1)	10 (300)
50 (22.7)	18 (530)
60 (27.2)	26 (770)
70 (31.8)	34 (1010)
80 (36.3)	42 (1240)
90 (40.8)	50 (1480)
100 (45.4)	58 (1720)
110 (49.9)	66 (1950)
120 (54.4)	74 (2190)
130 (59.0)	82 (2430)
140 (63.5)	90 (2660)
150 (68.0)	98 (2900)
160 (72.6)	106 (3130)
170 (77.1)	114 (3370)

© 2026 Vertiv Group Corp.
All Rights Reserved.

Table 7.10 Additional Oil Required per Refrigerant Charge (continued)

Refrigerant System Charge Per Circuit, lb (kg) *	Model
	DA250, DA265
	Additional Oil Required Per Circuit, oz (ml)
180 (81.6)	122 (3610)
190 (86.2)	130 (3840)
200 (90.7)	138 (4080)

System Charge: indoor unit, Vertiv CoolPhase Condenser heat rejection skid, refrigerant lines. Calculated per circuit.

For system charges over 200 lb. (90.7 kg), consult your Vertiv representative.

See **Table 11.3** on page 73 , for the recommended oil for the system.

Source: 20000354, Rev. A

Table 7.11 Volume of Oil in Standard Form Trap by Pipe Diameter

Pipe diameter, in.	Oil volume, oz (ml)
1/2	0.2 (5.9)
5/8	0.4 (11.8)
3/4	0.6 (17.7)
7/8	0.9 (26.6)
1-1/8	1.8 (53.2)
1-3/8	3.3 (97.6)
1-5/8	5.5 (162.7)

Source: 20000354, Rev. A

7.2.5 Evacuation, Leak Testing, and Charging Air Cooled Systems

Two discharge lines and two liquid lines must be field installed between the indoor unit and the outdoor condenser.

NOTE: Keep the evaporator unit, receiver (if equipped), and condenser closed with their factory charge of dry nitrogen while all field piping is installed. Keep the field piping clean and dry during installation. Do not allow it to stand open to the atmosphere. When all the field interconnecting piping is in place, vent each outdoor unit's dry nitrogen charge and connect to the field piping. Finally, vent the evaporator unit's dry nitrogen charge and make its piping connection last. Follow all proper brazing practices, including a dry nitrogen purge to maintain system cleanliness. The condenser connection pipes must be wrapped with a wet cloth to keep the pressure and temperature sensors cool during any brazing.

© 2026 Vertiv Group Corp.

All Rights Reserved.

Evacuation and Leak Testing Air Cooled Systems

For proper leak check and evacuation, you must open all system valves and account for all check valves.

NOTE: The system includes a factory installed additional downstream Schrader valve with core in the compressor discharge line. Proper evacuation of the condenser side of the compressor can be accomplished only using the downstream Schrader valve. See the appropriate piping schematic for your system in Submittal Drawings on page 95 .

1. Starting with Circuit #1, open the service valves (service valves not present on units with model digit 10=W,N,R,E) and place a 150 PSIG (1034 kPa) of dry nitrogen with a tracer of refrigerant. Check the system for leaks with a suitable leak detector.
2. With pressure still in Circuit #1, open the compressor service valves (service valves not present on units with model digit 10=W,N,R,E) in Circuit #2.
   - If pressure increases in Circuit #2, the system is cross-circuited and must be re-checked for proper piping.
   - If there is no pressure increase, repeat step 1 on Circuit #2.
3. After completion of leak testing, release the test pressure, (observe local code) and pull an initial deep vacuum of 500 microns on the system with a suitable pump.
4. After four hours, check the pressure readings and, if they have not changed, break vacuum with dry nitrogen. Pull a second and third vacuum to 500 microns or less. Re-check the pressure after two hours.
   When the three checks are complete, remove the jumper hose from the service valve fitting and the condenser, and proceed to Charging DA250 Air Cooled Systems (Vertiv™ MCV440 with Receivers) on the facing page .

NOTE: After completion of field piping, it shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements:

The minimum test pressure for the low side of the system shall be the low side design pressure and the minimum test pressure for the high side of the system shall be the high side design pressure, unless the high side of the system, cannot be isolated from the low side of the system in which case the entire system shall be pressure tested to the low side design pressure.

Break Vacuum

Using a manifold charging hose equipped with a ball valve, properly connect to a tank of refrigerant, and purge the hose with refrigerant to ensure non-condensables do not enter the system. Connect the hose assembly to the liquid line Schrader port and break circuit vacuum with a portion of the calculated refrigerant pre-charge. Add enough refrigerant to bring pressure slightly above positive. Close ball valve and remove refrigerant tank.

© 2026 Vertiv Group Corp.
All Rights Reserved.

Charging DA250 Air Cooled Systems (Vertiv™ MCV440 with Receivers)

NOTICE

Risk of improper refrigerant charging. Can cause equipment damage.

R-454B is a blended refrigerant and must be introduced and charged from the cylinder only as a liquid.

Care must be exercised to avoid damage to the compressor. We recommend connecting a manifold charging hose equipped with a ball valve to the liquid line Schraeder port.

NOTICE

Risk of improper operation. Can cause compressor failure.

Operating the unit with the EEV closed can cause compressor failure. The reheat and humidifier are disabled. A minimum of 70 psig (483 kPa) must be established and maintained for the compressor to operate. The charging function can be reset as many times as required to complete.

NOTICE

Units should never be operated with no refrigerant charge, holding charge, proper load, or without additional oil as required. Tag out system to prevent unauthorized personnel from accidentally starting equipment and damaging compressors if any of these conditions exist.

To charge the system:

1. Check the nameplate on the indoor unit for refrigerant type to be used. Unit control configurations differ depending on refrigerant type.
2. Refer to Checklist for Completed Installation on page 61 .
3. Calculate the amount of charge for the system. See Refrigerant Charge Requirements for Air Cooled Systems on page 47 .
4. Add additional compressor and trap oil. See Additional Oil Requirements for Digital Scroll Compressors on page 49 .
5. Accurately weigh in as much of the system charge as possible before starting the unit. Do not exceed the calculated charge by more than 0.5 lb (0.37 kg).
6. Close the MVC heat rejection skid disconnect switch.
   - We recommend charging the unit with the return air setpoint between 75°F and 85°F (24°C and 29°C).
   - The return air temperature to the unit being charged must be stable and must be maintained greater than 65°F (18°C). If this is not possible due to lack of heat load, then the load banks must be used to offset the cooling load during start-up. See Target Refrigerant Level in Sight Glasses at Outdoor Temperatures on page 55 .
7. Close the Vertiv CoolPhase Perimeter Thermal Management System Low GWP disconnect switch.

NOTICE

The unit must have line voltage applied to the unit at least 12 hours before compressor start-up to allow the compressor crankcase heaters time to warm the compressors and boil off any liquid refrigerant in the compressors after pre-charge.

© 2026 Vertiv Group Corp.
All Rights Reserved.

8. In the Service menu of the Vertiv Liebert iCOM controller, select *Diagnostics/Service* > *Diagnostics*:
    a. *Enable* Manual Mode.

NOTE: Manual Mode will time out after 60 minutes.

    b. In the search box, enter *E177* and press Enter.

       Two parameters appear in the Parameter Directory (E177.1 and E177.2).

       Press the *Gear* icon in the upper right corner.

       Select *Make Writeable*.

       Change E177.1 and E177.2 from 15 minutes to 2 minutes.

       This reduces the superheat setpoint from 24°F (13.3 °C) to 13°F (7.2°C) in two minutes.

    c. In Evaporator Fan options set *Motors* to *On* to operate the fan during Manual Mode.
    d. In Compressor Circuit 1 options, set *Compressor Mode* to *Charge* to operate Compressors 1A and 1B at full capacity. Turn Compressor 1A and 1B to On. The EEV will modulate to control superheat setpoint
    e. Reset the charge function as many times as needed to complete unit charging.

NOTE: You must establish and maintain a minimum 70 psig (483 kPa) for the compressor to operate.

    f. Repeat step 8 for Compressor Circuit 2.
9. Check the refrigerant level in the refrigerant level sight glasses on each receiver after the unit has been operating for at least 15 minutes.

NOTE: Each receiver at the condenser has two sight glasses and the refrigerant level varies with outside temperature.

10. Adjust the refrigerant level in each circuit to meet the level shown in Target Refrigerant Level in Sight Glasses at Outdoor Temperatures on the facing page .
11. After adjusting the refrigerant, allow the system to operate an additional 15 minutes before checking for the need of further adjustment.
12. Repeat the procedure for the second circuit.

NOTE: A digital scroll compressor can have a clear unit sight glass on the liquid line only when operating at 100% capacity. When operating with a receiver, the unit sight glass might not become clear even when operating at 100% capacity. When operating below 100%, the unit sight glass may show bubbles with each 15 second unloading cycle.

© 2026 Vertiv Group Corp.
All Rights Reserved.

Target Refrigerant Level in Sight Glasses at Outdoor Temperatures

- 40°F (4.5°C) and lower—bottom sight glass is 3/4 full
- 40°F (4.5°C) and higher—bottom sight glass is full

If the return air temperature cannot be maintained between 75°F and 85°F (24°C and 29°C) due to lack of load, then the liquid level receiver must be adjusted to the following if return air is between 65°F and 75°F (18°C and 24°C):

- 40°F (4.5°C) and lower—Charge to the bottom of the top sight glass.
- 40°F (4.5°C) and higher—Top sight glass is 1/4 full.

Additional Compressor Oil

Once the circuits are topped off with refrigerant, more compressor oil may need to be added to each circuit if the final charge is over 10 lbs of the calculated refrigerant charge. Record this additional oil amount on the manilla tag hanging on the compressor service valve.

© 2026 Vertiv Group Corp.
All Rights Reserved.

Charging DA250/DA265 Air Cooled Systems (Vertiv™ CoolPhase Condenser MCV430/MCV440 without Receivers)

NOTICE

Risk of improper refrigerant charging. Can cause equipment damage.

R-454B is a blended refrigerant and must be introduced and charged from the cylinder only as a liquid.

Care must be exercised to avoid damage to the compressor. We recommend connecting a manifold charging hose equipped with a ball valve to the liquid line Schrader port.

NOTICE

Risk of improper operation. Can cause compressor failure.

Operating the unit with the EEV closed can cause compressor failure. The reheat and humidifier are disabled. A minimum of 70 psig (483 kPa) must be established and maintained for the compressor to operate. The charging function can be reset as many times as required to complete.

NOTE: If at least 50% Nominal Unit Load is not available then Load Banks will be required at commissioning in order to allow for proper unit charging.

NOTICE

Units should never be operated with no refrigerant charge, holding charge, proper load, or without additional oil as required. Tag out system to prevent unauthorized personnel from accidentally starting equipment and damaging compressors if any of these conditions exist.

To charge the system:

1. Check the nameplate on the indoor unit for the refrigerant type to be used. Unit control configurations differ depending upon the refrigerant type.
2. Refer to Checklist for Completed Installation on page 61 .
3. Calculate the amount of charge for the system. See Refrigerant Charge Requirements for Air Cooled Systems on page 47 .
4. Add additional compressor and trap oil. See Additional Oil Requirements for Digital Scroll Compressors on page 49 .
5. Accurately weigh in as much of the system charge as possible before starting the unit. Do not exceed the calculated charge by more than 0.5 lb (0.37 kg).
6. Close the Vertiv™ CoolPhase Condenser heat rejection skid disconnect switch.
   - Unit must be charged with the return air within **+/- 10°F (5.5° C)** of the operating point.
   - If the operating point changes, the charge may need to be adjusted according to the new operating point.
   - The return air temperature to the unit being charged must be stable. If this is not possible due to the lack of heat load, then the load banks must be used to offset the cooling load during start-up.
7. Close the Vertiv CoolPhase Perimeter disconnect switch.

© 2026 Vertiv Group Corp.
All Rights Reserved.

NOTICE

The unit must have line voltage applied to the unit at least 12 hours before compressor start-up to allow the compressor crankcase heaters time to warm the compressors and boil off any liquid refrigerant in the compressors after pre-charge.

8. In the Service menu of the Vertiv Liebert iCOM controller, select *Diagnostics/Service > Diagnostics*.
   a. Enable Manual Mode.

NOTE: Manual mode will time out after 60 minutes.

   b. In the Search Box type *E177* and press Enter.

      Two parameters appear in the Parameter Directory (E177.1 and E177.2).

      Press the Gear icon in the upper right corner.

      Select *Make Writeable*.

      Change E177.1 and E177.2 from 15 minutes to 2 minutes.

      This will reduce the superheat setpoint from 24°F (13.3° C) to 13°F (7.2° C) degrees in two minutes.

   c. In the Evaporator Fan options, set Motors to On to operate the fan during Manual Mode.
   d. In Compressor Circuit 1 options, set the Compressor Mode to Charge to operate Compressors 1A and 1B at full capacity. Turn Compressor 1A and 1B to On. The EEV will modulate to control superheat setpoint.
   e. Reset the charge function as many times as needed to complete unit charging.

NOTE: You must establish and maintain a minimum 70 psig (483 kPa) for the compressor to operate.

9. Check out the subcooling using the Schrader port on the liquid line just before the expansion valve. Superheat should be around 13°F (7.2°C) before verifying subcooling.
10. Adjust the refrigerant level to meet the subcooling shown in Table 7.12 below .
11. After adjusting the refrigerant, allow the system to operate an additional 15 minutes before checking the need of further adjustment.

NOTE: A digital scroll compressor can have a clear unit sight glass on the liquid line only when operating at 100% capacity. When operating below 100% capacity, the unit sight glass may show bubbles with each 15 second unloading cycle.

Table 7.12 Target Subcooling at Outdoor Temperature

Outdoor Ambient		Subcooling	
°F	°C	°F	°C
-30	-34.4	10	-5.5
-15	-26.1	10	-5.5
0	-17.8	10	-5.5
15	-9.4	10	-5.5

© 2026 Vertiv Group Corp.
All Rights Reserved.

Table 7.12 Target Subcooling at Outdoor Temperature (continued)

Outdoor Ambient		Subcooling	
°F	°C	°F	°C
30	-1.1	10	-5.5
45	7.2	10	-5.5
60	15.6	10	-5.5
75	23.9	10	-5.5
85	29.4	10	-5.5
95	35	10	-5.5
105	40.6	12	-6.7
115	46.1	14	-7.8

Subcooling should be within ± 3°F (1.7°C)

Source: DPN002411, Rev. 10

12. Repeat steps 7 through 10 for Compressor Circuit 2.
13. Change E177.1 and E177.2 back to 15 minutes after both circuits are charged.

Additional Compressor Oil

Once the circuits are topped off with refrigerant, more compressor oil may need to be added to each circuit if the final charge is over 10 lbs of the calculated refrigerant charge. Record this additional oil amount on the manilla tag hanging on the compressor service valve.

7.2.6 Verifying Additional Oil Charge

1. Using unit manual mode, turn on the fans and operate the compressor/tandem at 100% for 30 minutes.
2. After 30 minutes, exit manual mode and let the compressor/tandem settle for two to three minutes. For tandems, waiting two to three minutes will allow the oil to equalize between the two connected compressors.

   Oil levels are checked while the tandem/compressor is in an off state to avoid sump turbulence which could show inaccurate levels.

3. Proper oil levels:

   Oil level should be checked in both sight glasses in the tandem and they should be equal.

   The oil level should be between 1/4 and 3/4 of the site glass.

   If the sight glass is completely empty, add oil until the level is at least a 1/4 full. Once the adjustment to the oil level has been made, operate the fans and compressor/tandem at 100% to verify level.

4. Document the amount of oil added or removed on the oil tag attached to the compressor, unit data plate or other applicable location.

© 2026 Vertiv Group Corp.

All Rights Reserved.

8 Heat Rejection Skid

8.1 Planning Dimensions

The unit dimensions are described in the submittal documents included in the Submittal Drawings on page 95 .

Table 8.1 below lists the relevant documents by number and title.

Table 8.1 Dimension Planning Drawings

Document Number	Title
20000506	MCV440 Single Skid Condenser Connection Data
20000507	MCV440 Dual Skid Condenser Connection Data
20000508	Vertiv™ CoolPhase Condenser MCV430 + Vertiv™ EconoPhase + Base Assembly Cabinet & Anchor Dimensional Data
20000509	Vertiv™ CoolPhase Condenser MCV430 (2) + Vertiv™ EconoPhase (2) + Base Assembly Cabinet & Anchor Dimensional Data

8.2 Vertiv™ CoolPhase Condenser Match-up Selections

Table 8.2 High-efficiency Condenser Match-ups

Outdoor Design Ambient Temp., °F (°C)	Maximum Return Air Temp., °F (°C)	Vertiv™ CoolPhase Perimeter Models DA250, DA265
Up to 105 (41)	85 (29) to 105 (41)	MCV430/MCV440

8.3 Vertiv™ CoolPhase Condenser Electrical Power Requirements

Condenser-rated voltage should be verified with available power supply before installation. Refer to the unit's electrical schematic and serial tag for specific electrical requirements. Line voltage electrical service is required for all condensers at the location of the condenser.

For the most reliable operation of the system, the indoor unit and the Vertiv CoolPhase Condenser should be on the same power source. The Vertiv CoolPhase Perimeter system offers an option for a power feed from the active source on the indoor unit to the outdoor condenser. This configuration provides the greatest reliability and fastest recovery during power loss or source change.

When powering the outdoor condenser from the indoor unit, there is a breaker/fuse on the indoor unit and the wire sizing requirements are provided in Table 8.3 on the next page .

A unit disconnect is standard on the Vertiv CoolPhase Condenser skid. However, a site disconnect may be required per local code to isolate the unit for maintenance. Refer to the unit's serial tag for specific condenser electrical requirements (Table 8.3 on the next page).

Route the supply power to the site disconnect switch and then to factory-provided high-voltage enclosure located on the Vertiv CoolPhase Condenser heat-rejection skid. Reference submittal drawings listed in Table 8.3 on the next page .

© 2026 Vertiv Group Corp.

All Rights Reserved.

Table 8.3 Heat Rejection Skid Electrical Data, Three-Phase

Model	Voltage	FLA	WSA	OPD
MCV440 + PR250*****2	2 = 380V/60Hz	36.4	37.5	40
	A = 460V/60Hz	29.4	30.3	35
	G = 415V / 50Hz	35.4	36.3	40
	B = 575V/60Hz	23.5	24.2	35
MCV440 + PR250*****5	2 = 380V/60Hz	35.8	36.8	40
	A = 460V/60Hz	28.8	29.6	30
	G = 415V/50Hz	NA	NA	NA
	B = 575V/60Hz	23.1	23.8	35
MCV430 + PR250	2 = 380V/60Hz	29.4	30.5	35
	A = 460V/60Hz	23.8	24.7	25
	G = 415V/50Hz	28.4	29.3	30
	B = 575V/60Hz	19.0	19.7	30

FLA = Full Load Amps; WSA = Wire Size Amps; OPD = Maximum Overcurrent Protection Device.

*For 380-V, 50-Hz application, consult the factory for SFA.

Source: DPN005045, Rev. 6

Table 8.4 Vertiv™ CoolPhase Condenser Condenser-Only Electrical Data, Three-Phase

Model	Voltage	FLA	WSA	OPD
MCV440	2 = 380V/60Hz	28.0	28.9	30
	A = 460V/60Hz	22.4	23.1	25
	M = 380-415V/50Hz	28.0	28.9	30
	G = 415V/50Hz	28.0	28.9	30
MCV430	2 = 380V/60Hz	21.0	21.9	25
	A = 460V/60Hz	16.8	17.5	20
	M = 380-415V/50Hz	21.0	21.9	25
	G = 415V/50Hz	21.0	21.9	25

FLA = Full Load Amps; WSA = Wire Size Amps; OPD = Maximum Overcurrent Protection Device.

*For 380-V, 50-Hz application, consult the factory for SFA.

Source: DPN005045, Rev. 6

© 2026 Vertiv Group Corp.
All Rights Reserved.

9 Checklist for Completed Installation

9.1 Moving and Placing Equipment

1. Unpack and check received material.
2. Make sure that proper clearance for service access has been maintained around the equipment.
3. Check that equipment is level and mounting fasteners are tight.

9.2 Electrical Installation Checks

1. Check that supply voltage and phase matches equipment nameplate.
2. Check that power wiring connections completed to the disconnect switch, evaporator unit and heat rejection equipment.
3. Check that power line circuit breakers or fuses have proper ratings for equipment installed.
4. Control wiring connections completed between indoor evaporator and heat rejection equipment.
5. Ensure that all internal and external high and low voltage wiring connections are tight.
6. Confirm that unit is properly grounded to an earth ground.
7. Check that control transformer setting matches incoming power.
8. Confirm that electrical service conforms to national and local codes.
9. Check blowers and compressors for proper rotation.

9.3 Piping Installation Checks

1. Check that piping is completed to refrigerant loop.
2. Confirm that piping has been leak checked.
3. Check that additional oil has been added for system charges over 40 lbs (18.1 kg) per circuit. See Additional Oil Requirements for Digital Scroll Compressors on page 49 .
4. Check that piping is properly sized, sloped and trapped as shown in the piping schematics.
5. Check piping inside and outside of equipment for proper support and adequate spacing to prevent rub through.
6. Ensure that factory clamps have been reinstalled.
7. Confirm that the drain line is connected, not obstructed, and pitched per local code.

9.4 Other Installation Checks

1. Make sure that ducting or plenum assembly complete (if required), maintain access to filters.
2. Check that filters are installed.
3. Check fasteners that secure motors—some may have become loose during shipment.
4. Verify water detection is properly installed around all units (recommended).
5. Confirm that blower drive system rotates freely.
6. Check all fans are free of debris.

© 2026 Vertiv Group Corp.
All Rights Reserved.

7. Set fan airflow calibration voltage. Refer to Table 9.1 below and Table 9.2 on the facing page , for values. The values are set in the Vertiv Liebert iCOM Service menu > *Setpoints* > *Fan*.

Table 9.1 Airflow Calibration Voltage for DA250

Return Air (1), (2), (3)		DA250 with Bottom Discharge				DA250 with Horizontal Discharge			
		60 Hz		50 Hz		60 Hz		50 Hz	
		0.2" ESP (50 Pa)	0.5" ESP (124 Pa)	0.2" ESP (50 Pa)	0.5" ESP (124 Pa)	0.2" ESP (50 Pa)	0.5" ESP (124 Pa)	0.2" ESP (50 Pa)	0.5" ESP (124 Pa)
ACFM	ACMH	Airflow Calibration Voltage (V)				Airflow Calibration Voltage (V)			
25,000	42,475	5.35	5.63	6.40	6.73	5.27	5.55	6.31	6.64
26,000	44,174	5.54	5.80	6.62	6.94	5.45	5.72	6.52	6.85
27,000	45,873	5.72	5.98	6.85	7.15	5.63	5.89	6.74	7.05
28,000	47,572	5.91	6.16	7.07	7.37	5.81	6.07	6.96	7.26
29,000	49,271	6.09	6.34	7.29	7.58	5.99	6.24	7.17	7.46
30,000	50,970	6.28	6.51	7.51	7.79	6.17	6.41	7.39	7.67
31,000	52,669	6.47	6.69	7.74	8.01	6.35	6.58	7.60	7.88
32,000	54,368	6.65	6.87	7.96	8.22	6.53	6.76	7.82	8.09
33,000	56,067	6.84	7.05	8.18	8.44	6.71	6.93	8.03	8.29
34,000	57,766	7.03	7.23	8.41	8.66	6.89	7.11	8.25	8.50
35,000	59,465	7.21	7.42	8.63	8.87	7.07	7.28	8.46	8.71
36,000	61,164	7.40	7.60	8.85	9.09	7.25	7.46	8.68	8.92
37,000	62,863	7.59	7.78	9.08	9.31	7.43	7.63	8.90	9.13
38,000	64,562	7.77	7.96	9.3	9.52	7.61	7.81	9.11	9.34
39,000	66,261	7.96	8.14	9.52	9.74	7.79	7.98	9.33	9.55
40,000	67,960	8.15	8.33	9.75	(4)	7.97	8.16	9.54	9.76
41,000	69,659	8.33	8.51	(4)	(4)	8.15	8.33	9.76	(4)
42,000	71,358	8.52	8.69	(4)	(4)	8.33	8.51	(4)	(4)
43,000	73,057	8.71	8.87	(4)	(4)	8.51	8.68	(4)	(4)
44,000	74,756	8.89	9.06	(4)	(4)	8.69	8.86	(4)	(4)
45,000	76,455	9.08	9.24	(4)	(4)	8.87	9.03	(4)	(4)
46,000	78,154	9.27	9.42	(4)	(4)	9.05	9.21	(4)	(4)
47,000	79,853	9.45	9.61	(4)	(4)	9.23	9.39	(4)	(4)

© 2026 Vertiv Group Corp.

All Rights Reserved.

Table 9.1 Airflow Calibration Voltage for DA250 (continued)

Return Air (1), (2), (3)		DA250 with Bottom Discharge				DA250 with Horizontal Discharge			
		60 Hz		50 Hz		60 Hz		50 Hz	
		0.2" ESP (50 Pa)	0.5" ESP (124 Pa)	0.2" ESP (50 Pa)	0.5" ESP (124 Pa)	0.2" ESP (50 Pa)	0.5" ESP (124 Pa)	0.2" ESP (50 Pa)	0.5" ESP (124 Pa)
ACFM	ACMH	Airflow Calibration Voltage (V)				Airflow Calibration Voltage (V)			
48,000	81,552	9.64	(4)	(4)	(4)	9.41	9.56	(4)	(4)
49,000	83,251	(4)	(4)	(4)	(4)	9.59	9.74	(4)	(4)

1. Return air conditions for data: 95°F (35°C) DB, 52°F (11.1°C) DP, 300 ft (91m) elevation
2. Assumes clean filters.
3. Please contact your Vertiv representative for specific values which are available from Vertiv blower and performance programs.
4. A blower system is not available for the airflow and ESP.

Table 9.2 Airflow Calibration Voltage for DA265

Return Air (1), (2), (3)		DA265 with bottom discharge				DA265 with horizontal discharge			
		60 Hz		50 Hz		60 Hz		50 Hz	
		0.2" ESP (50 Pa)	0.5" ESP (124 Pa)	0.2" ESP (50 Pa)	0.5" ESP (124 Pa)	0.2" ESP (50 Pa)	0.5" ESP (124 Pa)	0.2" ESP (50 Pa)	0.5" ESP (124 Pa)
ACFM	ACMH	Airflow Calibration Voltage (V)				Airflow Calibration Voltage (V)			
25,000	42,475	5.46	5.73	6.53	6.86	5.38	5.66	6.44	6.77
26,000	44,174	5.64	5.91	6.75	7.07	5.56	5.83	6.66	6.97
27,000	45,873	5.83	6.09	6.98	7.28	5.74	6	6.87	7.18
28,000	47,572	6.02	6.26	7.20	7.50	5.92	6.17	7.09	7.39
29,000	49,271	6.20	6.44	7.42	7.71	6.10	6.35	7.30	7.59
30,000	50,970	6.39	6.62	7.65	7.92	6.29	6.52	7.52	7.80
31,000	52,669	6.58	6.80	7.87	8.14	6.47	6.69	7.74	8.01
32,000	54,368	6.76	6.98	8.09	8.35	6.65	6.87	7.95	8.22
33,000	56,067	6.95	7.16	8.31	8.57	6.83	7.04	8.17	8.43
34,000	57,766	7.14	7.34	8.54	8.79	7.01	7.22	8.38	8.63
35,000	59,465	7.32	7.53	8.76	9	7.19	7.39	8.60	8.84
36,000	61,164	7.51	7.71	8.99	9.22	7.37	7.57	8.82	9.05
37,000	62,863	7.70	7.89	9.21	9.44	7.55	7.74	9.03	9.26
38,000	64,562	7.88	8.07	9.43	9.66	7.73	7.92	9.25	9.47
39,000	66,261	8.07	8.25	9.66	9.87	7.91	8.09	9.46	9.68

© 2026 Vertiv Group Corp.
All Rights Reserved.

Table 9.2 Airflow Calibration Voltage for DA265 (continued)

Return Air (1), (2), (3)		DA265 with bottom discharge				DA265 with horizontal discharge			
		60 Hz		50 Hz		60 Hz		50 Hz	
		0.2" ESP (50 Pa)	0.5" ESP (124 Pa)	0.2" ESP (50 Pa)	0.5" ESP (124 Pa)	0.2" ESP (50 Pa)	0.5" ESP (124 Pa)	0.2" ESP (50 Pa)	0.5" ESP (124 Pa)
ACFM	ACMH	Airflow Calibration Voltage (V)				Airflow Calibration Voltage (V)			
40,000	67,960	8.26	8.44	(4)	(4)	8.09	8.27	9.68	(4)
41,000	69,659	8.44	8.62	(4)	(4)	8.27	8.44	(4)	(4)
42,000	71,358	8.63	8.8	(4)	(4)	8.45	8.62	(4)	(4)
43,000	73,057	8.82	8.99	(4)	(4)	8.63	8.8	(4)	(4)
44,000	74,756	9.01	9.17	(4)	(4)	8.81	8.97	(4)	(4)
45,000	76,455	9.19	9.35	(4)	(4)	8.98	9.15	(4)	(4)
46,000	78,154	9.38	9.54	(4)	(4)	9.16	9.32	(4)	(4)
47,000	79,853	9.57	(4)	(4)	(4)	9.34	9.50	(4)	(4)
48,000	81,552	(4)	(4)	(4)	(4)	9.52	9.67	(4)	(4)
49,000	83,251	(4)	(4)	(4)	(4)	9.7	(4)	(4)	(4)

1. Return air conditions for data: 95°F (35°C) DB, 52°F (11.1°C) DP, 300 ft (91m) elevation.
2. Assumes clean filters.
3. Please contact your Vertiv representative for specific values which are available from Vertiv blower and performance programs.
4. A blower system is not available for the airflow and ESP.

9.5 Refrigerant Leak Mitigation

For information regarding the Refrigerant Leak Detection system, Mitigation Mode, and testing procedures, refer to Diagnosing Refrigerant Leak Detection Issues in the Vertiv™ CoolPhase Perimeter and CoolLoop Perimeter iCOM™ Installer/User Guide (SL-80185).

Table 9.3 Fan Speed Setting for Refrigerant Leak Mitigation

Unit	Mitigation Setting (cfm)[1]	Equivalent % Fan Speed
DA250	11,650	25%
DA265	11,650	25%

Source: 20000578, Rev. B

[1]Mitigation airflow is an approximation based on lowest airflow condition for Vertiv Thermal Management unit.

© 2026 Vertiv Group Corp.
All Rights Reserved.

10 Initial Start-up Checks and Commissioning Procedure for Warranty Inspection

WARNING! Arc flash and electric shock hazard. Can cause serious injury or death. Building and equipment damage may also result. Disconnect all local and remote electric power supplies and wear appropriate, OSHA-approved personal protective equipment (PPE) per NFPA 70E before working within the electric control enclosure. Customer must provide earth ground to unit, per NEC, CEC and local codes, as applicable.

Verify with a voltmeter that power is Off. The Vertiv Liebert iCOM controller does not isolate power from the unit, even in the “Unit Off” mode. Some internal components still require and receive power even during the “Unit Off” mode of the Vertiv Liebert iCOM 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.

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. Follow all local codes.

WARNING! Risk of electric shock. Can cause serious injury or death. Building and equipment damage may also result. Open all local and remote electric power supply disconnect switches and verify that power is off with a voltmeter before working within any electric connection enclosures. The Vertiv Liebert iCOM 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 Vertiv Liebert iCOM controller.

Installation, 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 improper wiring, piping, moving, lifting and handling. Can cause serious injury or death. Building and equipment damage may also result. 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.

NOTICE

Risk of improper electrical connection of three phase input power. Can cause backward compressor rotation and unit damage. Service technicians should use a gauge set on the system during the initial startup to verify that the three phase power is connected properly. Three phase power must be connected to the unit line voltage terminals in the proper sequence so that the compressors rotate in the proper direction. Incoming power must be properly phased to prevent compressors from running backward. We recommend checking the unit’s phasing with proper instrumentation to ensure that power connections were made correctly. We also recommend verifying discharge and suction pressures during startup to ensure that the compressors are running in the correct direction.

© 2026 Vertiv Group Corp.

All Rights Reserved.

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 back-up 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.

See transformer label for primary tap connections. Installer will need to change transformer primary taps if applied unit voltage is other than pre-wired tap voltage.

- Confirm that all items on Checklist for Completed Installation on page 61 have been done.
- Locate the Vertiv™ CoolPhase Perimeter Warranty Inspection Check Sheet in the unit's electric panel.
- Complete the Vertiv™ CoolPhase Perimeter Thermal Management System Low GWP Warranty Inspection Check Sheet during start-up.
- Forward the completed Vertiv™ CoolPhase Perimeter Thermal Management System Low GWP Warranty Inspection Check Sheet to your local sales office. **This information must be completed and forwarded to validate warranty.**
- Contact your local sales representative or technical support if you have any questions or problems during unit start-up and commissioning. Visit https://www.Vertiv.com/en-us/support/ or call 1-800-543-2778 for contacts.

© 2026 Vertiv Group Corp.

All Rights Reserved.

11 Maintenance

WARNING! Arc flash and electric shock hazard. Can cause serious injury or death. Building and equipment damage may also result. Disconnect all local and remote electric power supplies and wear appropriate, OSHA-approved personal protective equipment (PPE) per NFPA 70E before working within the electric control enclosure. Customer must provide earth ground to unit, per NEC, CEC and local codes, as applicable.

Verify with a voltmeter that power is Off. The Vertiv Liebert iCOM controller does not isolate power from the unit, even in the “Unit Off” mode. Some internal components still require and receive power even during the “Unit Off” mode of the Vertiv Liebert iCOM 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.

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. Follow all local codes.

WARNING! Risk of electric shock. Can cause serious injury or death. Building and equipment damage may also result. Open all local and remote electric power supply disconnect switches and verify that power is off with a voltmeter before working within any electric connection enclosures. The Vertiv Liebert iCOM 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 Vertiv Liebert iCOM controller.

Installation, 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 short circuits and electric shock. Can cause serious injury or death. Building and equipment damage can result from cut insulation or damaged wires. Can cause overheated wiring, smoke, fire, activation of fire suppression systems and EMS personnel, and loss of power to fans. Verify that all wiring connections are tight and that all wiring is contained within the junction box prior to closing and securing the cover.

Insert CSA-certified or UL-listed bushings into holes and/or knockouts used to route wiring through metal panels to protect the wire insulation from contact with sheet metal edges.

WARNING! Risk of improper wire sizing/rating and loose electrical connections causing overheated wire and electrical connection terminals resulting in smoke or fire. Can cause serious injury or death. Building and equipment damage may also result. 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.

© 2026 Vertiv Group Corp.
All Rights Reserved.

WARNING! Risk of explosive discharge of high-pressure refrigerant. Can cause serious injury or death. Building and equipment damage may also result. The handling, installation, cleaning, servicing and disposal/reclaim of refrigerant shall be in accordance with all national and local codes.

WARNING! Risk of fire due to flammable refrigerant. Perform safety check to minimize the risk of ignition before working on unit. All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Ventilation is required and work in confined spaces shall be avoided. Check for presence of refrigerant with appropriate detector. Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used. Fire extinguisher shall be available. No ignition sources during service, with "no smoking" signs displayed.

CAUTION: Risk of improper handling heavy and lengthy parts. Can cause injury. Building and equipment damage may also result. Cabinet panels can exceed 5 ft. (1.5 m) in length and weigh more than 35 lb (15.9 kg). Follow relevant OSHA lifting recommendations and consider using a two-person lift for safe and comfortable removal and installation of cabinet panels. Only properly trained and qualified personnel wearing appropriate, OSHA-approved PPE should attempt to remove or install cabinet panels

The Vertiv CoolPhase Perimeter Thermal Management System Low GWP is a single component in the facility heat removal system. The system includes air distribution (raised floors, duct systems), outdoor heat rejection (condensers, pumps) and indoor cooling and humidity loads (equipment load, location, outside air infiltration). Proper application and maintenance of the entire system is critical to the life and reliability of the thermal-management units.

- Good maintenance practices are essential to minimizing operation costs and maximizing product life.
- Read and follow monthly and semi-annual maintenance schedules included in this manual. These *minimum* maintenance intervals may need to be more frequent based on site-specific conditions.
- See the Vertiv™ CoolPhase Perimeter and CoolLoop Perimeter iCOM™ User Manual, SL-80185, available at www.Vertiv.com, for instructions on using the controller to predict some service maintenance intervals.
- We recommend the use of trained and authorized service personnel, extended service contracts and factory specified replacement parts. Contact your Vertiv sales representative.

11.1 Filters

NOTICE

Risk of improper filter installation. Can cause filter collapse and airflow reduction.

To maximize the performance and reliability of the equipment, use only Vertiv filters. Contact your Vertiv representative to order replacement filters.

Verify that filters are installed and positioned so the airflow direction marked on the filter is the same direction as unit air flow.

© 2026 Vertiv Group Corp.
All Rights Reserved.

Table 11.1 Filter Quantity and Type

Unit Size	Filter Type	Filter Size, Width x Length x Depth in. (mm)	Quantity
DA250, DA265	MERV 8 or MERV 11	28 X 22 X 4 (711 X 559 X 102)	15

11.1.1 Replacing the Filters

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.

Enter the unit through the service access door, and locate the supply side air filters in front of the heat exchanger. Refer to 20000345 in Submittal Drawings on page 95 .

Table 11.2 Filter Replacement Drawings

Document Number	Title
20000345	Vertiv™ CoolPhase Perimeter DA250-DA265 Filter Replacement

11.2 Fan Maintenance

11.2.1 Fan Assembly Troubleshooting

Any safety hazards stemming from the device must be re-evaluated once it is installed in the end device.

Do not make any modifications, additions or conversions to the fan assembly without the approval of Vertiv.

WARNING! Risk of electric shock. Can cause serious injury or death. Open all local and remote electric power supply disconnect switches and verify that power is off with a voltmeter before working within any electric connection enclosures. The Vertiv Liebert iCOM controller does not isolate power from the unit, even in the "Unit Off" mode. Fan-motor controls can maintain an electric charge for 10 minutes after power is disconnected. Wait 10 minutes after power is verified as off before working within the electric control/connection enclosures.

Installation, 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.

© 2026 Vertiv Group Corp.
All Rights Reserved.

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 exposure to harmful noise levels. Can cause hearing injury or loss. Depending on the installation and operating conditions, a sound pressure level greater than 70 dB(A) may arise. Take appropriate technical safety measures. Operating personnel must wear appropriate, OSHA-approved PPE and observe all appropriate hearing protection safety requirements.

CAUTION: Risk of contact with hot surfaces. Can cause injury. Personal burn injury can be the result of touching an electronics housing, fan motor, and some electrical components that are extremely hot during unit operation. Allow sufficient time for them to cool to a touch-safe temperature before working within the unit cabinet.

Use extreme caution and wear appropriate, OSHA-approved PPE when working on or near hot components, including when replacing or performing maintenance on the fans.

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 startup, 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.

NOTE: Do not assume that the fan blades will not start to spin. If the motor is in a fault condition, it will safely shut down. Once the fault condition is cleared, there are certain conditions in which the motor will automatically resume operation.

11.2.2 Fan Impellers

Fan impellers should be periodically inspected and any debris removed. Check to ensure that the impellers can rotate freely.

Consult the factory for fan assembly maintenance and removal instructions. Do not attempt to service or remove the fans without first contacting Vertiv support at 1-800-543-2778.

© 2026 Vertiv Group Corp.

All Rights Reserved.

11.2.3 Blower Motor Lubrication

The motor is initially lubricated at the factory.

Every year from DA250 and DA265 start up, the motor bearings should be lubricated.

Use Exxon Polyrex EM grease Vertiv part 341166P1.

See DA250 and DA265 Motor Maintenance on page 91 .

11.2.4 Removing Fan Assembly

Do not attempt to remove the fan assemblies without first contacting Vertiv Technical Support at 1-800-543-2778.

11.3 Condensate Drain and Condensate Pump System Maintenance

11.3.1 Condensate Drain

Check for and clear obstructions in tubing during routine maintenance.

11.3.2 Condensate Pump

WARNING! Risk of electric shock. Can cause serious injury or death. Open all local and remote electric power supply disconnect switches and verify that power is off with a voltmeter before working within any electric connection enclosures. The Vertiv Liebert iCOM controller does not isolate power from the unit, even in the "Unit Off" mode. Condensate pump will stay energized and has the potential to operate even in the “Unit Off” mode.

Installation, 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.

To maintain the condensate pump:

1. Disconnect power to the unit using the disconnect switch.
2. Check for and clear obstructions in gravity lines leading to the condensate pump.
3. Remove the sump, clean with a stiff nylon brush and flush with water.
4. Inspect and clear clogs in the discharge check valve and float mechanism.
5. Reassemble and check for leaks.

© 2026 Vertiv Group Corp.
All Rights Reserved.

11.4 Electronic Expansion Valve (EEV) Maintenance

The EEV controls superheat through the Vertiv Liebert iCOM controls by actively measuring suction pressure via a transducer attached to the suction line rotalock and suction temperature via a thermister strapped to the suction line. The EEV actively adjusts the orifice size and resulting mass flow of refrigerant to maintain the superheat setpoint (set in Vertiv Liebert iCOM). The EEV is used in place of the standard thermal expansion valve (TXV).

WARNING! Risk of electric shock. Can cause serious injury or death. Building and equipment damage may also result. Open all local and remote electric power supply disconnect switches and verify that power is off with a voltmeter before working within any electric connection enclosures. The Vertiv Liebert iCOM 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 Vertiv Liebert iCOM controller.

Installation, 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.

NOTE: Intermittent loss of subcooling may result in EEV/superheat instability. If superheat instability is observed, check for proper refrigerant level in receiver (see Refrigerant Piping Guidelines for Air Cooled Systems on page 45 for the proper charge level). If proper charge is observed in receiver, and superheat remains unstable, then increase superheat setting in the Vertiv Liebert iCOM to 15°F (8.49°C).

11.5 Compressor Maintenance

WARNING! Risk of over-pressurization of the refrigeration system. Can cause serious injury or death. Building and equipment damage may also result. Can cause explosive discharge of high-pressure refrigerant, loss of refrigerant, or environmental pollution. This unit contains fluids and gases under high pressure. Use extreme caution when charging the refrigerant system. Do not pressurize the system higher than the design pressure marked on the unit's nameplate.

11.5.1 Compressor Oil

NOTICE

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

Failure to use oil types, viscosities and quantities recommended by the compressor manufacturer may reduce compressor life and void the compressor warranty.

- Do not mix polyolester (POE) and mineral based oils.
- Do not mix oils of different viscosities.
- Consult Vertiv technical support or the compressor manufacturer if questions arise.

© 2026 Vertiv Group Corp.
All Rights Reserved.

Table 11.3 Compressor Oil Types for R-454B Refrigerant

Compressor Type	Oil Type
Copeland Digital Scroll	POE Oil - ISO 32 Centistoke Viscosity[1]
1. Use Copeland POE Oil ULTRA 32-3MAF or other Copeland-approved oils.	
20000354, Rev A	

11.5.2 Replacement Compressors

Replacement compressors are available through your Vertiv sales office. If the unit is under warranty, the replacement compressor must be obtained from and the original compressor returned to your local Vertiv sales office. Compressors are shipped in reusable packaging, and the original compressor should be returned in the same packaging.

11.5.3 Unloading Solenoid(s) on a Digital Scroll Compressor

When replacing a digital scroll compressor, the digital solenoid valve and coil must be replaced. The compressor and valve kit are shipped separately. The valve kit must be field brazed to the top of the compressor in proper orientation and supported with the original factory bracket.

11.5.4 Compressor Electrical Failure (Motor Burnout)

If a burnout has occurred, a full system clean out is required. If not cleaned, compressor and system problems will continue.

Consult the factory for compressor maintenance. Do not attempt to remove the compressor without first contacting Vertiv support at 1-800-543-2778.

© 2026 Vertiv Group Corp.
All Rights Reserved.

11.5.5 Replacing a Compressor with Electrical Failure (Motor Burnout)

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 Vertiv 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 over-pressurization of the refrigeration system. Can cause serious injury or death. Building and equipment damage may also result. Can cause explosive discharge of high-pressure refrigerant, loss of refrigerant, or environmental pollution. This unit contains fluids and gases under high pressure. Use extreme caution when charging the refrigerant system. Do not pressurize the system higher than the design pressure marked on the unit's nameplate.

NOTE: Release of refrigerant to the atmosphere is harmful to the environment. Refrigerant must be recycled or discarded in accordance with federal, state, and local regulations.

1. Attach suction and discharge gauges to access fittings.
2. Recover refrigerant using an approved recovery procedure and equipment. Use a filter drier when charging the system with recovered refrigerant.
3. Remove the marked pressure transducer and the discharge pressure switch. Disconnect all electrical connections.
4. Detach service valves from the compressor. (Service valves not present on units with model digit 10 = W, N, R, or E.)
5. Remove the failed compressor.
6. Follow compressor manufacturer's suggested clean-out procedures.
7. Install the replacement compressor and make all connections. Replace the gaskets or seals on the service valves. (Service valves not present on units with model digit 10 = W, N, R, or E.)

   Replace the unloading solenoid.
8. Evacuate, charge and operate per the appropriate procedure per local codes:
   - Evacuation, Leak Testing, and Charging Air Cooled Systems on page 51
9. Verify oil charge per Verifying Additional Oil Charge on page 58 .

NOTICE

Risk of improper component re-installation. Can cause equipment damage.

Identify and mark location of suction pressure transducer and discharge pressure switch. These devices look similar and they must be reinstalled in their original location.

11.5.6 Compressor Mechanical Failure

If mechanical failure of the compressor has occurred, only the compressor needs replaced. A full system clean out is not required.

© 2026 Vertiv Group Corp.

All Rights Reserved.

11.5.7 Replacing a Compressor with Mechanical Failure

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 Vertiv 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 over-pressurization of the refrigeration system. Can cause serious injury or death. Building and equipment damage may also result. Can cause explosive discharge of high-pressure refrigerant, loss of refrigerant, or environmental pollution. This unit contains fluids and gases under high pressure. Use extreme caution when charging the refrigerant system. Do not pressurize the system higher than the design pressure marked on the unit's nameplate.

NOTE: Release of refrigerant to the atmosphere is harmful to the environment. Refrigerant must be recycled or discarded in accordance with federal, state, and local regulations.

1. Attach suction and discharge gauges to access fittings.
2. Recover refrigerant using an approved recovery procedure and equipment. Use a filter drier when charging the system with recovered refrigerant.
3. Remove the marked pressure transducer and the discharge pressure switch. Disconnect all electrical connections.
4. Remove the failed compressor.
5. Install the replacement compressor and make all connections. Replace the unloading solenoid.
6. Evacuate, charge and operate per the appropriate procedure per local codes:
   - Evacuation, Leak Testing, and Charging Air Cooled Systems on page 51
7. Verify oil charge per Verifying Additional Oil Charge on page 58 .

NOTICE

Risk of improper component re-installation. Can cause equipment damage.

Identify and mark location of suction pressure transducer and discharge pressure switch. These devices look similar and they must be reinstalled in their original location.

11.6 Evaporator Coil

The DA250 and DA265 units contain single slab coils. This results in different evaporator (suction) temperatures between System 1 and System 2. The outer coil (System 1) will operate at a higher evaporator temperature than the inner coil (System 2) when operating at the same compressor loading.

© 2026 Vertiv Group Corp.
All Rights Reserved.

11.7 Air Cooled Condenser Maintenance

Restricted airflow will reduce operating efficiency and could result in high compressor head pressure and loss of cooling.

- Clear the coil surface of all debris that will inhibit airflow.
- Check for bent or damaged coil fins and correct.
- Do not permit snow to accumulate around or under the outdoor unit.
- Periodically consider commercial cleaning of the coil surface.
- Inspect fans, motors and controls for proper operation.
- Check all piping and capillaries for proper support.
- Inspect for leaks.
- Check contactors for pitting. Replace if pitted.

11.8 Units with a Refrigeration Detection System

For units with a Refrigerant Detection System:

REFRIGERANT DETECTION SYSTEMS shall only be replaced with sensors specified by Vertiv.

A service schedule shall be made to verify that the safety systems of the appliance are working as intended, at a minimum interval of once per year.

A design failure mode and effects analysis of the circulation airflow path must be conducted, in the ITE (Information Technology Equipment) AREA, to ensure the airflow velocity is at least 1 m/s for all operating conditions expected for the life of the ITE AREA.

Vertiv models with A2L refrigerants provide an output signal for use in notifying the user that a REFRIGERANT DETECTION SYSTEM has been activated. The user shall provide a notification means of receiving the output signal. If this signal is used for an alarm, the alarm shall comply with all national and local codes.

11.9 Decommissioning

Equipment shall be labeled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed.

11.10 Qualification of Workers

The manual shall contain specific information about the required qualification of the working personnel for maintenance, service and repair operations. Every working procedure that affects safety means shall only be carried out by competent persons.

Examples for such working procedures are:

- Breaking into the refrigerating circuit
- Opening of sealed components
- Opening of ventilated enclosures

Information of procedures additional to usual information for refrigerating appliance installation, repair, maintenance, and decommission procedures is required when an appliance with FLAMMABLE REFRIGERANTS is affected.

© 2026 Vertiv Group Corp.

All Rights Reserved.

The training of these procedures is carried out by national training organizations or manufacturers that are accredited to teach the relevant national competency standards that may be set in legislation. The achieved competence should be documented by a certificate.

11.11 Information on Servicing

The manual shall contain specific information for service personnel according to the following:

11.11.1 Checks to the Area

Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimized. For repair to the REFRIGERATING SYSTEM, the following checks to the area shall be completed prior to conducting work on the system.

11.11.2 Work Procedure

Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor being present while the work is being performed.

11.11.3 General Work Area

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

11.11.4 Checking for Presence of Refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e., non-sparking, adequately sealed or intrinsically safe.

11.11.5 Presence of Fire Extinguisher

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO2 fire extinguisher adjacent to the charging area.

11.11.6 No Ignition Sources

No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. No Smoking signs shall be displayed.

11.11.7 Ventilated Area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

© 2026 Vertiv Group Corp.

All Rights Reserved.

11.11.8 Checks to the Refrigerating Equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.

The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

- The actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed.
- The ventilation machinery and outlets are operating adequately and are not obstructed.
- Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected.
- Refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

11.11.9 Checks to Electrical Devices

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.

Initial safety checks shall include:

- That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking.
- That no live electrical components and wiring are exposed while charging, recovering or purging the system.
- That there is continuity of earth bonding.

11.11.10 Cabling

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

11.11.11 Detection of Flammable Refrigerants

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

The following leak detection methods are deemed acceptable for all refrigerant systems.

Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.

© 2026 Vertiv Group Corp.

All Rights Reserved.

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

NOTE: Examples of leak detection fluids are:

- Bubble method
- Fluorescent method agents

If a leak is suspected, all naked flames shall be removed/extinguished.

If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Removal of refrigerant shall be according to Clause DD.9.

11.11.12 Removal and Evacuation

When breaking into the refrigerant circuit to make repairs – or for any other purpose – conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration.

The following procedure shall be adhered to:

- Safely remove refrigerant following local and national regulations.
- Evacuate (optional for A2L); continuously flush or purge with inert gas when using flame to open circuit; and open the circuit.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

11.11.13 Charging Procedures

In addition to conventional charging procedures, the following requirements shall be followed:

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
- Cylinders shall be kept in an appropriate position according to the instructions.
- Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

© 2026 Vertiv Group Corp.

All Rights Reserved.

11.11.14 Decommissioning

Prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

1. Become familiar with the equipment and its operation.
2. Isolate system electrically.
3. Before attempting the procedure, ensure that:
    a. Mechanical handling equipment is available, if required, for handling refrigerant cylinders.
    b. All personal protective equipment is available and being used correctly.
    c. The recovery process is supervised at all times by a competent person.
    d. Recovery equipment and cylinders conform to the appropriate standards.
4. Pump down refrigerant system, if possible.
5. If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
6. Make sure that cylinder is situated on the scales before recovery takes place.
7. Start the recovery machine and operate in accordance with instructions.
8. Do not overfill cylinders (no more than 80 % volume liquid charge).
9. Do not exceed the maximum working pressure of the cylinder, even temporarily.
10. When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
11. Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

11.11.15 Labeling

Equipment shall be labeled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating the equipment contains FLAMMABLE REFRIGERANT.

11.11.16 Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labeled for that refrigerant (i.e., special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of the flammable refrigerant. If in doubt, the manufacturer should be consulted. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition.

The recovered refrigerant shall be processed according to local legislation in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

© 2026 Vertiv Group Corp.

All Rights Reserved.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

© 2026 Vertiv Group Corp.
All Rights Reserved.

This page intentionally left blank

© 2026 Vertiv Group Corp.
All Rights Reserved.

12 Preventive Maintenance Checklist

Source: 20000356, Rev. A

Inspection Date			Job Name	
Indoor Unit Model #			Indoor Unit Serial Number #	
Condenser/Drycooler Model #			Condenser/Drycooler Serial #	
Room Temperature/Humidity	°	%	Ambient Temperature	°

Not all units will have all components. To determine your unit's configuration, compare the Indoor Unit Model # above and the information in the Components and Nomenclature section.

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. We recommend the use of trained and authorized service personnel, extended service contracts, and factory certified replacement parts. Contact your local sales representative for more details.

***Check all that apply*:**

Evaporator/Filters

☐ Check/Replace filters.

☐ Make sure that the grille area is unrestricted.

☐ Wipe section clean.

☐ Coil clean.

☐ Clean the condensate pan.

☐ Clean the trap in the condensate drain.

☐ Check/test the filter-clog switch operation (if equipped).

Blower Section (EC fan)

☐ Verify that the mounting bolts are tight.

☐ Fan guard bolts tight.

☐ Confirm that the impeller spins freely.

☐ Check/test the air sail switch (if equipped).

☐ Check the motor amp draw.

☐ Compare to nameplate amps.

#1	L1	L2	L3
#2	L1	L2	L3
#3	L1	L2	L3

© 2026 Vertiv Group Corp.
All Rights Reserved.

☐ Check the belt tension and condition (replace if needed).

☐ Check the sheave/pulley (replace if worn).

Condensate Pump (if equipped)

☐ Check for debris in the sump.

☐ Check the operation of float(s) (free movement).

☐ Check/clean the discharge check valve.

Electrical Panel

☐ Check the fuses.

☐ Check the contactors for pitting (replace if pitted).

☐ Check/re-torque the wire connections.

Controls

☐ Check/verify the control operation (sequence).

☐ Check/test the changeover device(s) (if equipped).

☐ Check/test the water detection device(s) (if equipped).

☐ Check/test the CAN connection between the indoor and outdoor units (if equipped).

Refrigeration Piping

☐ Check the refrigerant lines (clamps secure/no rubbing/no leaks).

☐ Check for moisture (sight glass).

☐ Check for restriction temperature drop across filter drier.

☐ Verify proper oil in compressor by using procedure outlined in Verifying Additional Oil Charge on page 58 .

© 2026 Vertiv Group Corp.
All Rights Reserved.

Compressor Section

☐ Check the oil level.

☐ Check for oil leaks

☐ Check the compressor mounts (springs/bushings).

☐ Verify that the cap tubes are not rubbing.

☐ Check/re-torque the wire connections (inside the compressor box).

☐ Check the compressor operation (vibration/noise).

☐ Check the crank-case heater fuses/operation.

☐ Check for refrigerant leaks.

☐ Suction pressure	Circuit #1	_____	Circuit #2	_____
☐ Discharge pressure	Circuit #1	_____	Circuit #2	_____
☐ Superheat	Circuit #1	_____	Circuit #2	_____
☐ Low pressure switch cut out	Circuit #1	_____	Circuit #2	_____
☐ Low pressure cut in	Circuit #1	_____	Circuit #2	_____
☐ High pressure cut out	Circuit #1	_____	Circuit #2	_____

☐ Amp draw

Circuit #1A	L1	L2	L3
Circuit #1B	L1	L2	L3
Circuit #2A	L1	L2	L3
Circuit #2B	L1	L2	L3

© 2026 Vertiv Group Corp.
All Rights Reserved.

Vertiv™ CoolPhase Condenser

☐ Make sure that the coil is clean of debris (clean coil if required).

☐ Verify that the fans are free of debris.

☐ Ensure that the fans are securely mounted.

☐ Confirm that the motor bearings are in good condition.

☐ Check all refrigerant lines for vibration isolation. Support as necessary.

☐ Check for refrigerant leaks.

☐ Check the surge protection device (if installed) status-indicator lights.

☐ Check/Re-torque the wire connections.

☐ Check the contactors for pitting (replace if pitted).

☐ Verify the operation sequence/setpoints.

☐ Charge verification:

Outdoor Ambient Temperature _____

Subcooling _____

Indoor unit return air temperature _____

Receiver sight-glass level _____

☐ Motor amp draw

#1	L1	L2	L3
#2	L1	L2	L3
#3	L1	L2	L3
#4	L1	L2	L3
#5	L1	L2	L3
#6	L1	L2	L3
#7	L1	L2	L3
#8	L1	L2	L3
#9	L1	L2	L3
#10	L1	L2	L3
#11	L1	L2	L3
#12	L1	L2	L3
#13	L1	L2	L3
#14	L1	L2	L3
#15	L1	L2	L3
#16	L1	L2	L3

© 2026 Vertiv Group Corp.
All Rights Reserved.

Vertiv™ EconoPhase Pumped Refrigerant Economizer

☐ Check for refrigerant leaks.

☐ Check/re-torque the wire connections.

☐ Check the contactors for pitting (replace if pitted).

☐ Verify the pump-speed control operation.

☐ Check the pump mounting.

© 2026 Vertiv Group Corp.
All Rights Reserved.

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 1-800-543-2778.

© 2026 Vertiv Group Corp.

All Rights Reserved.

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

Vertiv Thermal Management Products

1-800-543-2378

Vertiv Channel Products

1-800-222-5877

Vertiv AC and DC Power Products

1-800-543-2378

A.2 Locations

United States

Vertiv Headquarters

505 N. Cleveland Ave.

Westerville, OH 43082, 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

© 2026 Vertiv Group Corp.

All Rights Reserved.

This page intentionally left blank

© 2026 Vertiv Group Corp.
All Rights Reserved.

Appendix B: DA250 and DA265 Motor Maintenance

NOTE: Verify all parts received before starting kit. Contact your local sales rep if there are missing parts.

Purpose

Every year from DA250 and DA265 start-up the motor bearings should be lubricated. This document is to give instruction on how to replace lubrication.



WARNING! Arc flash and electric shock hazard. Disconnect all local and remote electric power supplies and wear appropriate personal protective equipment per NFPA 70E-2012 before working within the electric enclosure. Failure to comply can cause serious injury or death.



WARNING! This kit should be installed by qualified personnel only.



CAUTION: Risk of improper moving, lifting and handling. Can cause equipment damage or injury. Only properly trained and qualified personnel should work on this equipment. Fan modules may weigh in excess of 150 pounds each and will require more than one person or a mechanical lifting device to raise or lower the fan (s) safely. Use proper lifting techniques and wear protective clothing, gloves, shoes and head gear to avoid injury and dropping the fan module during removal.



CAUTION: Equipment used in handling/lifting, and/or installing the fan assembly must meet OSHA requirements. Use handling/lifting equipment rated for the weight of the fan assembly. Use ladders rated for the weight of the fan assembly and technicians if used during installation. Refer to handling/lifting, and/or installation equipment operating manual for manufacturer's safety requirements and operating procedures.

Tools

- OSHA approved ladder and all required fall arrest equipment
- Grease pan or equivalent for catching grease drainage
- Exxon Polyrex EM grease Vertiv part 341166P1

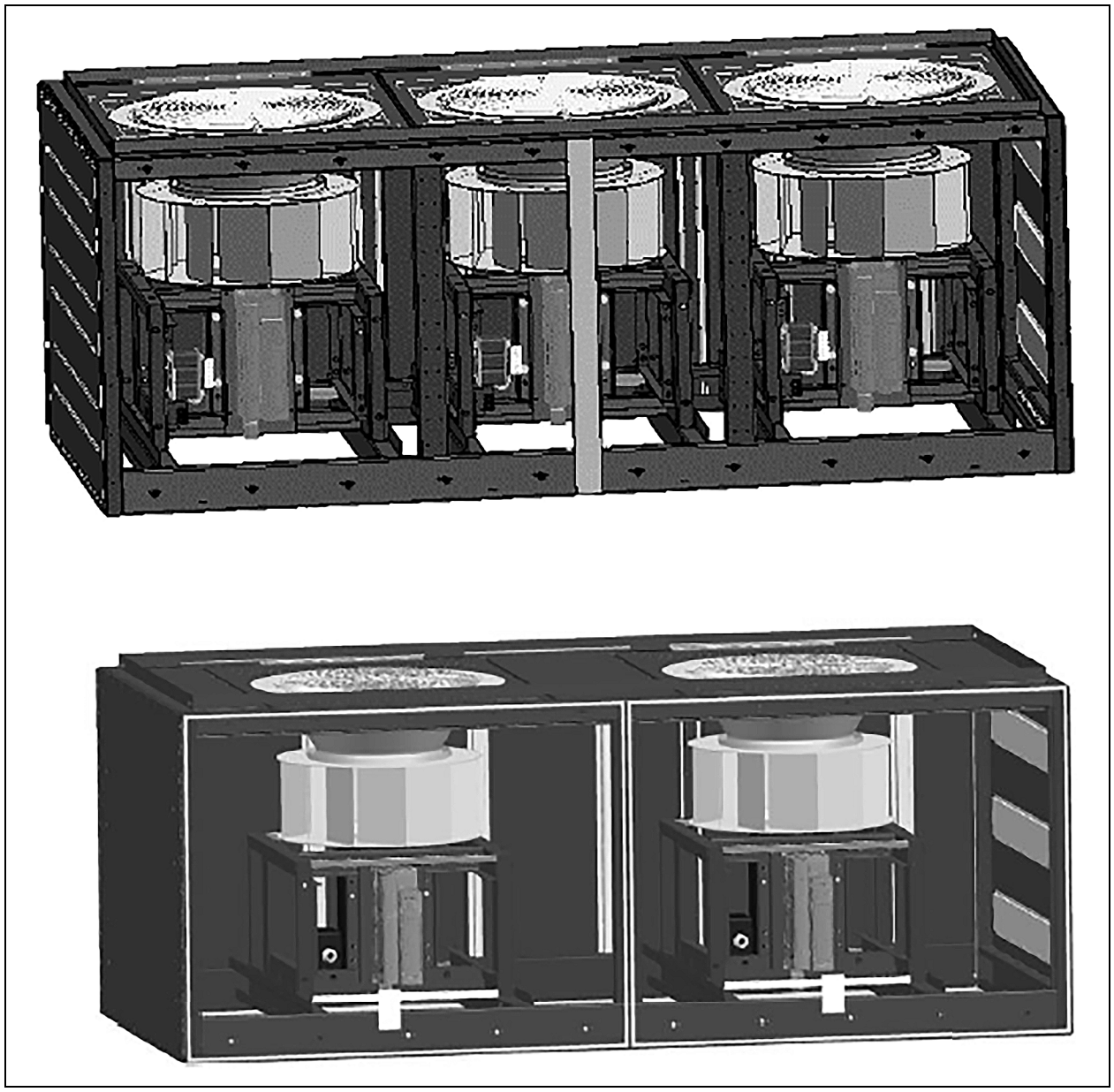
Steps

1. Turn off power on unit from Disconnect.
2. Lockout power to unit.
3. Person performing work must observe best safety practices including safety harness in order to tie off. Tie off points for DA250/DA265 are not factory provided. It is the responsibility of individual performing work to adhere and tie off per OSHA approved requirements.
4. Remove front exterior panels on unit to access Motor section. See DA250/DA265 Front Exterior Panels on the next page .

© 2026 Vertiv Group Corp.

All Rights Reserved.

Figure B.1 DA250/DA265 Front Exterior Panels

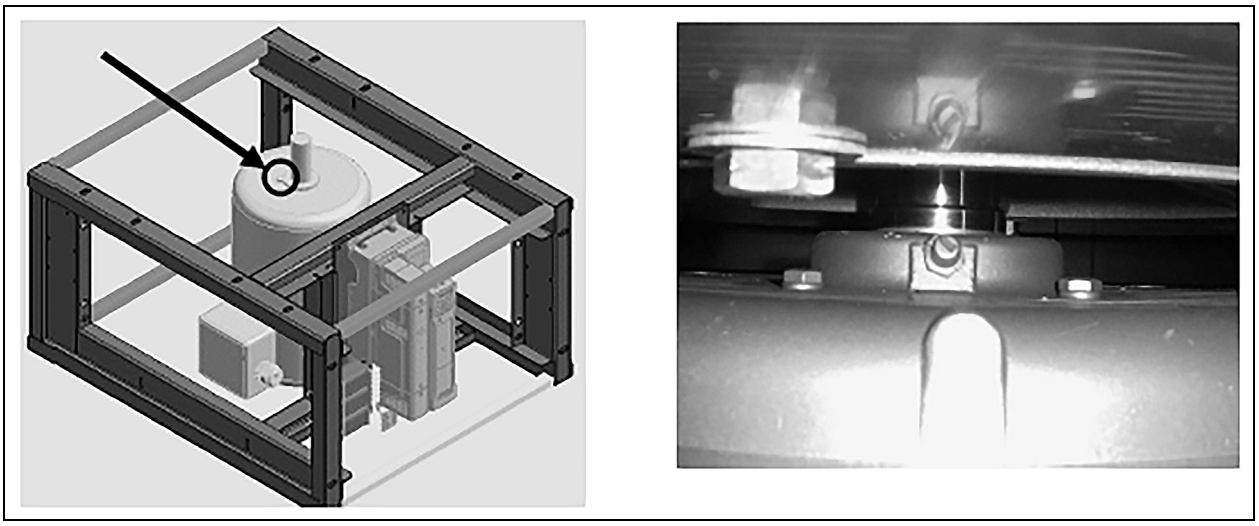


5. Locate the grease inlet plug on motor shaft end. See DA250/DA265 Grease Inlet Plug on the facing page .

© 2026 Vertiv Group Corp.

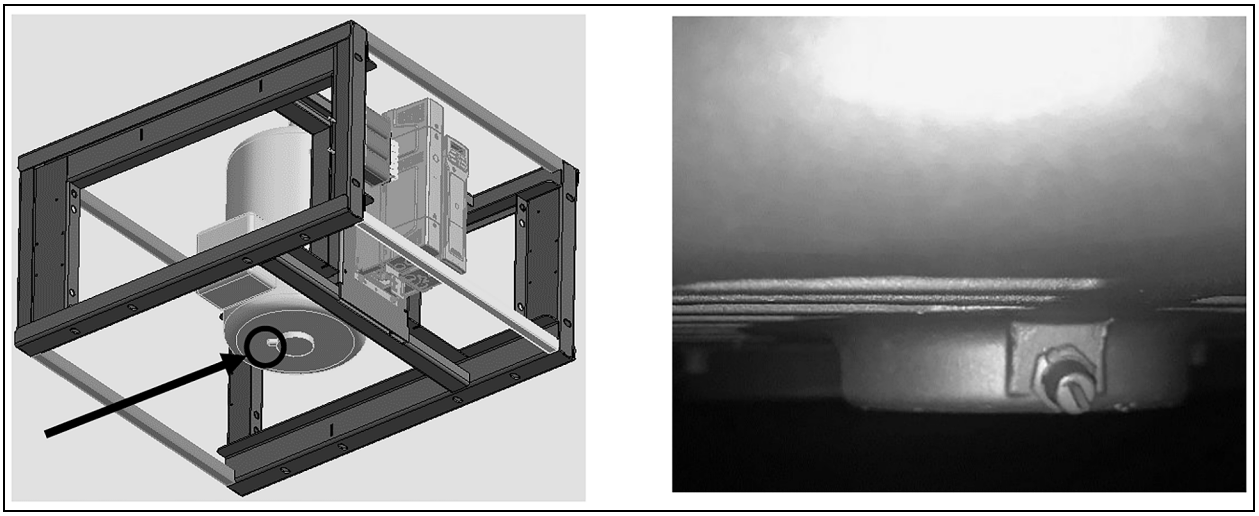
All Rights Reserved.

Figure B.2 DA250/DA265 Grease Inlet Plug



6. Clean the area around grease inlet and replace pipe plug with a grease fitting.
7. Need to have grease pan or equivalent under motor to catch drainage.
8. Locate and remove the grease drain plug. See DA250/DA265 Remove the Grease Drain Plug below .

Figure B.3 DA250/DA265 Remove the Grease Drain Plug



9. While slowly rotating the shaft, add 0.47 ounces of grease to the inlet port.
10. Replace grease inlet plug and unlock unit power and power on unit to run motor.
11. Run the motor for 15 minutes.
12. Replace the grease drain plug.
13. Clean area from any grease dripping and remove tools.

© 2026 Vertiv Group Corp.

All Rights Reserved.

14. Install front exterior panels on motor section of unit.
15. Remove any power lockout and restore unit power to be fully functional.

Source: INST-9317

© 2026 Vertiv Group Corp.

All Rights Reserved.

Appendix C: Submittal Drawings

Table C.1 Submittal Drawings Contents

Document Number	Title
Component Location	
20000330	Vertiv™ CoolPhase Perimeter Component Location Diagram
Dimension Planning Drawings — Evaporator Units	
20000331	Vertiv™ CoolPhase Perimeter DA250-DA265 Cabinet Dimensional Data Horizontal Discharge
20000332	Vertiv™ CoolPhase Perimeter DA250-DA265 Cabinet Dimensional Data Bottom Discharge
20000333	Vertiv™ CoolPhase Perimeter DA250-DA265 Installation and Service Clearance Data
20000334	Vertiv™ CoolPhase Perimeter DA250-DA265 Floor Planning for Adjacent Units
Dimension Planning Drawings — Floor Stands	
20000335	Vertiv™ CoolPhase Perimeter DA250-DA265 Floor Stand Dimensional Data
Airflow Schematics	
20000336	Vertiv™ CoolPhase Perimeter DA250 Downflow Cabinet and Plenum Airflow Schematic Horizontal Discharge
20000337	Vertiv™ CoolPhase Perimeter DA250 Downflow Cabinet and Plenum Airflow Schematic Bottom Discharge
Dimension Planning Drawings - Condenser Units	
20000506	MCV440 Single Skid Cabinet Dimensional Data
20000507	MCV440 Dual Skid Cabinet Dimensional Data
20000508	Vertiv™ CoolPhase Condenser MCV430 + [TBD] + Base Assembly Cabinet & Anchor Dimensional Data
20000509	Vertiv™ CoolPhase Condenser MCV430 (2) + [TBD] (2) + Base Assembly Cabinet & Anchor Dimensional Data
Electrical Field Connection Drawings	
20000338	Vertiv™ CoolPhase Perimeter DA250-DA265 Downflow Electrical Field Connections
20000339	Vertiv™ Heat Rejection Skid CANbus and Interlock Connections Vertiv™ CoolPhase Condenser and Vertiv™ EconoPhase and Base Assembly
DPN005196	Automatic Transfer Switch
Electrical Unit to Unit Networking	
20000347	Vertiv™ Liebert® iCOM™ Unit to Unit Network Connections (Vertiv™ CoolLoop Perimeter, Vertiv™ CoolLoop Thermal Wall, Vertiv™ CoolPhase Perimeter)
Vertiv™ CoolPhase Condenser Heat-rejection Skid Field-connection Drawings	
20000301	MCV440 Single Skid Condenser Connection Data
20000302	MCV440 Dual Skid Condenser Connection Data
20000510	Vertiv™ CoolPhase Condenser MCV430 + Vertiv™ CoolPhase [TBD] + Base Assembly Primary Connection Locations

© 2026 Vertiv Group Corp.

All Rights Reserved.

Table C.1 Submittal Drawings Contents (continued)

Document Number	Title
20000511	Vertiv™ CoolPhase Condenser MCV430 (2) + Vertiv™ CoolPhase [TBD] (2) + Base Assembly Primary Connection Locations
Piping General Arrangement Drawings	
20000340	Vertiv™ CoolPhase Perimeter DA250-DA265 Piping Schematic with Optional Oil Separator with Vertiv™ CoolPhase Condenser without Receivers
Refrigeration Piping Layout and Condenser Positioning Drawings	
20000341	Vertiv™ CoolPhase Perimeter Air Cooled Piping Schematic Vertiv™ CoolPhase Condenser Mounted above DA125-DA250
20000342	Vertiv™ CoolPhase Perimeter Air Cooled Piping Schematic Vertiv™ CoolPhase Condenser Mounted above DA265
20000343	Vertiv™ CoolPhase Perimeter DA250-DA265 Gravity Condensate Piping
20000506	MCV440 Single Skid Condenser Connection Data
20000507	MCV440 Dual Skid Condenser Connection Data
Piping Connection Drawings	
20000344	Vertiv™ CoolPhase Perimeter DA250-DA265 Primary Connection Locations
20000510	Vertiv™ CoolPhase Condenser MCV430 + Vertiv™ CoolPhase [TBD] + Base Assembly Primary Connection Locations
20000511	Vertiv™ CoolPhase Condenser MCV430 (2) + Vertiv™ CoolPhase [TBD] (2) + Base Assembly Primary Connection Locations
Filter Replacement Drawings	
20000345	Vertiv™ CoolPhase Perimeter DA250-DA265 Filter Replacement

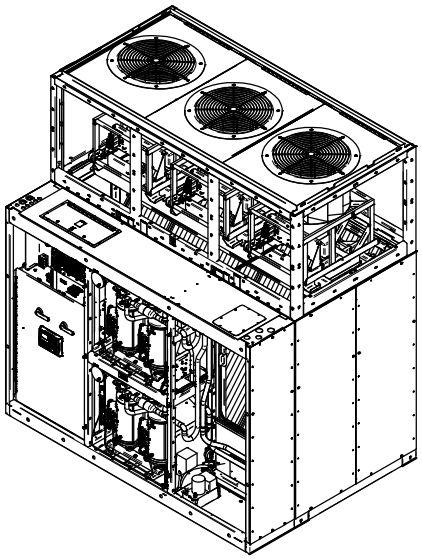
© 2026 Vertiv Group Corp.

All Rights Reserved.

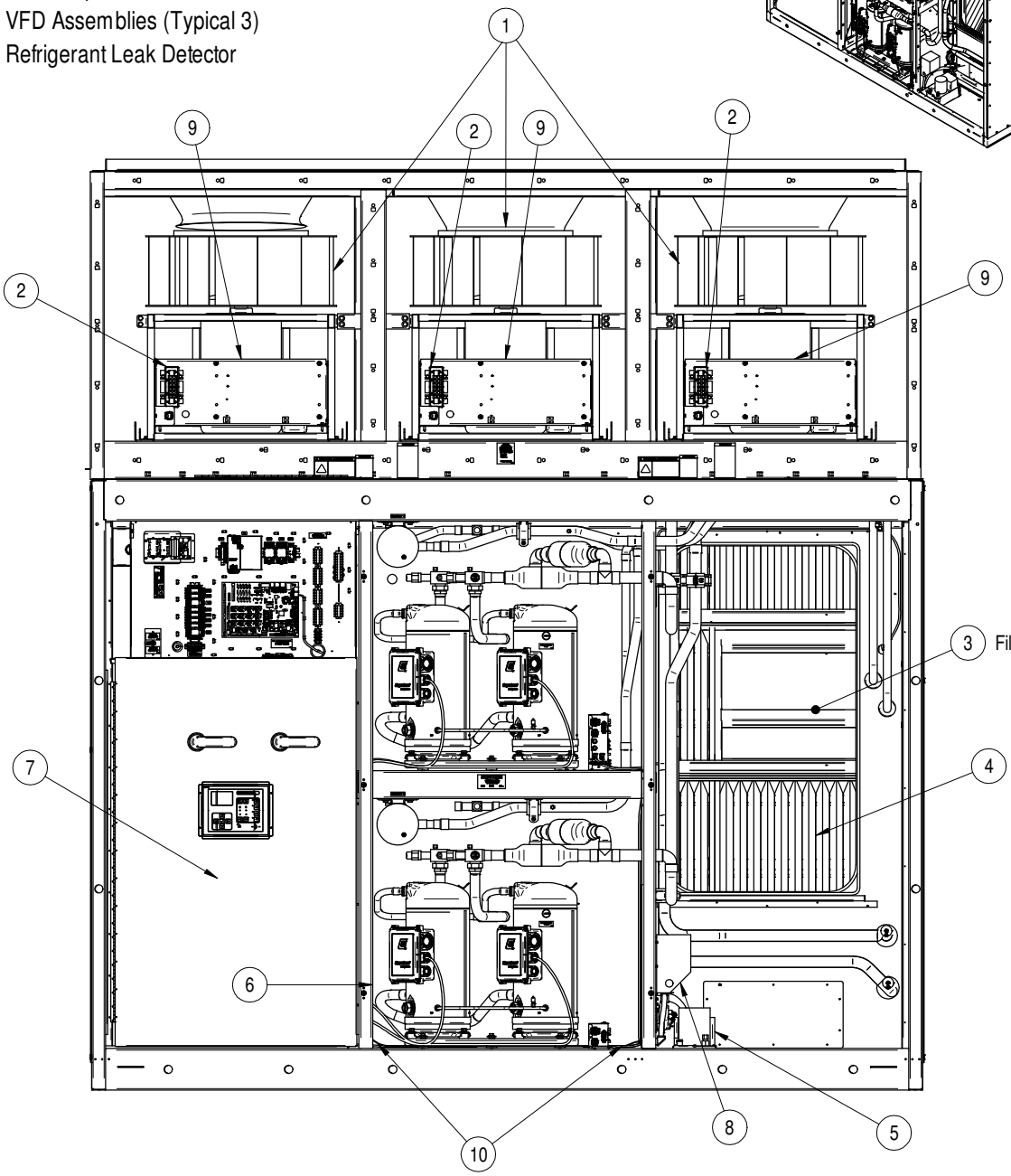
COOLPHASE PERIMETER

COMPONENT LOCATION DIAGRAM

DA250 - DA265 MODELS



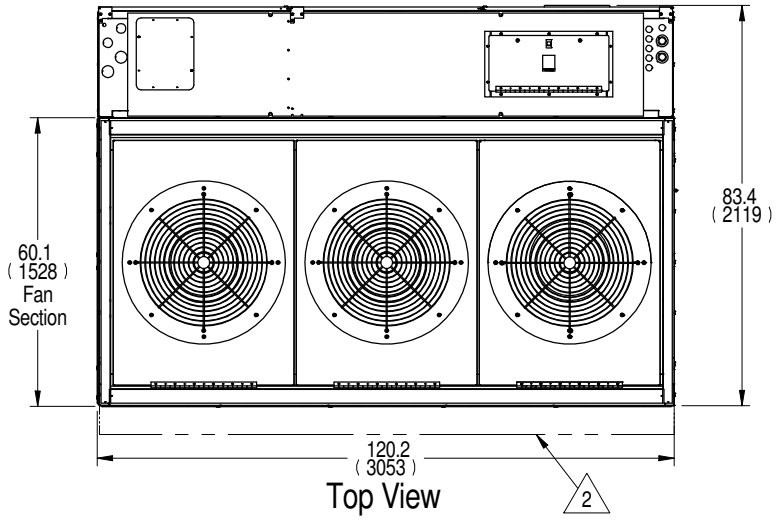
1. Blower/Motor (Typical 3)
2. Line Reactor Transformers (Typical 3)
3. Evaporator Coil
4. Air Filters
5. Condensate Pump (optional)
6. Compressor Compartment
7. Electric Panel
8. 575v Step Down Transformer
9. VFD Assemblies (Typical 3)
10. Refrigerant Leak Detector



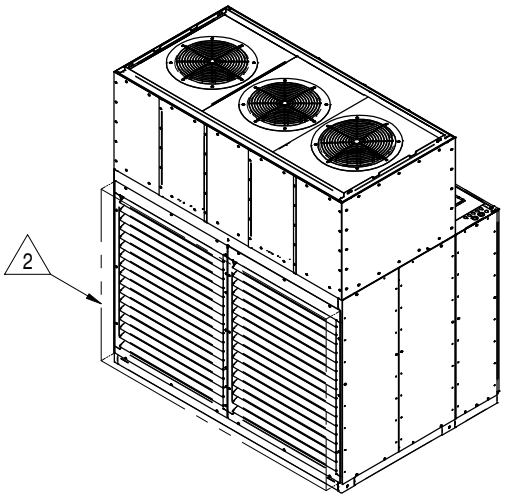
COOLPHASE PERIMETER

CABINET DIMENSIONAL DATA

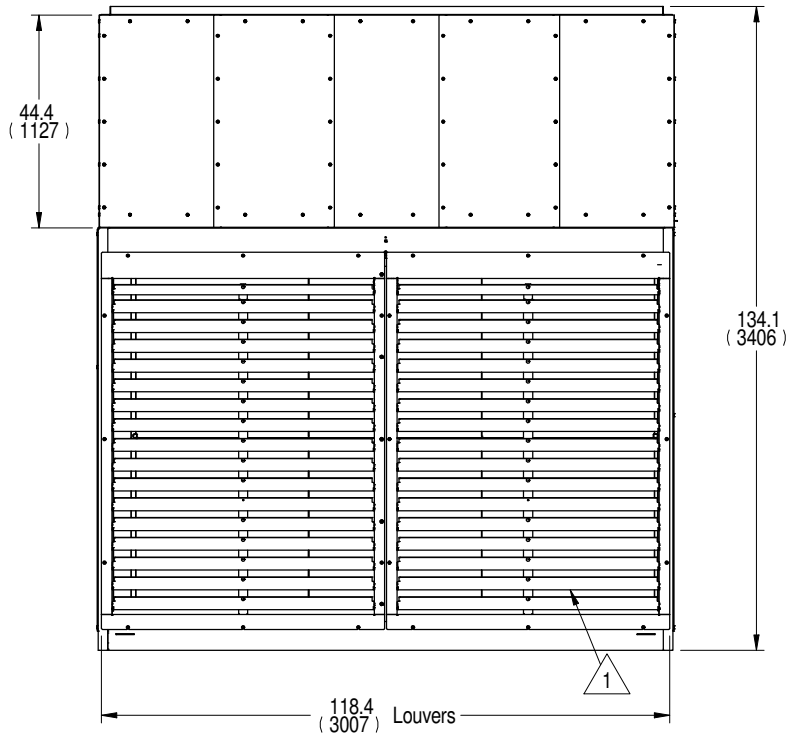
DA250 - DA265 W/ HORIZONTAL DISCHARGE



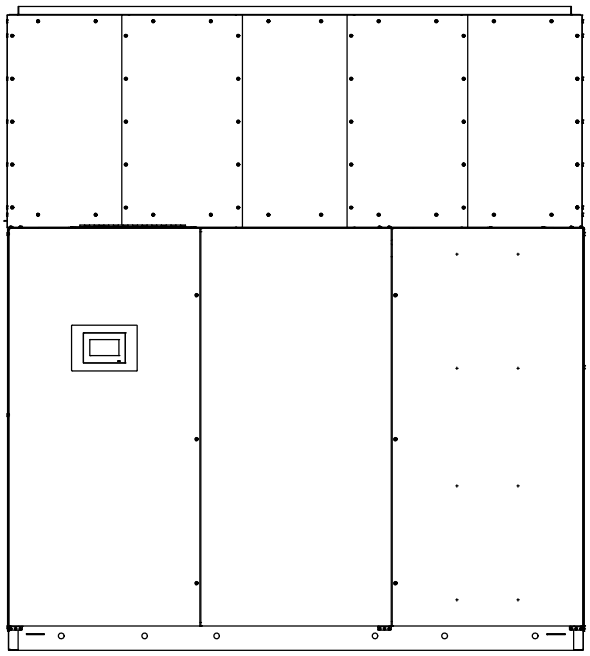
Top View



For Unit Disassembly Data
Refer to 20000577



Front View
(Data Hall Side)



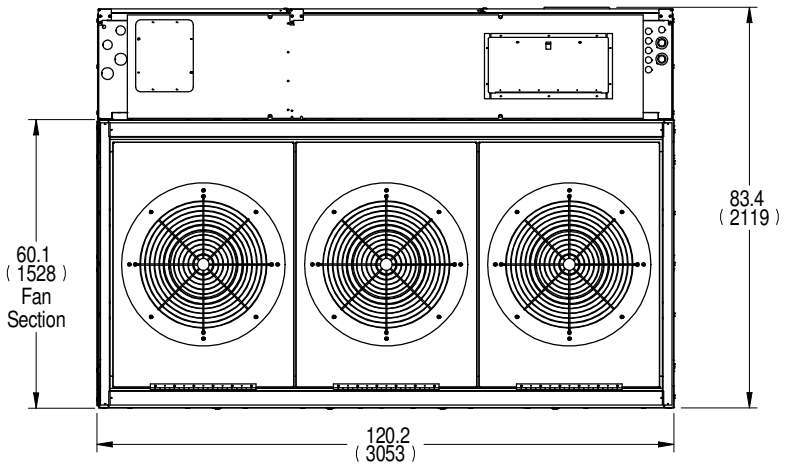
Rear View
(Service on Gallery Side)

Notes:

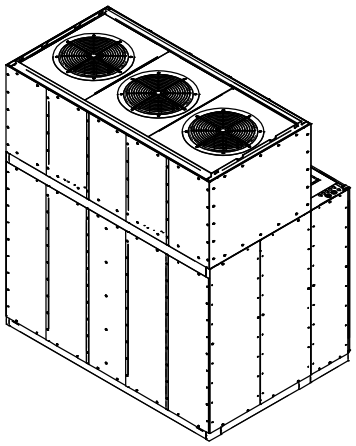
1. Louvers in non-raised floor application are pre-attached at the factory.
2. Louvers extend behind unit 6" (152mm) for seismic applications. Shipped loose for field attachment.

COOLPHASE PERIMETER

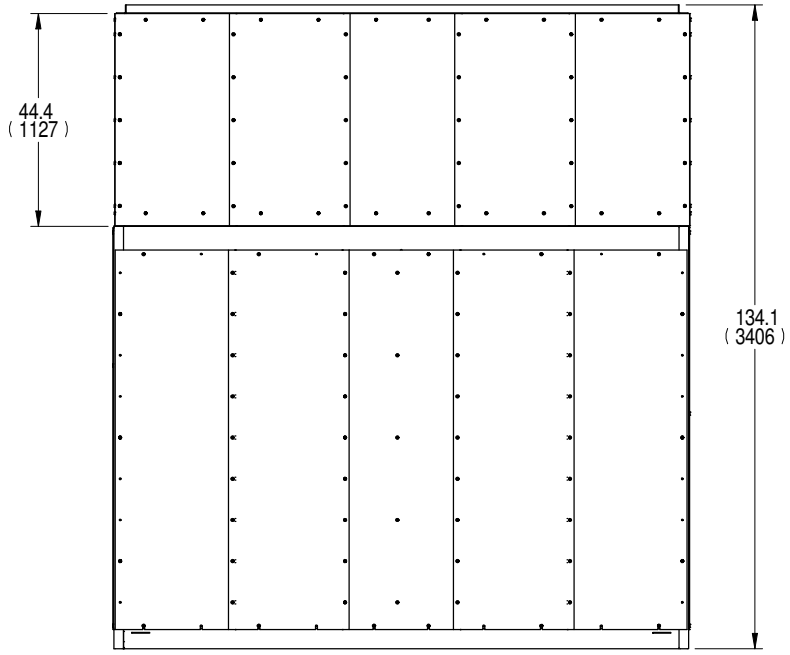
CABINET DIMENSIONAL DATA
DA250 - DA265 W/ BOTTOM DISCHARGE



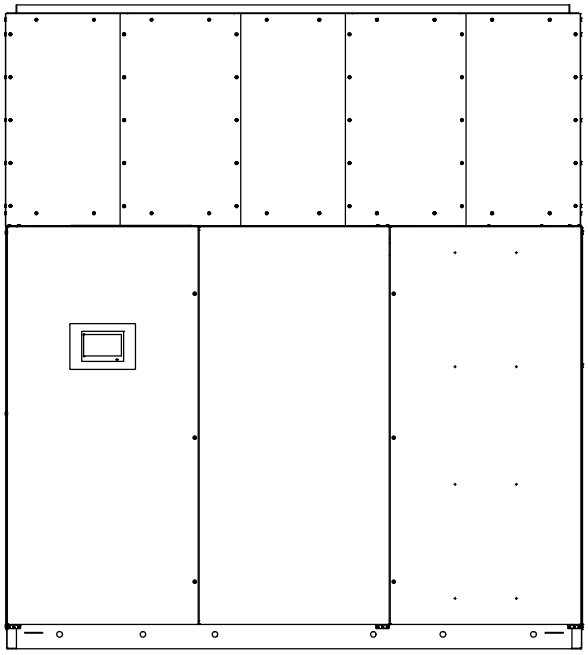
Top View



For Unit Disassembly Data
Refer to 20000577



Front View
(Data Hall Side)



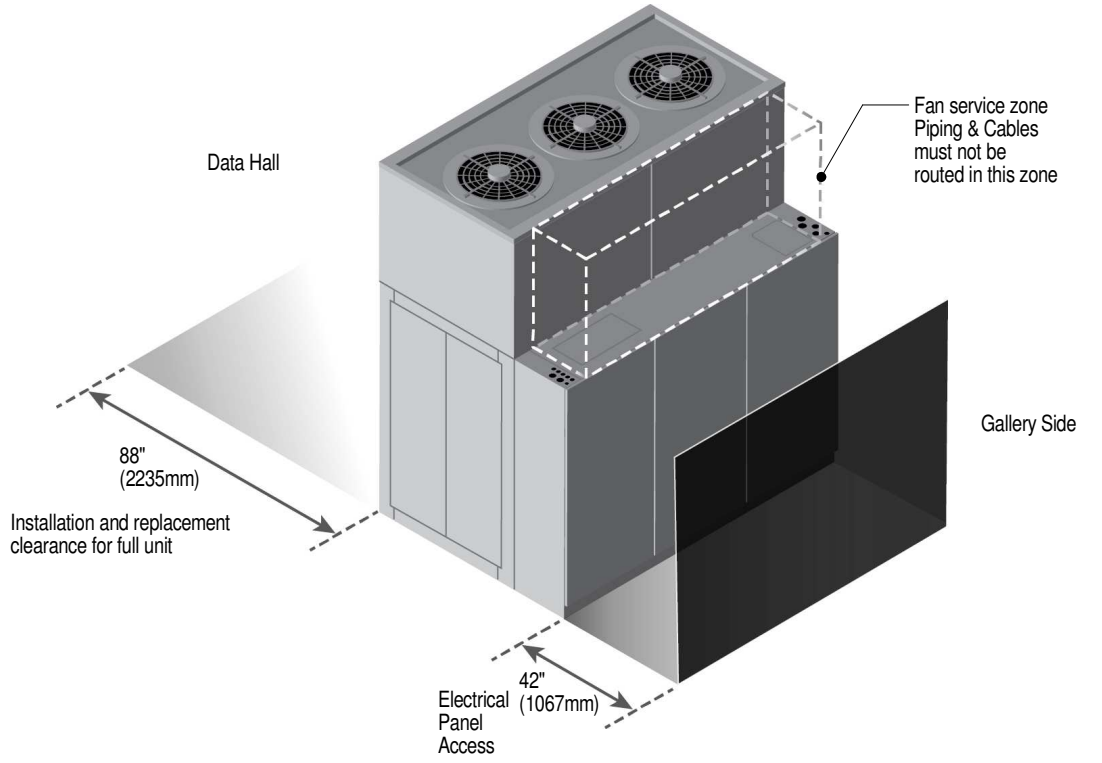
Rear View
(Service on Gallery Side)

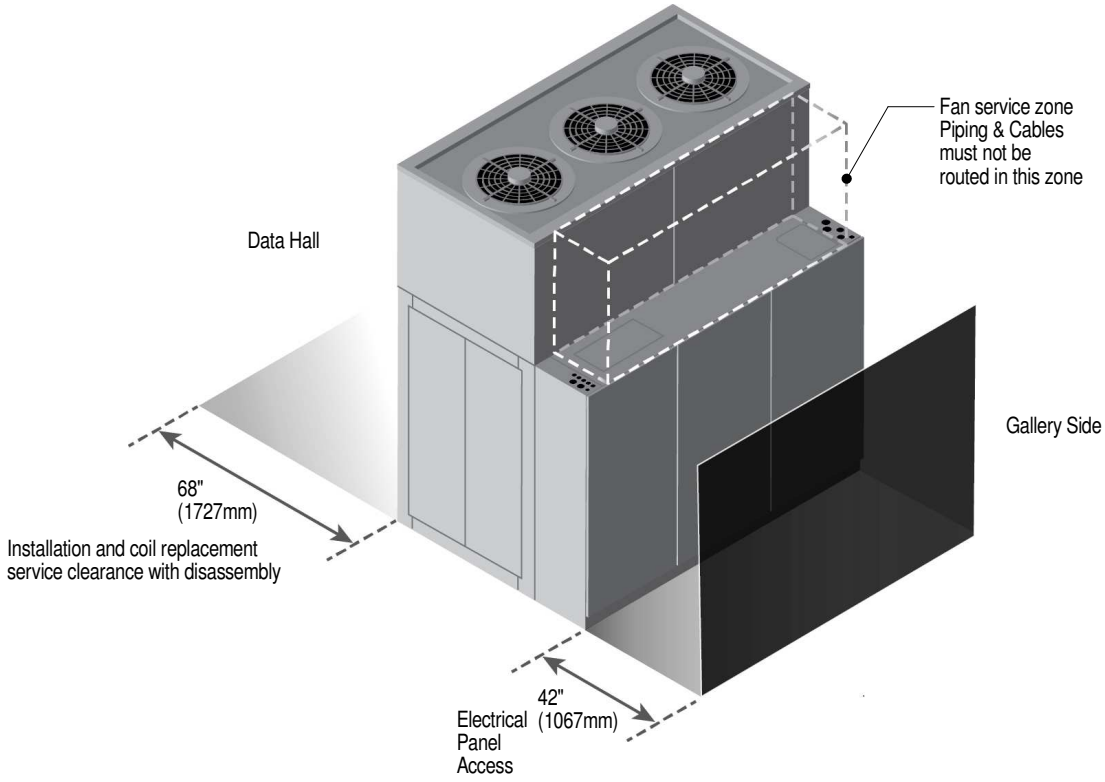
Notes:
1. Optional Floorstand required with bottom discharge units.

COOLPHASE PERIMETER

INSTALLATION & SERVICE DATA DA250 - DA265

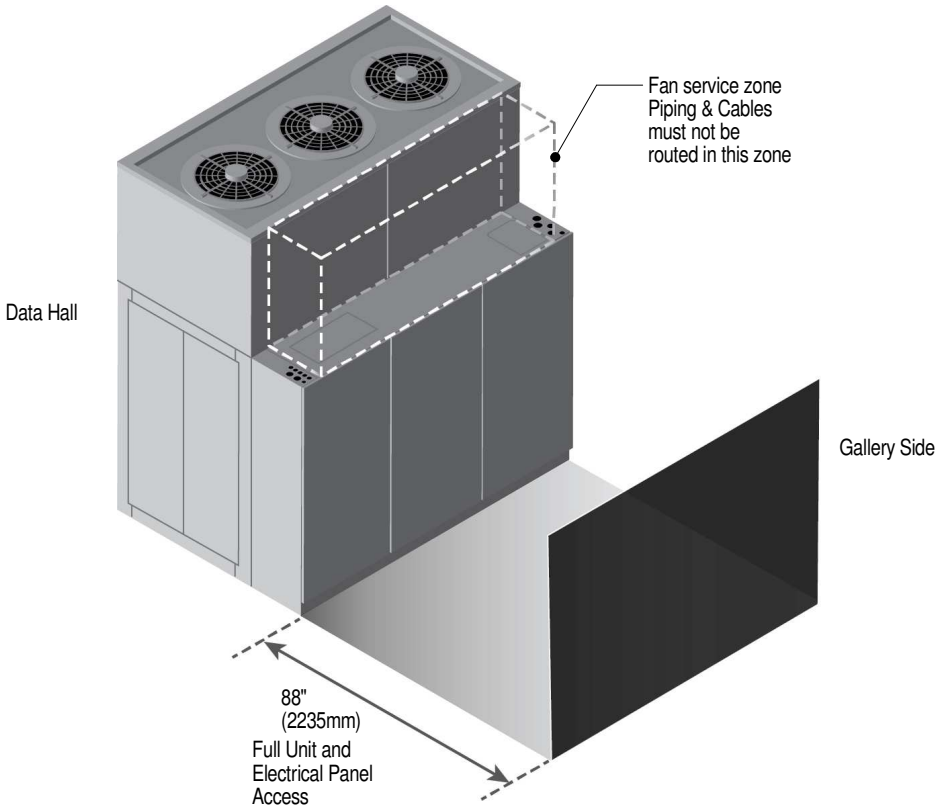
INSTALLATION, REPLACEMENT FROM DATA CENTER SIDE, MAINTENANCE FROM GALLERY

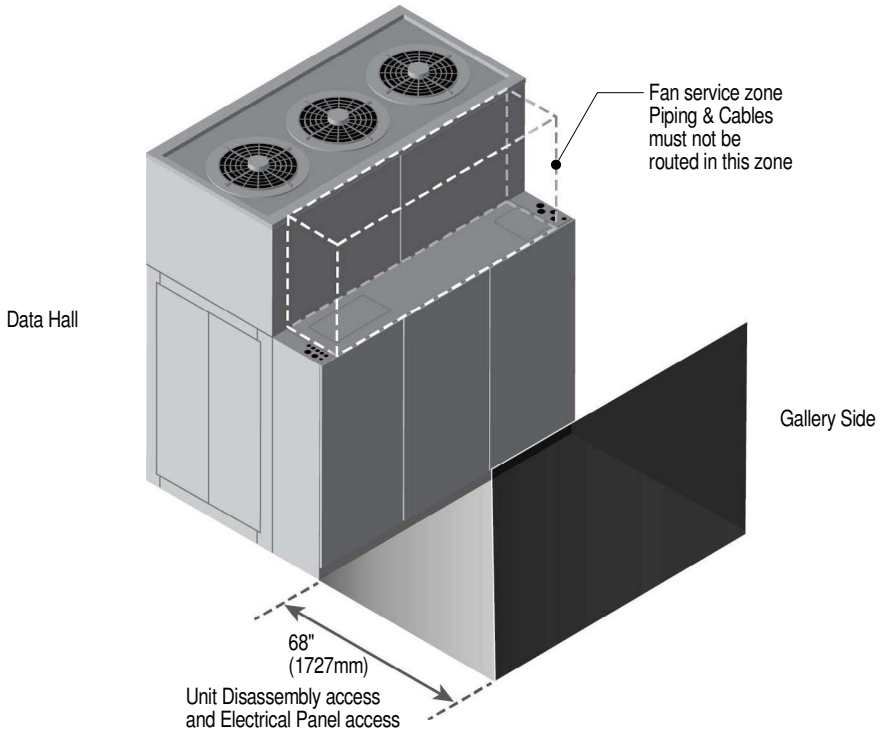




INSTALLATION & SERVICE DATA DA250 - DA265

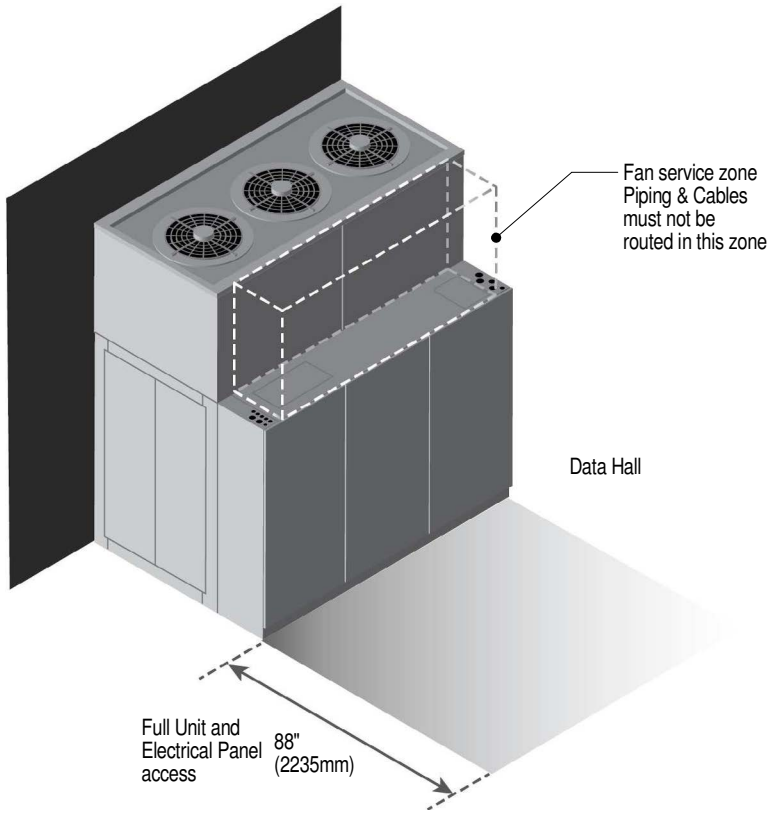
INSTALLATION, SERVICE, AND MAINTENANCE FROM GALLERY

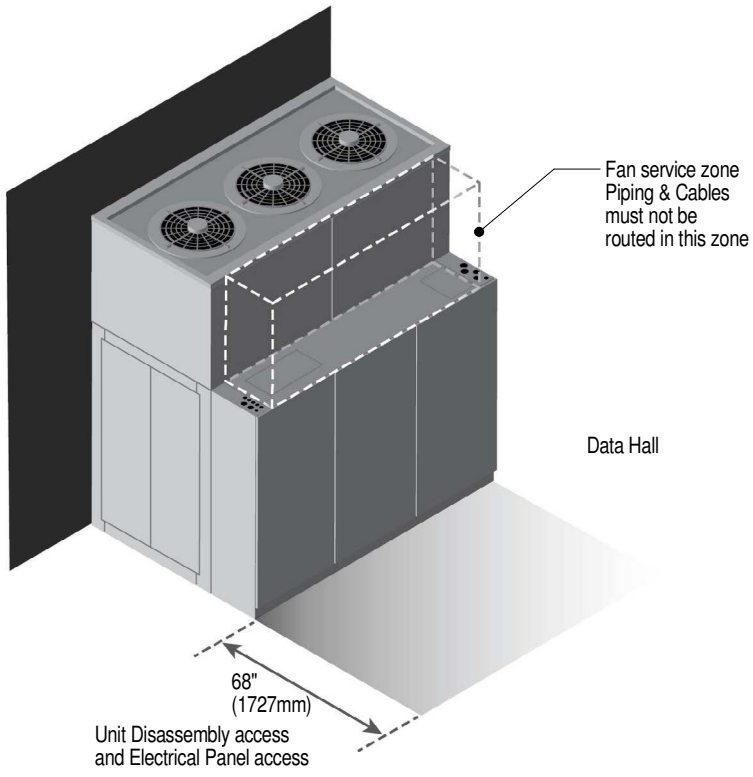




INSTALLATION & SERVICE DATA DA250 - DA265

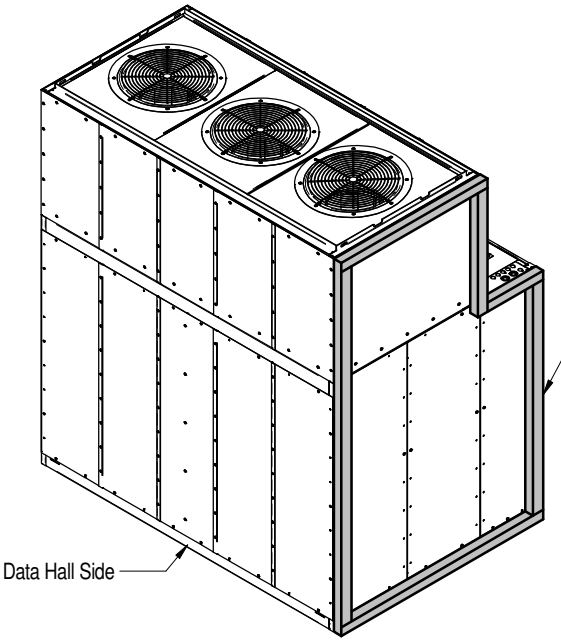
PERIMETER INSTALLATION AND SERVICE CLEARANCE

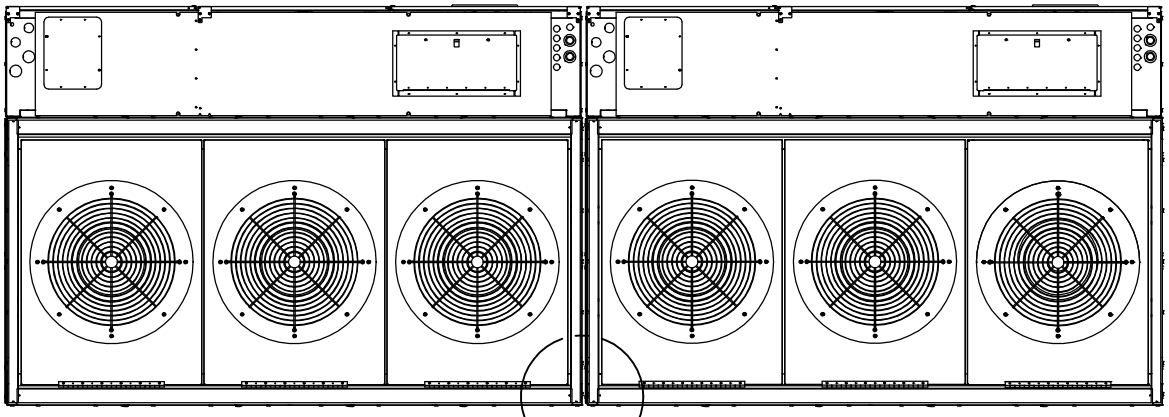


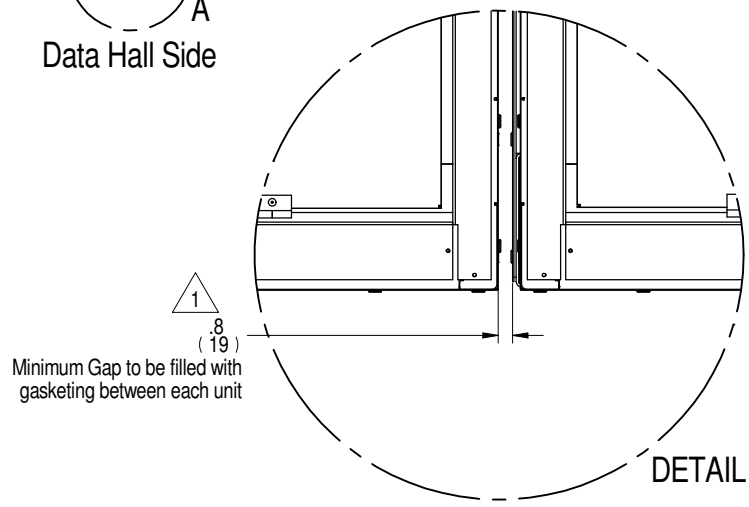


COOLPHASE PERIMETER

FLOOR PLANNING
FOR ADJACENT DA250 - DA265 UNITS







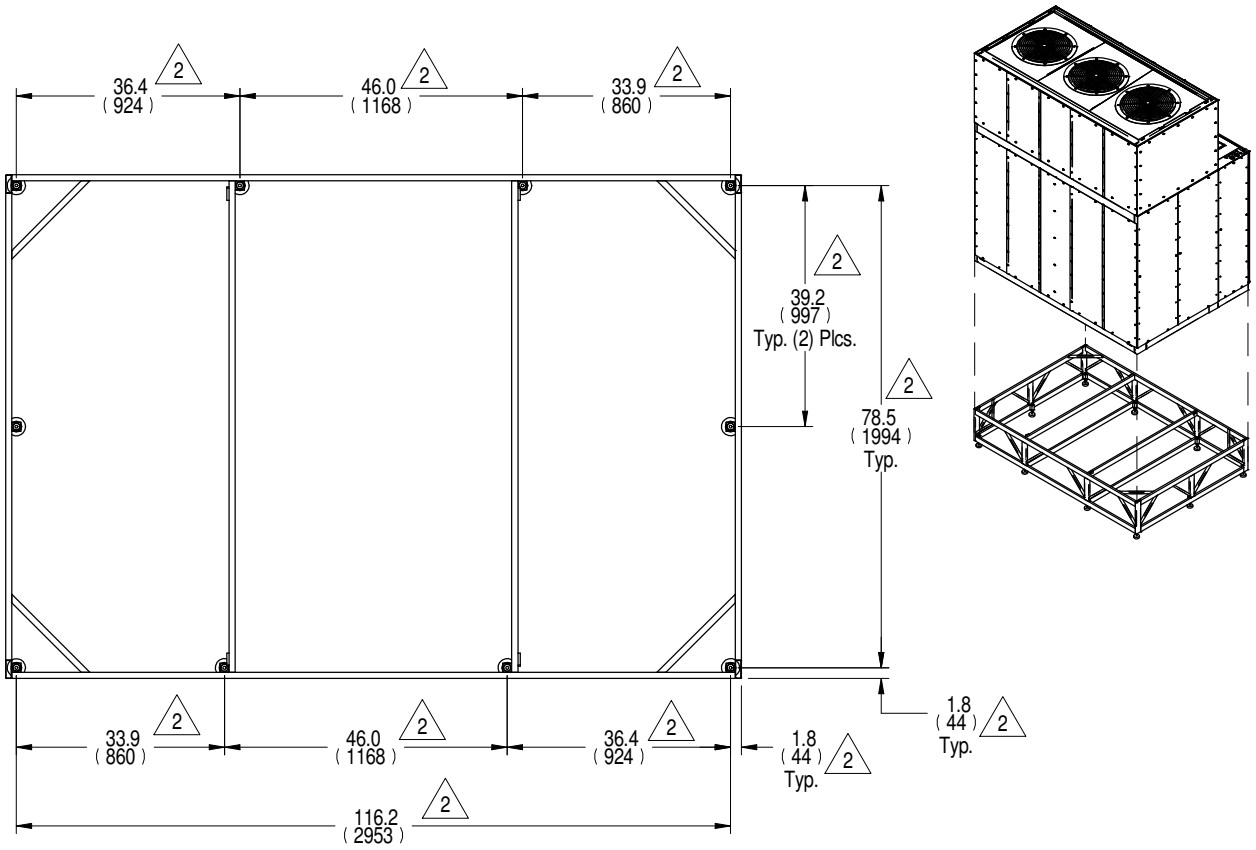
Notes:

1. Gap is measured between frame memebrs of adjacent units.

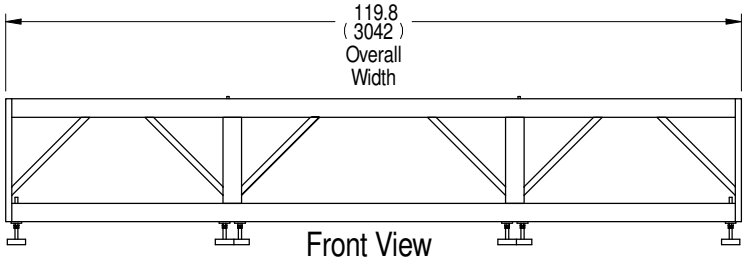
COOLPHASE PERIMETER

FLOORSTAND DIMENSIONAL DATA

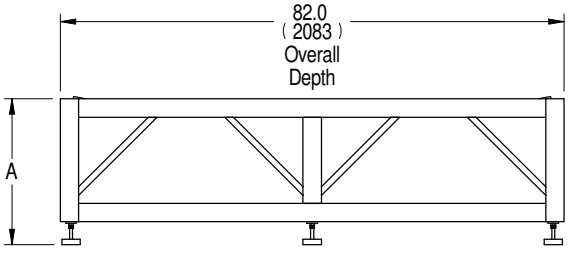
DA250 - DA265



Top View



Front View



Right Side View

Height in. (mm) A 1
24 (610)
30 (762)
36 (914)
42 (1069)
48 (1219)

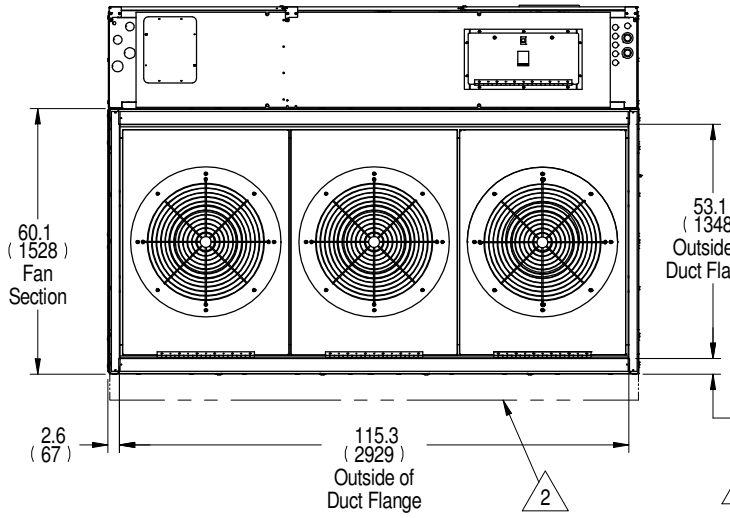
Notes:

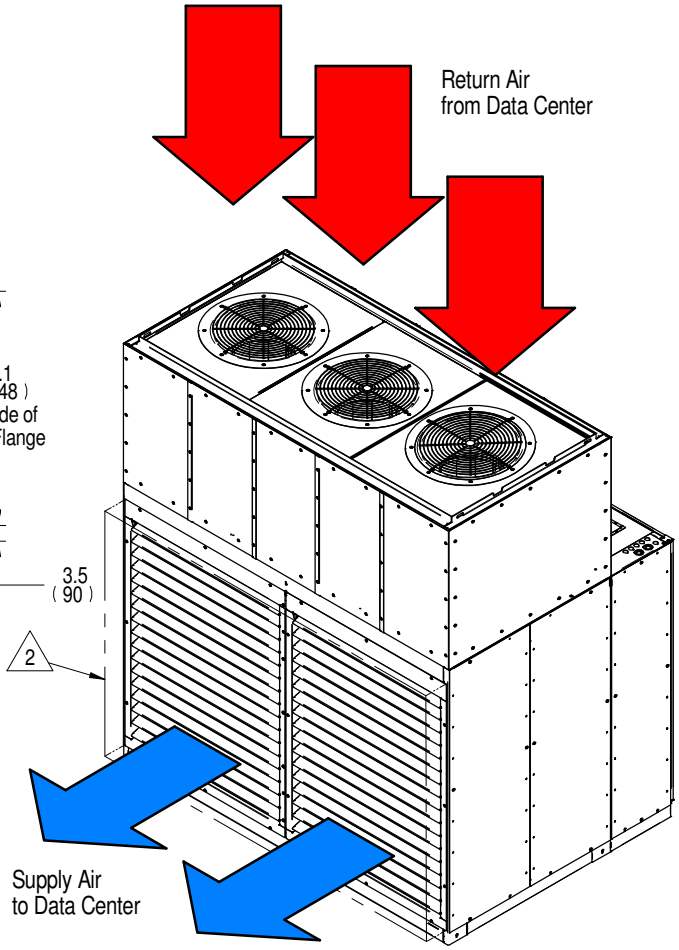
1. Leveling feet are provided with ± 1-1/2" (38mm) adjustment from nominal height "A".
2. Dimensions are to center of feet.

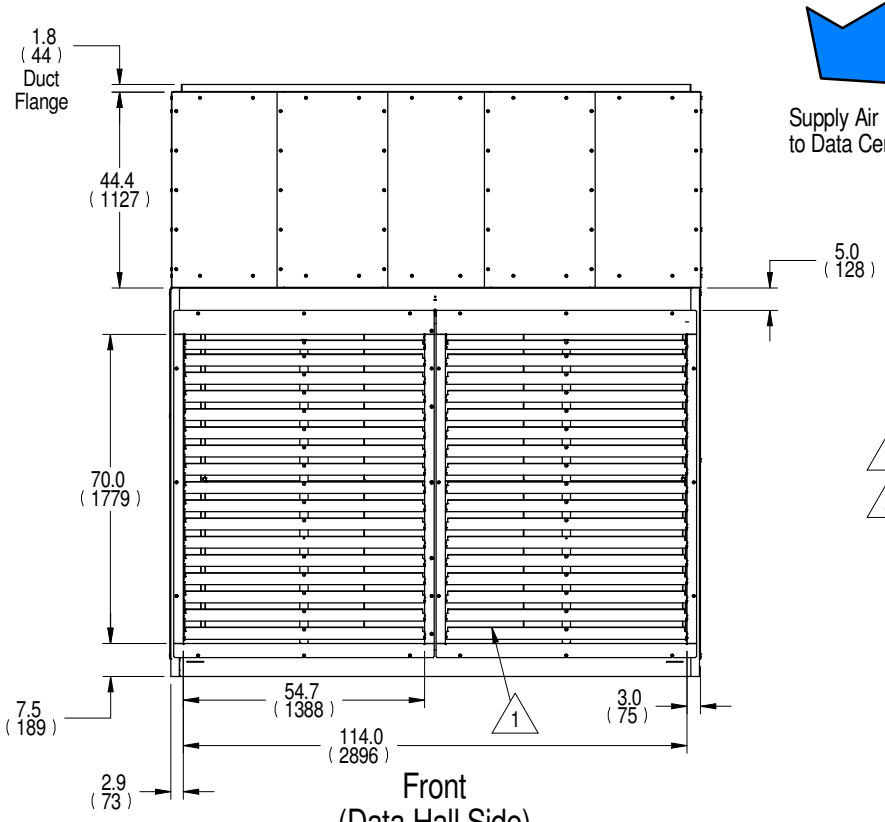
COOLPHASE PERIMETER

AIRFLOW SCHEMATIC

DA250 - DA265 DOWNFLOW UNIT W/ HORIZONTAL DISCHARGE







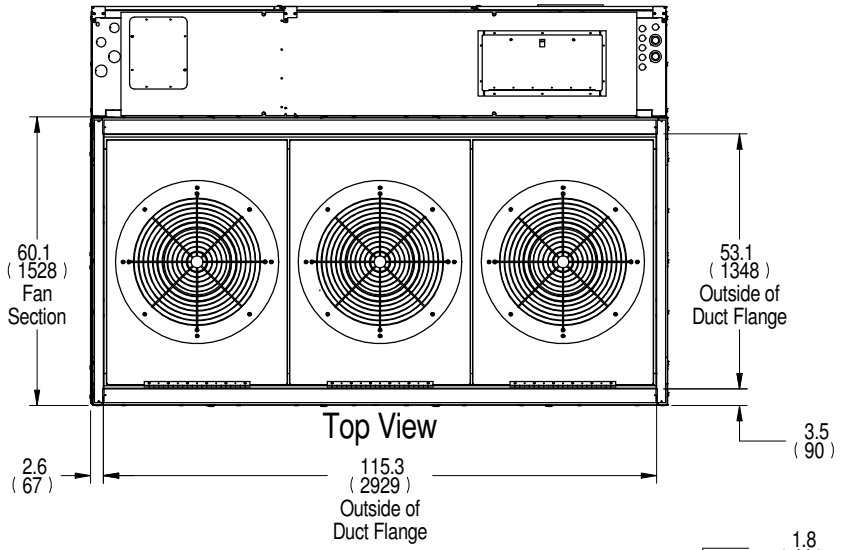
Notes:

1. Louvers in non raised floor application are pre-attached at the factory.
2. Louvers extend behind unit 6" (152mm) for seismic applications. Shipped loose for field attachment.

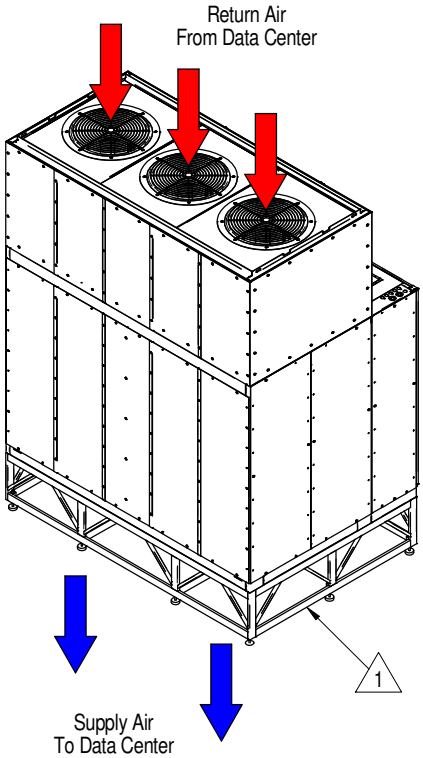
COOLPHASE PERIMETER

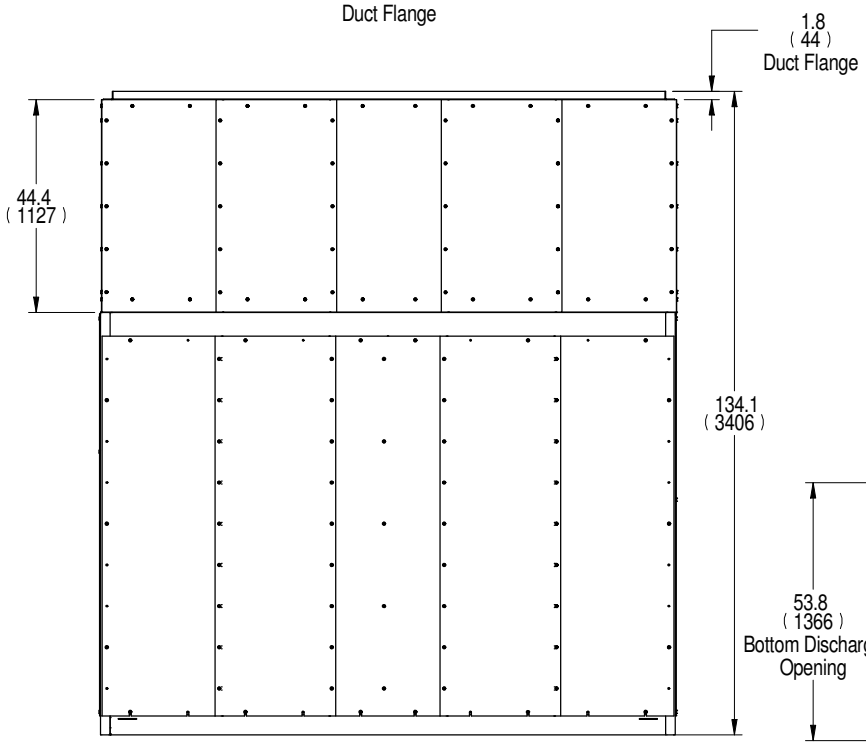
AIRFLOW SCHEMATIC

DA250 - DA265 W/ BOTTOM DISCHARGE

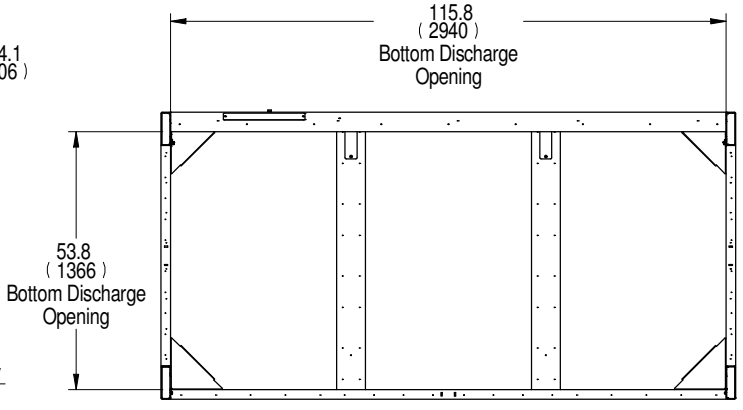


Top View





Front View
(Data Hall Side)



Top View of
Bottom of Frame

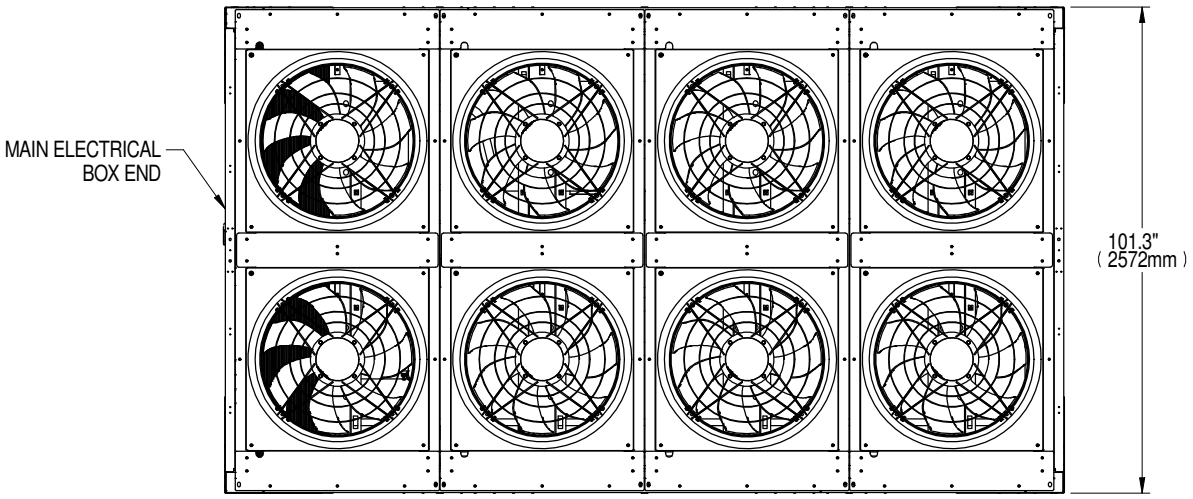
Notes:

1. Optional Floorstand required with bottom discharge units.

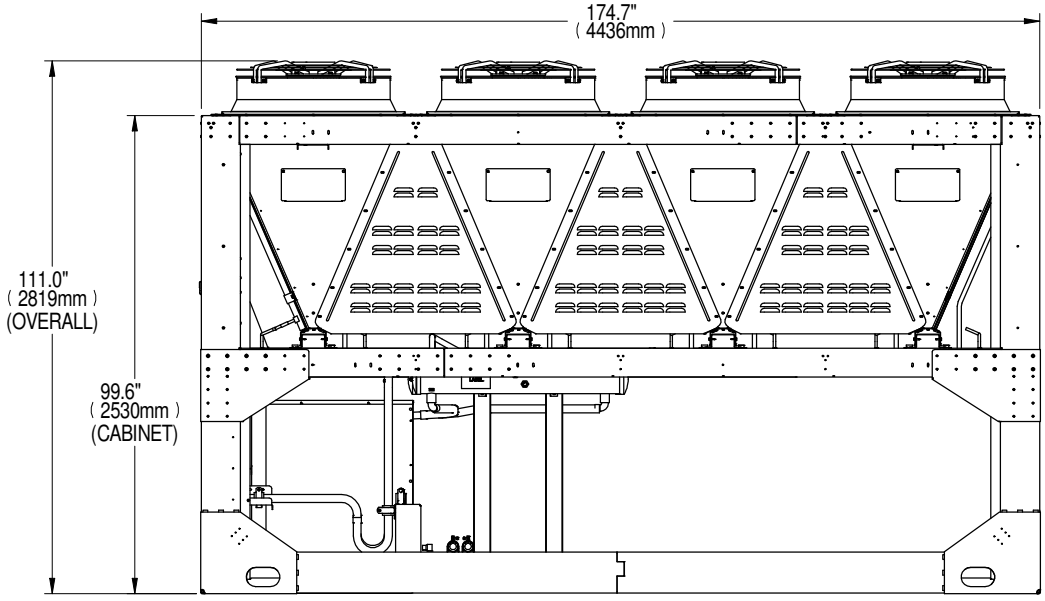
HEAT REJECTION SKID

CABINET & ANCHOR DIMENSIONAL DATA

MCV440 + ECONOPHASE + BASE ASSEMBLY



TOP VIEW



SIDE VIEW

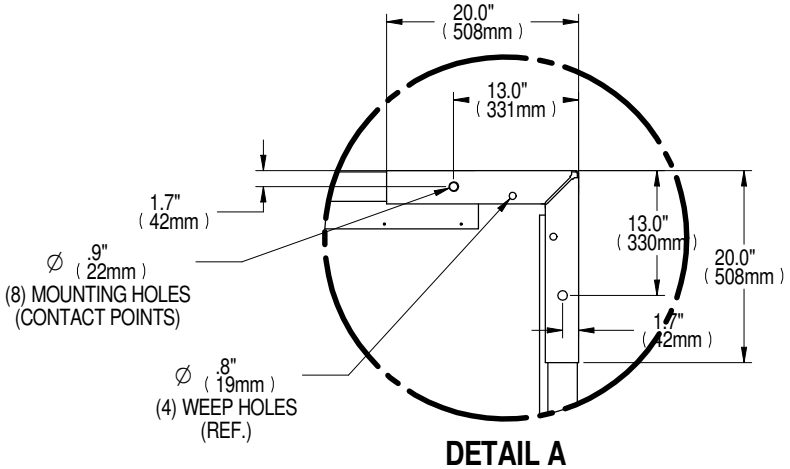
Model			No. of Fans	No. of MCV/PRE Pairs	Domestic Shipping		Export Shipping	
					lb	(kg)	lb	(kg)
MCV440	with PRE and with Receiver	(Single Skid)	8	1	5,998	(2,721)	6,115	(2,774)
MCV440	with PRE and without Receiver	(Single Skid)	8	1	5,898	(2,675)	6,015	(2,728)

Notes:
1. Minimum clearance on the Main Unit Disconnect Enclosure shall be 48" (1219mm) or per local code.
2. Recommended minimum 48" (1219mm) clearance when multiple skids are mounted side by side to ensure proper airflow. Contact the factory for other spacing requirements.

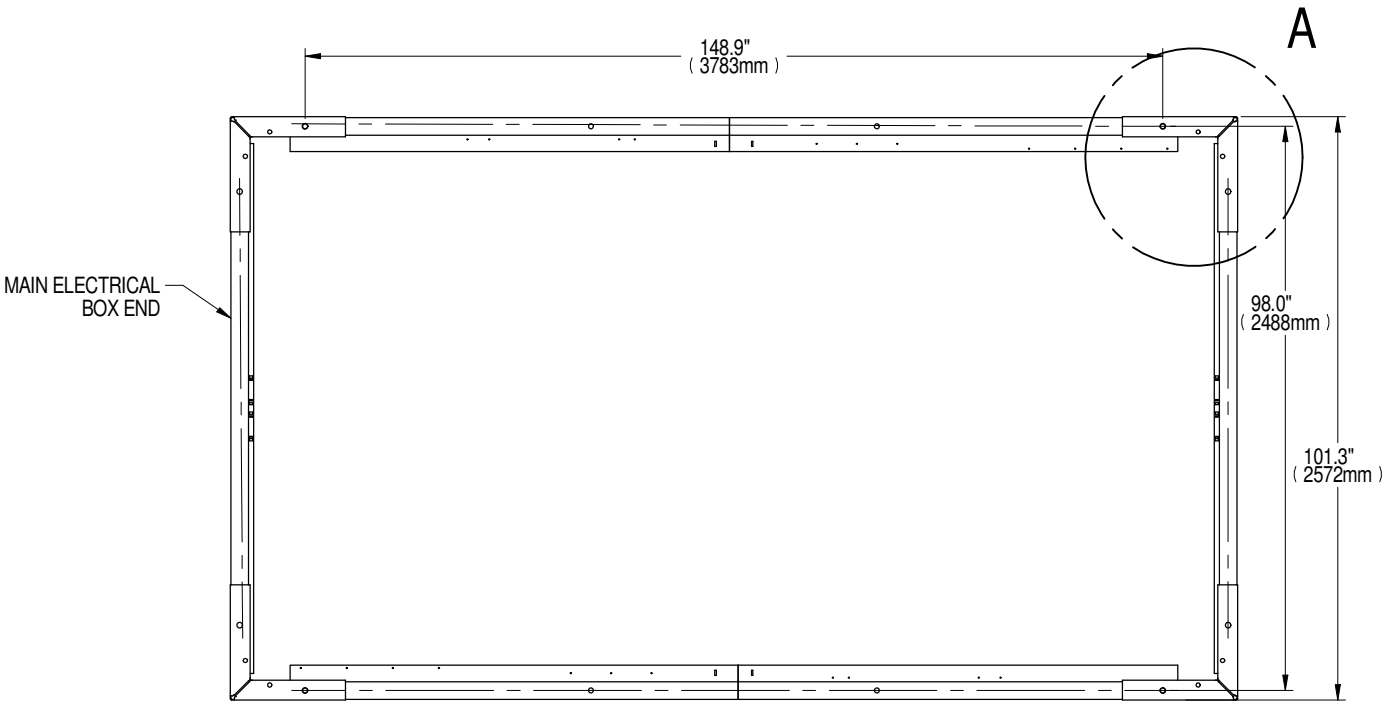
HEAT REJECTION SKID

CABINET & ANCHOR DIMENSIONAL DATA

MCV440 + ECONOPHASE + BASE ASSEMBLY



DETAIL A
TYP. (4) PLACES

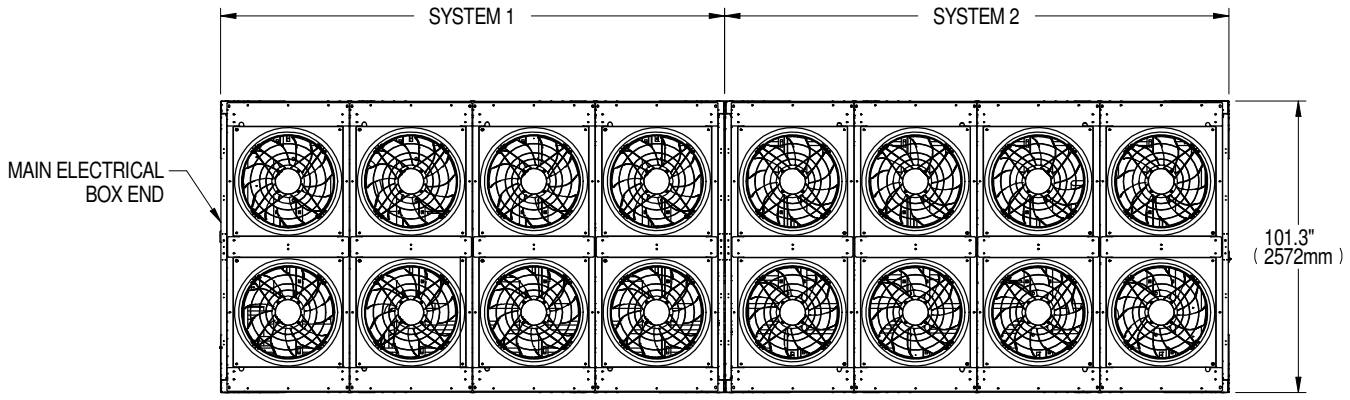


UNDERSIDE OF UNIT
COIL AND FANS REMOVED FOR CLARITY

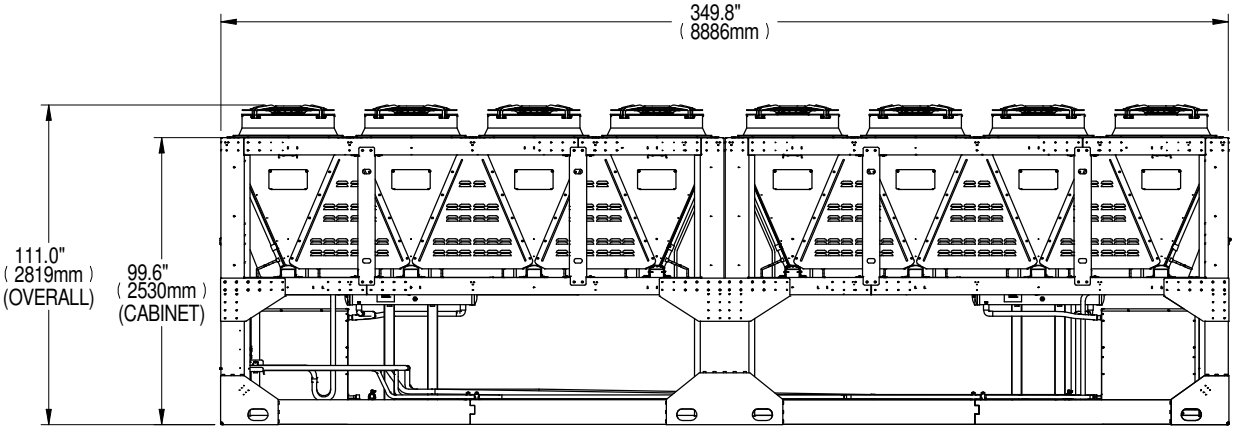
Notes:
1. Underside of unit, coil and fan removed for clarity.
2. Four mounting holes and four 3/4" field supplied bolts required to secure skid base assembly to customer support structure. Bolt grade to be specified by local requirements.

HEAT REJECTION SKID

CABINET & ANCHOR DIMENSIONAL DATA
MCV440 (2) + ECONOPHASE (2) + BASE ASSEMBLY



TOP VIEW



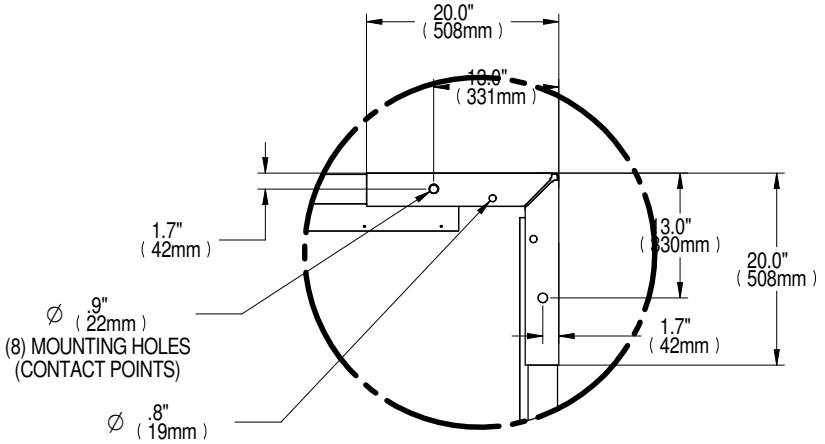
SIDE VIEW

Model			No. of Fans	No. of MCV/PRE Pairs	Domestic Shipping		Export Shipping	
					lb	(kg)	lb	(kg)
MCV440	with PRE and with Receiver	(Dual Skid)	16	2	11,766	(5,337)	12,003	(5,444)
MCV440	with PRE and without Receiver	(Dual Skid)	16	2	11,566	(5,246)	11,803	(5,354)

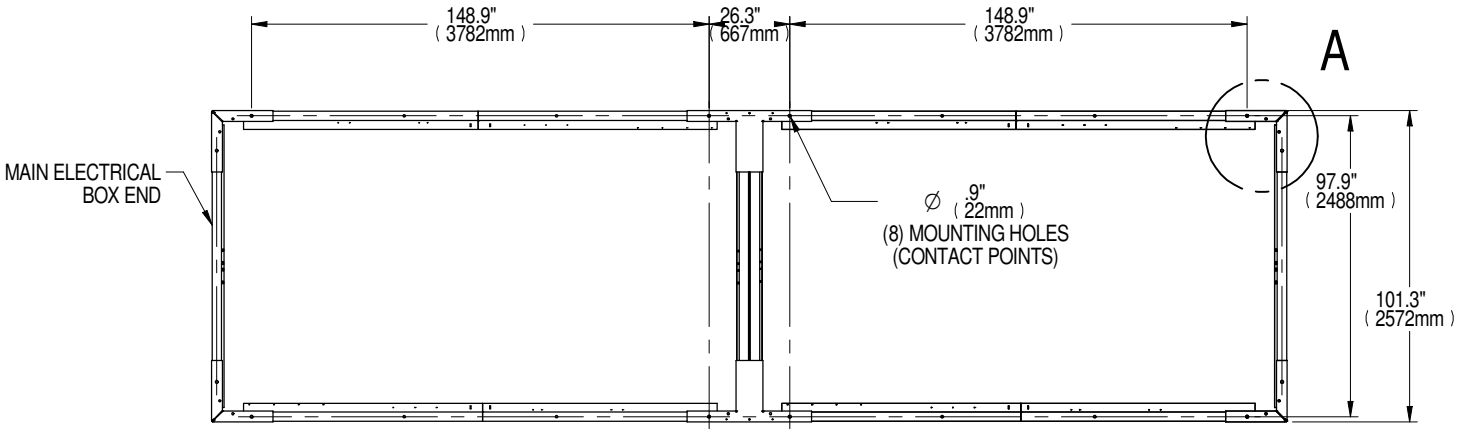
Notes:
1. Minimum clearance of the Main Unit Disconnect Enclosure shall be 48" (1219mm) or per local electrical code.
2. Recommended minimum 48" (1219mm) clearance when multiple skids are mounted side by side to ensure proper airflow. Contact the factory for other spacing requirments.

HEAT REJECTION SKID

CABINET & ANCHOR DIMENSIONAL DATA
MCV440 (2) + ECONOPHASE (2) + BASE ASSEMBLY



DETAIL A
TYP. (4) PLACES



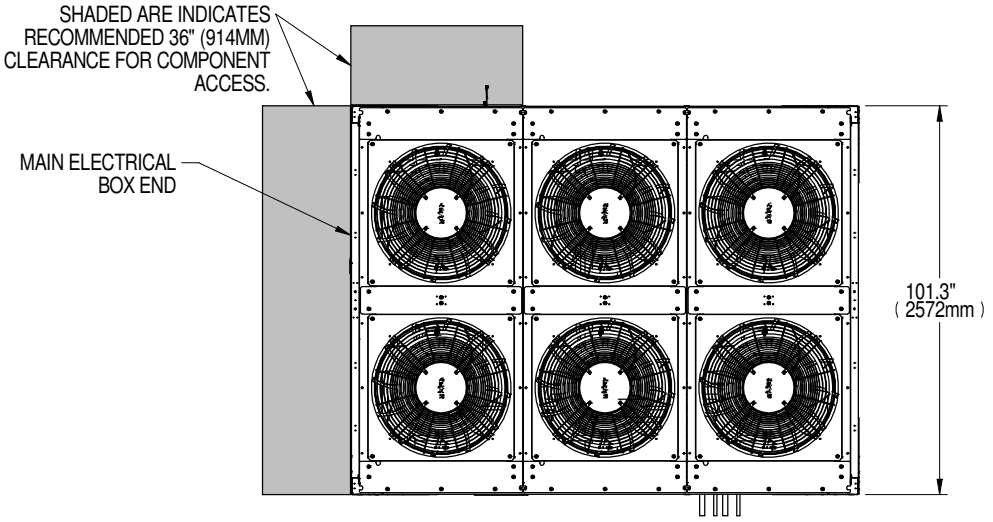
UNDERSIDE OF UNIT
COIL AND FANS REMOVED FOR CLARITY

Notes:
1. Eight mounting holes and eight 3/4" field supplied bolts required to secure skid base assembly to customer support structure. Bolt grade to be specified by local requirements.

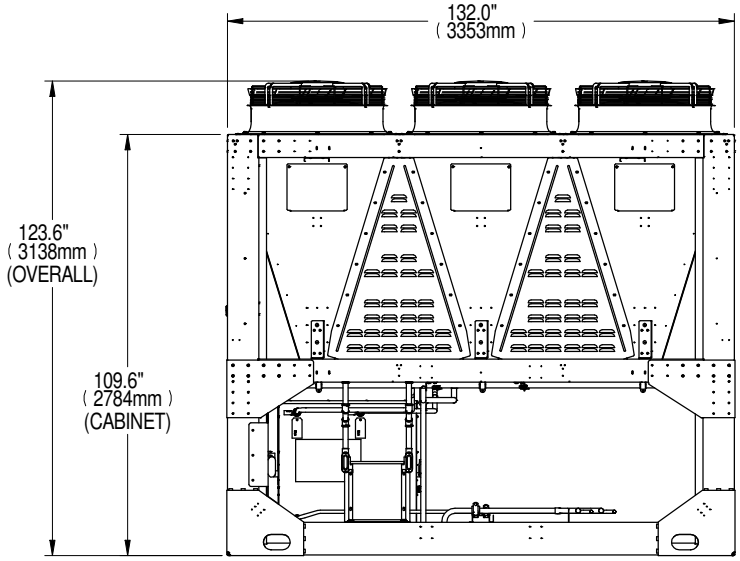
HEAT REJECTION SKID

CABINET & ANCHOR DIMENSIONAL DATA

MCV430 + ECONOPHASE + BASE ASSEMBLY



TOP VIEW



SIDE VIEW

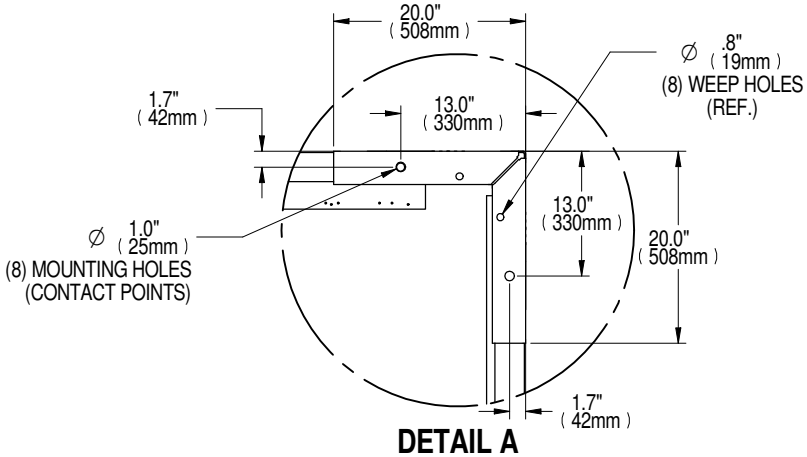
Model			No. of Fans	No. of MCV/PRE Pairs	Domestic Shipping		Export Shipping	
					lb	(kg)	lb	(kg)
MCV430	with PRE and without Receiver	(Single Skid)	6	1	4,756	(2,157)	4,947	(2,244)

Notes:
1. Minimum clearance on the Main Unit Disconnect Enclosure shall be 48" (1219mm) or per local code.
2. Recommended minimum 48" (1219mm) clearance when multiple skids are mounted side by side to ensure proper airflow. Contact the factory for other spacing requirements.

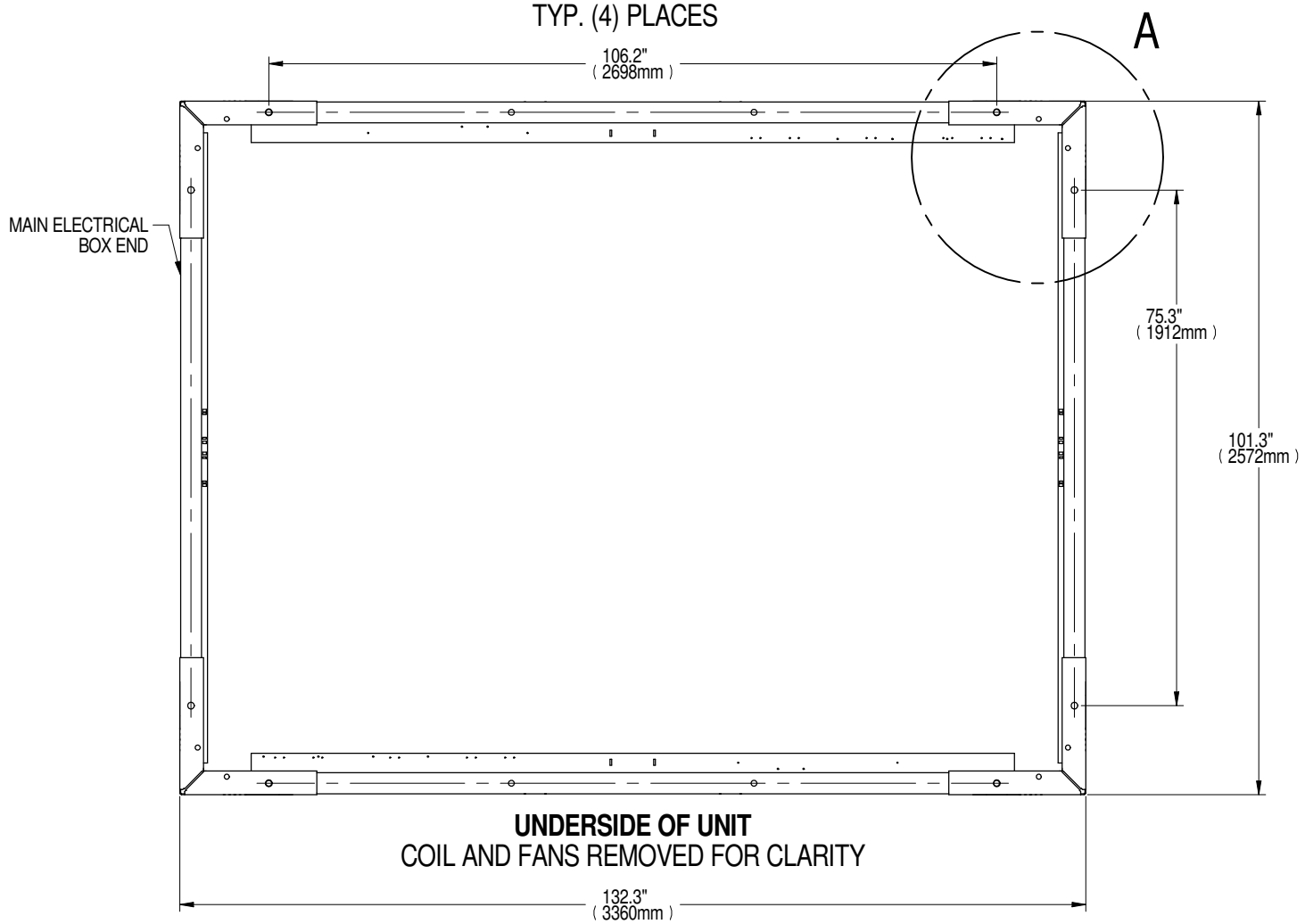
HEAT REJECTION SKID

CABINET & ANCHOR DIMENSIONAL DATA

MCV430 + ECONOPHASE + BASE ASSEMBLY



DETAIL A
TYP. (4) PLACES

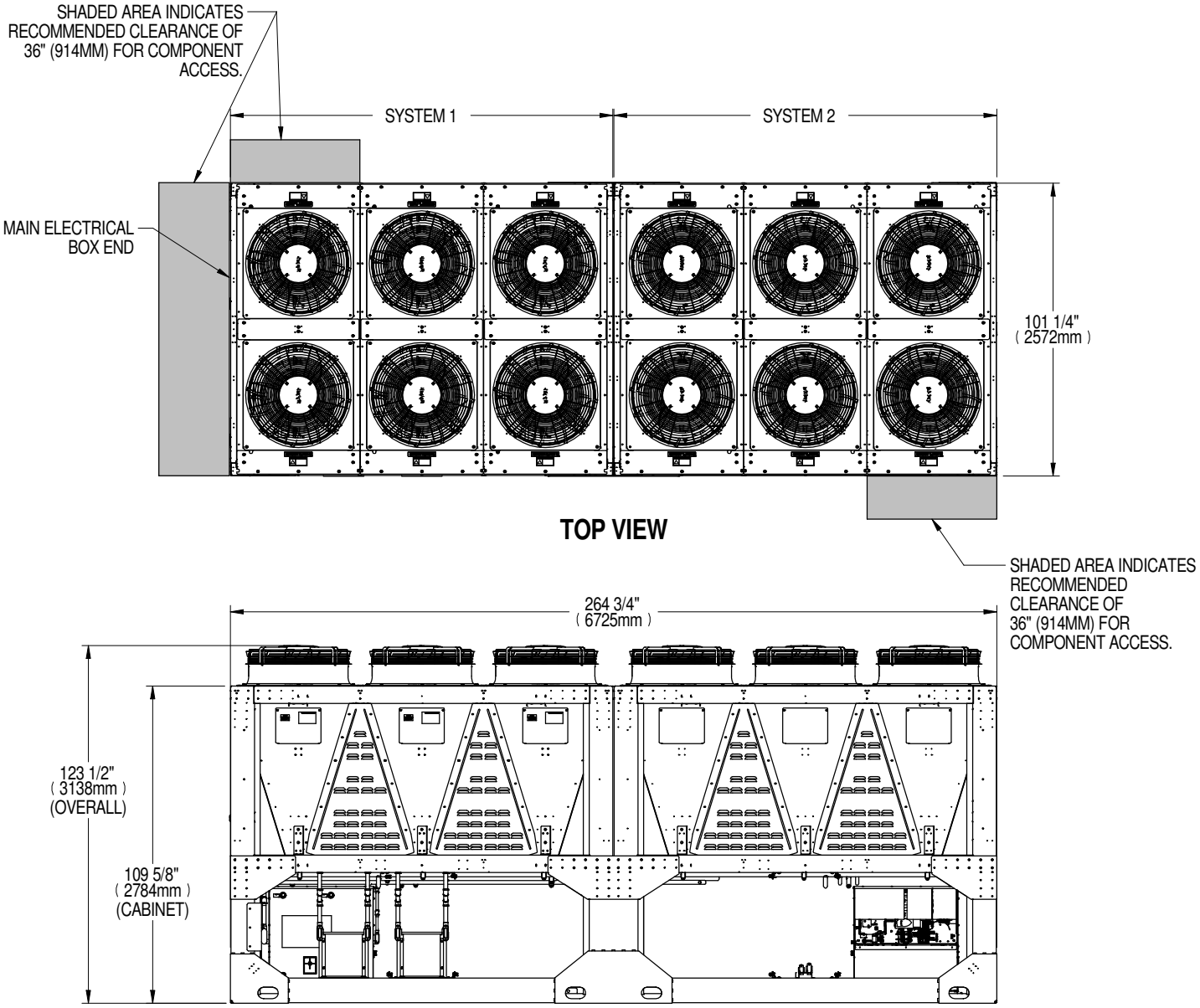


UNDERSIDE OF UNIT
COIL AND FANS REMOVED FOR CLARITY

Notes:
1. Underside of unit, coil and fan removed for clarity.
2. Four mounting holes and four 3/4" field supplied bolts required to secure skid base assembly to customer support structure. Bolt grade to be specified by local requirements.

HEAT REJECTION SKID

CABINET & ANCHOR DIMENSIONAL DATA
MCV430 (2) + ECONOPHASE (2) + BASE ASSEMBLY

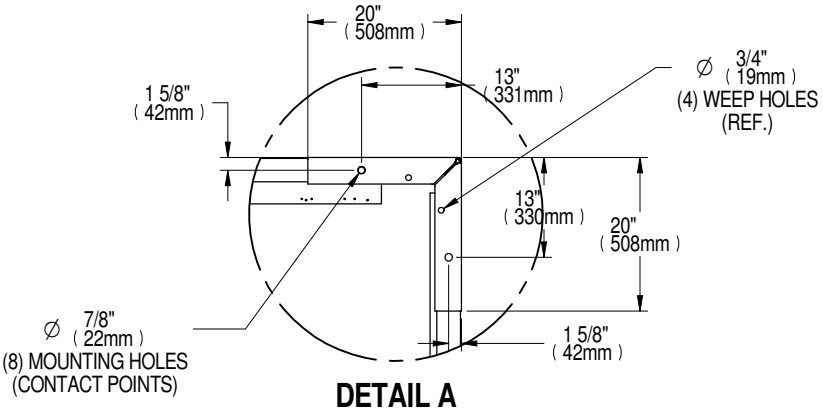


Model			No. of Fans	No. of MCV/PRE Pairs	Domestic Shipping		Export Shipping	
					lb	(kg)	lb	(kg)
MCV430	with PRE and without Receiver	(Dual Skid)	12	2	9,479	(4,300)	9,822	(4,455)

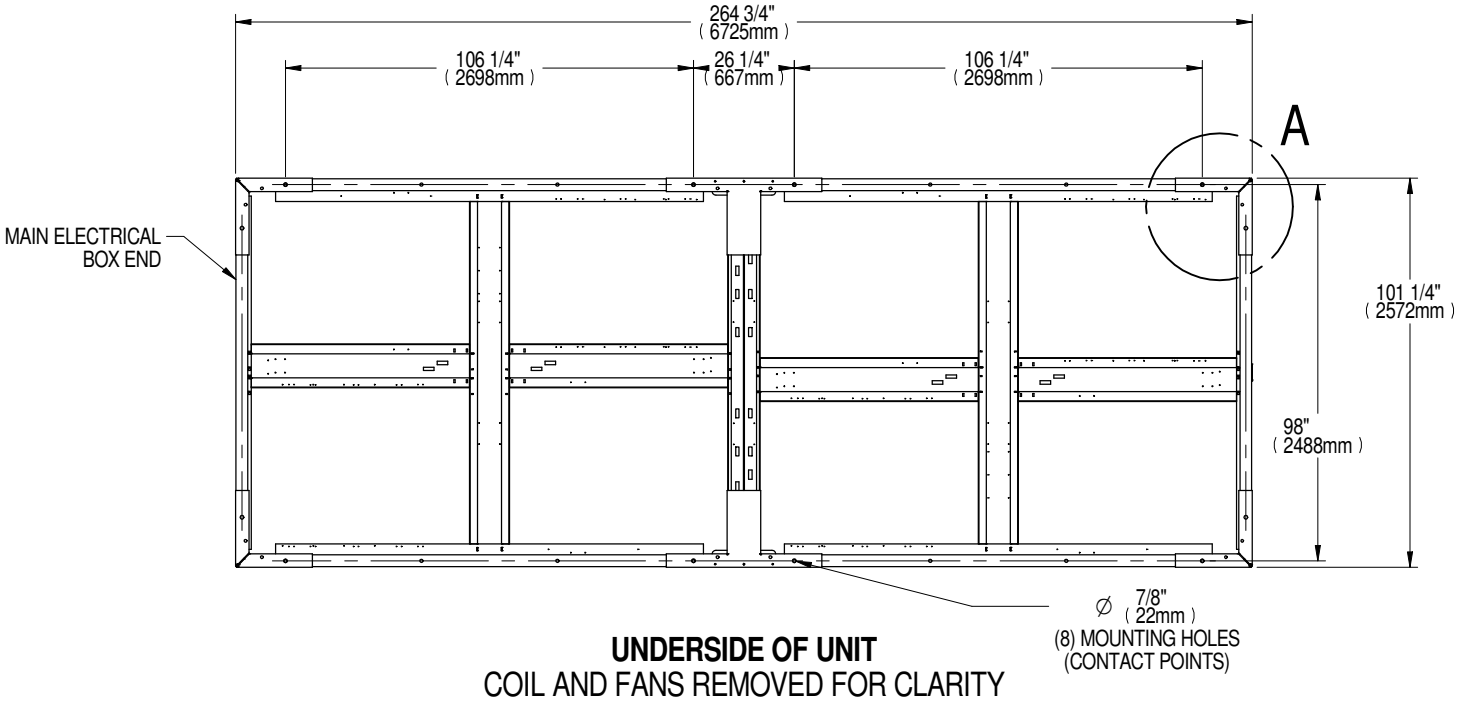
Notes:
1. Minimum clearance of the Main Unit Disconnect Enclosure shall be 48" (1219mm) or per local electrical code.
2. Recommended minimum 48" (1219mm) clearance when multiple skids are mounted side by side to ensure proper airflow. Contact the factory for other spacing requirments.

HEAT REJECTION SKID

CABINET & ANCHOR DIMENSIONAL DATA
MCV430 (2) + ECONOPHASE (2) + BASE ASSEMBLY



DETAIL A
TYP. (4) PLACES



UNDERSIDE OF UNIT
COIL AND FANS REMOVED FOR CLARITY

Notes:
1. Underside of unit, coil and fan removed for clarity.
2. Eight mounting holes and eight 3/4" field supplied bolts required to secure skid base assembly to customer support structure. Bolt grade to be specified by local requirements.

ELECTRICAL FIELD CONNECTIONS
DA250 - DA265 DOWNFLOW MODELS

STANDARD ELECTRICAL CONNECTIONS

1) High voltage entrance - Located in bottom and top of box (quantity 3)
2) Low voltage entrance – Located in bottom and top of box (quantity 4)
3) Three phase electrical service - Terminals are on top of disconnect switch. Three phase service not provided by Vertiv™.
4) Earth ground - Terminal for field supplied earth grounding wire and component ground terminal strip. Earth grounding required for Liebert units.
5) Unit factory installed disconnect switch and Main Fuses – Access to the high voltage electric panel compartment can be obtained only with the switch in the "off" position. Fused disconnects are provided with a defeater button that allows access to the electrical panel when power is on.
6) 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.
7) Customer alarm inputs - Terminals for field supplied, normally open contacts, having a minimum 75VA, 24VAC rating, between terminals 24 & 50, 51, 55, 56. Use field supplied Class 1 wiring. Terminal availability varies by unit options.
8) 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.
9) Heat rejection interlock - On any call for compressor operation, normally open dry contact is closed across terminals 70 & 71 & 230 to heat rejection equipment. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.

CANbus ELECTRICAL CONNECTIONS

10) CANbus Connector – Terminal block with terminals 49-1 (CAN-H) and 49-3 (CAN-L) + SH (shield connection). The terminals are used to connect the CANBus communication cable (provided by others) from the indoor unit to the Vertiv™ CoolPhase Condenser skid.
11) CANbus Cable – CANbus cable provided by others to connect to the outdoor condenser and optional PRE unit. No special considerations are required when the total external cable connection between the indoor unit and outdoor unit(s) is less than 450FT (137M). For total external cable connections greater than 450FT (137M). For external cable connections greater than 450FT (137M), but less than 800FT (243M) a CANbus isolator is required (Contact Factory).

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 BELDEN 89207 (PLENUM RATED), OR ALPHA WIRE 6454 CATEGORY 5, 5E, OR HIGHER
- Do not run in same conduit, raceway, or chase as high voltage wiring
- For CANbus network lengths greater than 450FT (137M) call factory

ELECTRICAL FIELD CONNECTIONS
DA250 - DA265 DOWNFLOW MODELS

OPTIONAL ELECTRICAL CONNECTIONS

12) Condensate alarm (with condensate pump option) - On pump high water indication, normally open dry contact is closed across terminals 88 & 89 for remote indication. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
13) Remote humidifier - On any call for humidification, normally open dry contact is closed across terminals 11 & 12 to signal field supplied remote humidifier. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
14) Reverse Starter contacts - Normally open dry contact is closed across terminals 102 & 103 for power supply 1 and 106 & 107 for power supply 2 to indicate the active power feed. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
15) Heat Rejection Power Connection- Terminals are on bottom of fuse block. Use field supplied wiring per local codes for connection to Heat Rejection unit.
16) Smoke sensor alarm - Factory wired dry contacts from smoke sensor are 91-common, 92-NO, and 93-NC. Supervised contacts, 80 & 81, open on sensor trouble indication. This smoke sensor is not intended to function as, or replace, any room smoke detection system that may be required by local or national codes. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
17) Analog inputs- Terminals 41, 42, 43, and 44 are user configurable for 0-10V, 0-5V, or 4-20MA.

OPTIONAL LOW VOLTAGE TERMINAL PACKAGE CONNECTIONS

18) Remote unit shutdown - Two additional contact pairs available for unit shutdown (labeled as 37B & 38B, 37C & 38C). Replace jumpers with field supplied normally closed switch having a minimum 75VA, 24VAC rating. Use field supplied Class 1 wiring.
19) Common alarm - On any alarm, two additional normally open dry contacts are closed across terminals 94 & 95 and 96 & 97 for remote indication. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
20) Main fan enabled contact - On VFD enable, normally open dry contact is closed across terminals 84 & 85 for remote indication. 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.
21) Vertiv™ Liqui-Tect™ shutdown and dry contact - On Vertiv™ Liqui-Tect™ activation, normally open dry contact is closed across terminals 58 & 59 for remote indication (Vertiv™ Liqui-Tect™ sensor ordered separately). 1 AMP, 24VAC max load. Use Class 1 field supplied wiring.

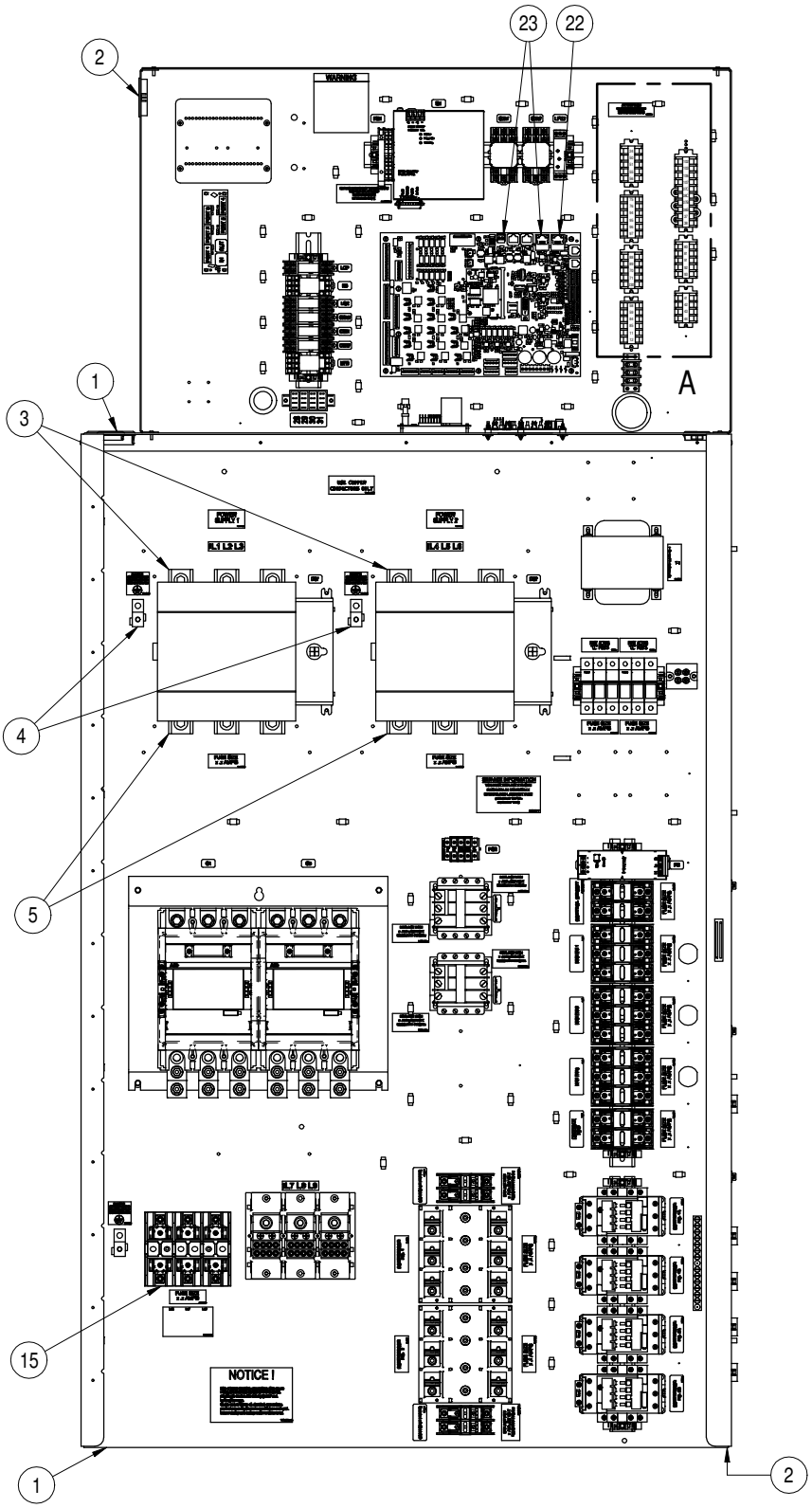
OPTIONAL COMMUNICATION CONNECTIONS

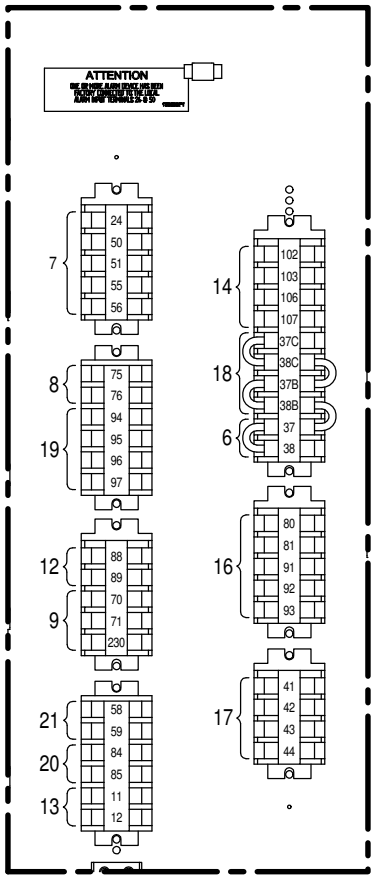
22) Unit-to-Unit – Plug 64 is reserved for U2U communication.
23) Site and BMS – Plug 74 and terminal block 3 are reserved for Site and BMS connections. Plug 74 is an eight pin RJ45 for a Cat 5 cable. Terminal block 3 is a two position screw terminal block for use with twisted pair wires.

COOLPHASE PERIMETER

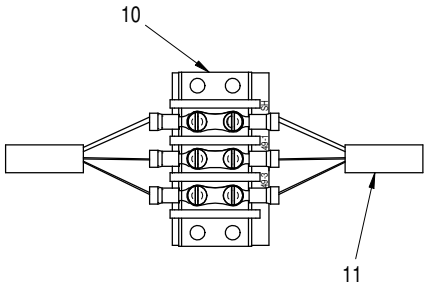
ELECTRICAL FIELD CONNECTIONS

DA250 - DA265 DOWNFLOW MODELS



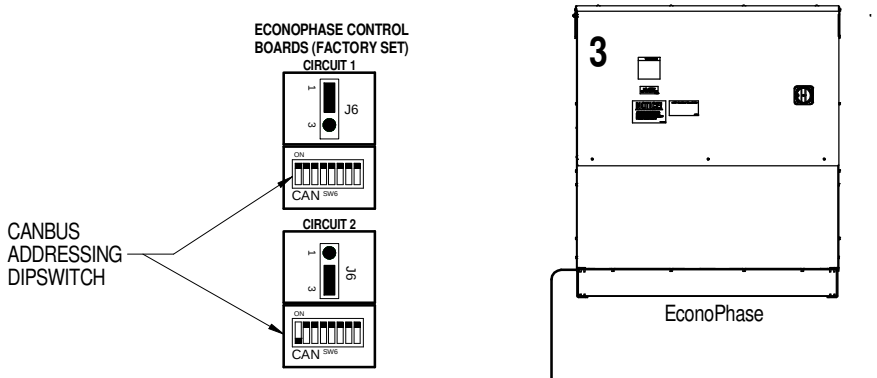


DETAIL A

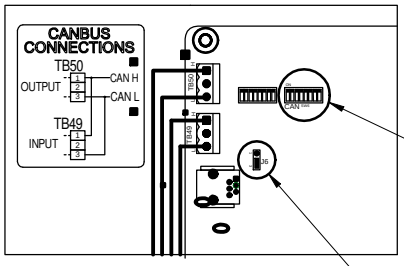


HEAT REJECTION SKID

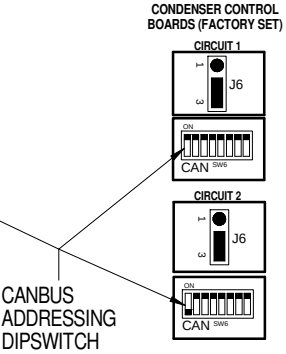
CANbus & INTERLOCK CONNECTIONS
MCV + ECONOPHASE + BASE ASSEMBLY



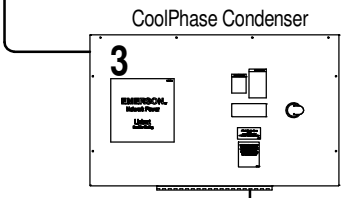
CANBUS COMMUNICATION CABLE



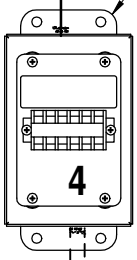
DETAIL 3
JUMPER AND DIPSWTICH LOCATION



CANBUS TERMINATION JUMPER

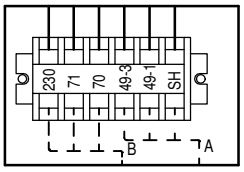


LOW VOLTAGE JUNCTION BOX



FACTORY WIRED

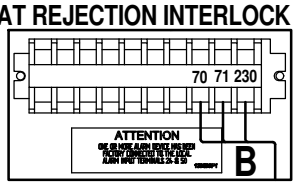
FIELD INSTALLED

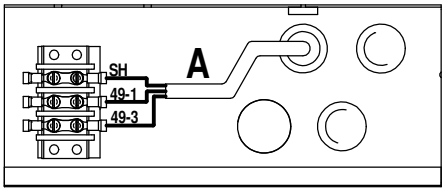


DETAIL 4 LOW VOLTAGE JUNCTION BOX

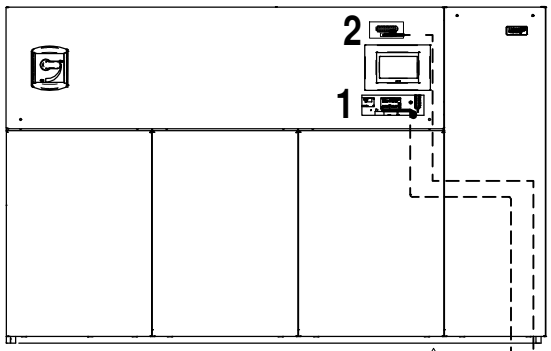
A B

DETAIL 2
HEAT REJECTION INTERLOCK (B)





DETAIL 1 CANBUS CABLE CONNECTION (A)



CoolPhase Perimeter 1

SEE SHEET 2 FOR COMPONENT NOTES, CABLE NOTES, & WIRE NOTES

Note:

1. One (1) Unit shown for simplicity.

CANbus & INTERLOCK CONNECTIONS
MCV + ECONOPHASE + BASE ASSEMBLY

COMPONENT NOTES:
1. COMPONENT APPEARANCE, ORIENTATION, AND POSITION MAY VARY BETWEEN PRODUCT LINES. TERMINAL NAMES REMAIN CONSTANT.
2. ALL CIRCUITS TO THESE CONNECTION POINTS REMAIN CONSTANT.

CAN & CABLE NOTES (A):
1. 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 BELDEN 89207 (PLENUM RATED), OR ALPHA WIRE 6454 CATEGORY 5, 5E, OR HIGHER.
2. DO NOT RUN IN SAME CONDUIT, RACEWAY, OR CHASE AS HIGH VOLTAGE WIRING.
3. FOR CANBUS NETWORK LENGTHS GREATER THAN 450FT(137M), CONTACT VERTIV™ FACTORY.

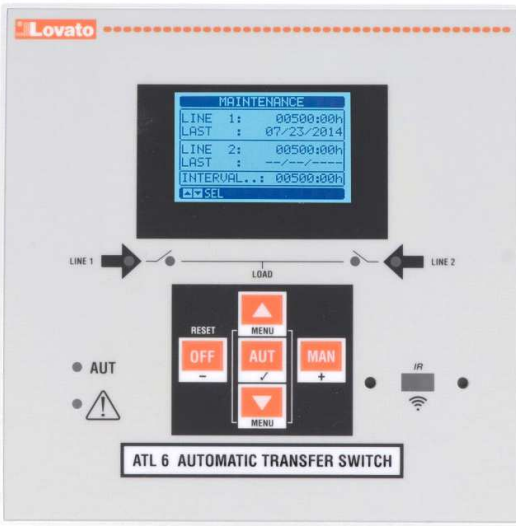
INTERLOCK WIRE NOTES (B):
1. FIELD SUPPLIED WIRE
   - 3 CONDUCTOR 18AWG OR GREATER
   - RATED 600V
2. RUN FIELD SUPPLIED WIRES BETWEEN THE INDOOR UNIT AND THE LOW VOLTAGE JUNCTION BOX.

AUTOMATIC TRANSFER SWITCH

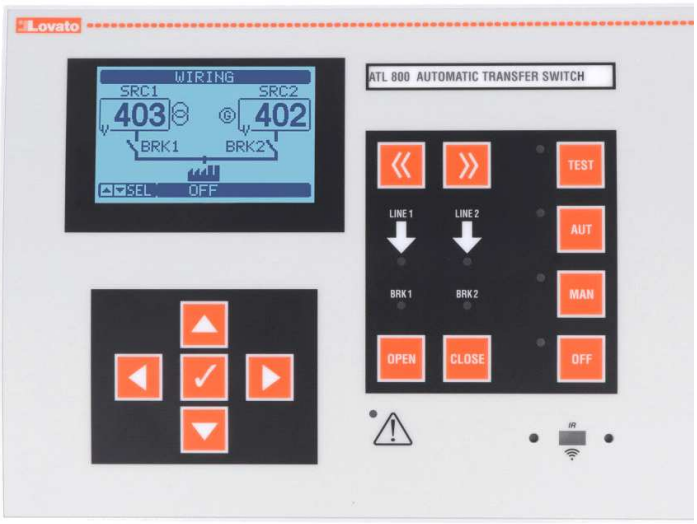
CONTROL MODULE
OVERVIEW OF LOVATO ATS, MODELS ATL610 & ATL800

Vertiv™ Thermal Management units equipped with the optional Lovato ATS (automatic transfer switch) control, will automatically switch over to a secondary power source upon loss of primary power. It will also return to the primary power source when it is determined it is available.

When units are equipped with the optional Capacitive Buffer feature, it will not only keep the Vertiv™ iCOM™ control powered (minimum of 3 minutes) during a loss of power, but will also keep the ATS electronics powered when neither the primary or secondary source are available, allowing for a quick unit response when power is restored.



ATL610 (Units up to 460V)



ATL800 (575V Units)

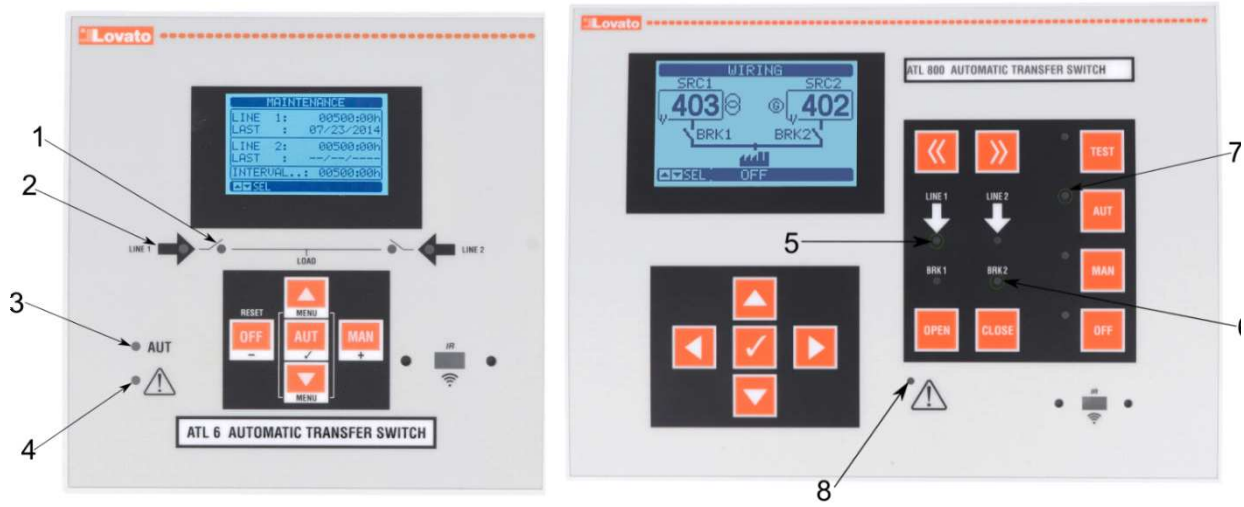
Lovato ATS, model ATL610 (or ATL800) shown in images above, will be located within the cabinet of the units.

AUTOMATIC TRANSFER SWITCH

CONTROL MODULE
KEY CAPABILITIES OF LOVATO ATS, MODELS ATL610 & ATL800

The Lovato ATS, model ATL610 (or ATL800), will be the primary unit level device for switching between power sources. This control will be capable of the following features:

- Determine if power is available in both primary and secondary sources
- Allow for selection of which source is primary and which is secondary
- Ability to automatically switch from primary to secondary source, in the event of primary power loss
- Ability to automatically switch secondary to primary source when primary power returns
- Visible indication of available power sources
- Visible indication of power source that is currently active



Item #	Description for ATL610 Display	Item #	Description for ATL800 Display
1	LEDs indicate which source is active	5	LEDs indicate if a source is available
2	LEDs indicate if a source is available	6	LEDs indicate which source is active
3	Controller is in automatic mode	7	Controller is in automatic mode
4	Alarm is present	8	Alarm is present

ATL610 (Units up to 460V) **ATL800 (575V Units)**

CONTROL MODULE
INTERACTION OF LOVATO ATS WITH VERTIV™ iCOM™ CONTROL

The Vertiv™ iCOM™ control will pull key information from the Lovato ATS, allowing for easy interpretation of the current operation without needing to open the unit's front panel, potentially interrupting operation.

***Identification of current power source and power source availability**

*Available via PA2.06.54.04R or greater



Power source availability

- o **GREEN** circle w/ check mark = power source available
- o **RED** circle w/ cross = power source not available

Power Source A/B utilization

- o **ORANGE** highlighted & underlined power source title = current power source being utilized.

CONTROL MODULE
KEY PARAMETERS OF LOVATO ATS, MODELS ATL610 & ATL800

There are multiple key parameters that are factory set by Vertiv to recommended values. Please consult a Vertiv factory technician before making any changes to these parameters.

- Priority power source selection (default = Source 1)
- Switching delay between power sources
    - if secondary power source is present at time of primary failure, delay is up to 11s (default, adjustable via multiple parameters)
    - if secondary power source is ***NOT*** present at time of primary failure, delay is 10s (default, adjustable) after secondary power source is available
- Unit would be removed from active power source in following conditions:
    - Voltage Limit: If voltage is outside of a set limit for a set period (default = 5s)
        - Min Voltage Limit = 85% (default) of nominal
        - Max Voltage Limit = 115% (default) of nominal
    - Voltage Imbalance: If voltage imbalance (asymmetry) is greater than 15% (default) for a set period (default = 5s)
    - Phase Loss: If a phase falls below 70% (default) of nominal for a set period (default = 0.1s)
    - Frequency Limit: If frequency is outside of a set limit for a set period (default = 3s)
        - Min Freq Limit = 95% (default)
        - Max Frequency Limit = 105% (default)

Please note that not all parameters are applicable to Vertiv equipment operation. Consult a Vertiv factory technician before making any changes to these parameters.

CONTROL MODULE

MONITORING FUNCTIONS OF LOVATO ATS, MODELS ATL610 & ATL800

The voltage and frequency information from the ATS can be displayed on the Vertiv™ iCOM™ user interface, as shown in the below image. Further information is available via BMS monitoring through the Vertiv™ iCOM™ Unity Card / Embedded Unity (BACnet MSTP, BACnet IP, Modbus TCP/IP, Modbus RTU, SNMP v2, v3). The items are outlined in the table on the following page.

ATS voltage & frequency summary page



CONTROL MODULE
MONITORING POINTS

The below ATS specific points can be monitored through a BMS system. Alarm codes at the ATS panel will not match the BMS alarm but can be cross referenced in this chart. Please note that these points are read only.

Lovato Code (at ATS)	Vertiv Alarm (BMS)	Description
ATS_EvLdTO	ATS Load Not Powered Timeout	Unit has not been powered after preset delay (default = 60s).
ATS1_L1L2	Power Source: L1-L2 voltage	Voltage reading phase L1-L2
ATS1_L2L3	Power Source: L2-L3 voltage	Voltage reading phase L2-L3
ATS1_L3L1	Power Source: L3-L1 voltage	Voltage reading phase L3-L1
ATS1_Freq	Power Source: Line Frequency	Measured frequency, per source.
ATS1_BrkOp	Power Source: Breaker Operation Count	Available to be turned on by customer, would indicate number of operations per source.
ATS1VAllOk	Power Source: All status are okay	All parameters are within limits, per source.
ATS1VLo	Power Source: Voltage Is Too Low	Voltage on active source is below acceptable range.
ATS1VHi	Power Source: Voltage Is Too High	Voltage on active source is above acceptable range.
ATS1VAsymm	Power Source: Voltages Are Asymmetric	Voltages imbalance alarm
ATS1VPhsLs	Power Source: Voltage Phase Loss	Indicates one of the phases voltage has dropped below 70% nominal.
ATS2VPhsSq	Power Source: Phase Sequence Issue	Indicates the incoming power wasn't wired per the phase sequence configured (L1-L2-L3).
ATS1VFrqLo	Power Source: Frequency Is Too Low	Frequency on active source is below acceptable range.
ATS1VFrqHi	Power Source: Frequency Is Too High	Frequency on active source is above acceptable range.
ATS2BClsd	Power Source: Breaker is closed	ATS is receiving feedback that the indicated contactor as closed.
ATS2BCClsd	Power Source: Breaker command status closed	ATS is directing the indicated contactor to close.
ATS1EvBTim	Power Source: Breaker Timeout Issue	The indicated changeover device did not complete the

CONTROL MODULE
CHANGE OVER CIRCUIT SEQUENCE OF OPERATIONS

Source 1 is out of range

1) Source 1 exceeds one or more limits of voltage, frequency, phase, or voltage symmetry.
2) A delay timer will begin to count. The amount of time depends on which Source 1 parameter is out of spec, and the value saved in the following parameters. The parameters below are the delays for each condition.

Description	Default	Parameter	
		ATL610	ATL800
Voltage below the minimum limit	5s	P06.03	P09.01.03
Voltage above the maximum limit	5s	P06.06	P09.01.06
Phase failure	0.1s	P06.10	P09.01.10
Voltage exceeds the asymmetry limits	5s	P06.12	P09.01.12
Frequency exceeds the maximum limit	3s	P06.14	P09.01.14
Frequency exceeds the minimum limit	5s	P06.16	P09.01.16

3) Once the delay timer is finished, the following events will occur.
    a. The transfer controller will de-energize Source 1 contactor coil.
    b. The transfer controller will signal the unit is no longer being powered by Source 1.
    c. An auxiliary switch NO contact on Source 1's contactor will open, sending a signal to the transfer controller. This signal verifies that the load is not connected to Source 1.
    d. The NC contacts of the same auxiliary switch will close to allow the coil of the Source 2 contactor to be energized. The Source 2 contactor coil is not energized at this time.

4) Once the transfer controller output has opened, a delay timer will begin using the value entered under parameter P05.03 (ATL610) or P07.01.02 (ATL800), default = 6s. **This value should not be decreased without consent from Vertiv.**

5) A presence delay is used to determine if Source 2 is a valid source. This delay will start as soon as Source 2 is available. The presence delay is based on the value entered in parameter P07.07 (ATL610) or P09.02.07 (ATL800), default = 10s. If Source 2 is available before Source 1 fails, it is possible that the delay will already be satisfied at the time Source 1 fails. If this is a manual transfer to Source 2 and Source 1 is still available, the presence delay will refer to the value in parameter P07.08 (ATL610) or P09.02.08 (ATL800), default = 60s.
6) When the timer in both step 4 and 5 are finished:
    a. The transfer controller will energize the Source 2 contactor.
    b. An auxiliary switch NO contact on Source 2's contactor will close, sending a signal to the transfer controller. This signal verifies that the load is connected to Source 2.
    c. The NC contacts of the same auxiliary switch will open to prevent the coil of Source 1 contactor from energizing.
    d. The transfer controller will signal the unit is being powered by Source 2.

CONTROL MODULE
CHANGE OVER CIRCUIT SEQUENCE OF OPERATIONS

Transfer back to Source 1 when Source 2 is present

1) When Source 1 has reached acceptable levels, a presence delay will start. The presence delay is based on the value entered in parameter P06.08 (ATL610) or P09.01.08 (ATL800), default = 60s.
2) Once this timer is finished:
    a. The transfer controller will de-energize Source 2 contactor coil.
    b. An auxiliary switch NO contact on Source 2's contactor will open, sending a signal to the transfer controller. This signal verifies that the load is not connected to Source 2.
    c. The NC contacts of the same auxiliary switch will close to allow the coil of the Source 1 contactor to be energized. The Source 1 contactor coil is not energized at this time.
    d. The transfer controller will signal the unit is no longer being powered by Source 2.
3) A delay timer starts using the value in parameter P05.04 (ATL610) or P07.02.02 (ATL800), default = 6s. **This value should not be decreased without consent from Vertiv.**
4) When the timer in step 3 is finished:
    a. The transfer controller will energize the Source 1 contactor.
    b. An auxiliary switch NO contact on Source 1's contactor will close, sending a signal the transfer controller. This signal verifies that the load is connected to Source 1.
    c. The NC contacts of the same auxiliary switch will open to prevent the coil of Source 2 contactor from energizing.
    d. The transfer controller will signal the unit is being powered by Source 1.

CONTROL MODULE
CHANGE OVER CIRCUIT SEQUENCE OF OPERATIONS

Source 2 is out of range when unit is powered by Source 2

1) Source 2 exceeds one or more limits of voltage, frequency, phase, or voltage symmetry.
2) A delay timer will begin to count. The amount of time depends on which Source 2 parameter is out of spec, and the value saved in the following parameters. The parameters below are the delays for each condition.

Description	Default	Parameter	
		ATL610	ATL800
Voltage below the minimum limit	5s	P07.03	P09.02.03
Voltage above the maximum limit	5s	P07.06	P09.02.06
Phase failure	0.1s	P07.10	P09.02.10
Voltage exceeds the asymmetry limits	5s	P07.12	P09.02.12
Frequency exceeds the maximum limit	3s	P07.14	P09.02.14
Frequency exceeds the minimum limit	5s	P07.16	P09.02.16

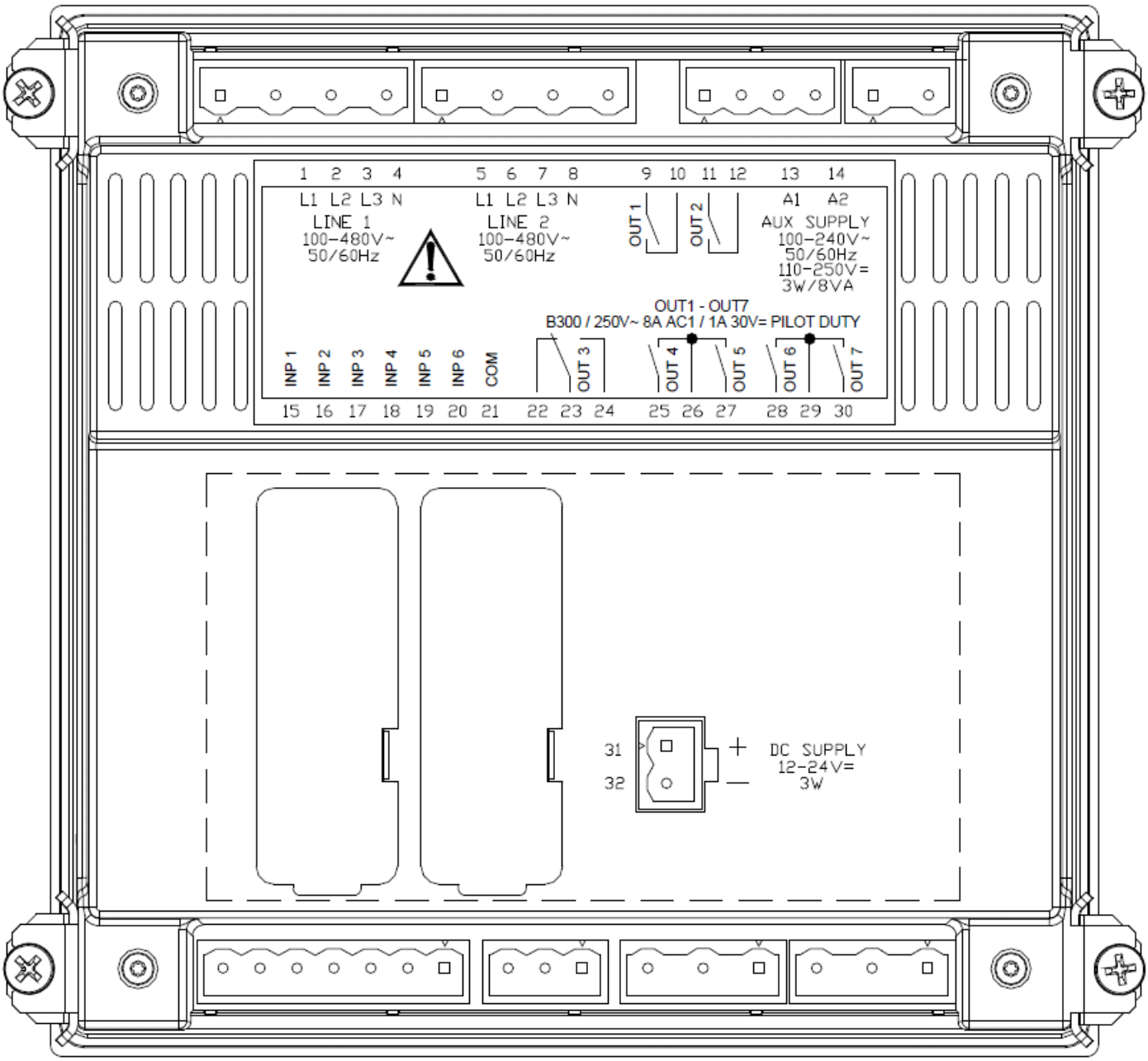
3) Once the delay timer is finished, the following events will occur:
    a. The transfer controller will de-energize Source 2 contactor coil.
    b. The transfer controller will signal the unit is no longer being powered by Source 2.
    c. An auxiliary switch NO contact on Source 2's contactor will open, sending a signal to the transfer controller. This signal verifies that the load is not connected to Source 2.
    d. The NC contacts of the same auxiliary switch will close to allow the coil of Source 1 contactor to be energized. The Source 1 contactor coil is not energized at this time.
4) Once the transfer controller output has opened, a delay timer will begin using the value entered under parameter P05.04 (ATL610) or P07.02.02 (ATL800), default = 6s. This value should not be decreased without consent from Vertiv.
5) A presence delay is used to determine if Source 1 is a valid source. This delay will start as soon as Source 1 is available. The presence delay is based on the value entered in parameter P06.07 (ATL610) or P09.01.07 (ATL800), default = 10s. If Source 1 is available before Source 2 fails, it is possible that the delay will already be satisfied at the time Source 2 fails. If this is a manual transfer to Source 1 and Source 2 is still available, the presence delay will refer to the value in parameter P06.08 (ATL610) or P09.01.08 (ATL800), default = 60s.
6) When the timer in both steps 4 and 5 are finished:
    a. The transfer controller will energize the Source 1 contactor.
    b. An auxiliary switch NO contact on Source 1's contactor will close, sending a signal to the transfer controller. This signal verifies that the load is connected to Source 1.
    c. The NC contacts of the same auxiliary switch will open to prevent the coil of Source 2 contactor from energizing.
    d. The transfer controller will signal the unit is being powered by Source 1.

Transfer when Source 1 and Source 2 fails

1) If both Source 1 and Source 2 fail and are restored, the transfer controller will transfer the load to the preferred Source defined in parameter P05.02 (ATL610) or P06.01.02/P06.02.02 (ATL800), default = 1.

CONTROL MODULE

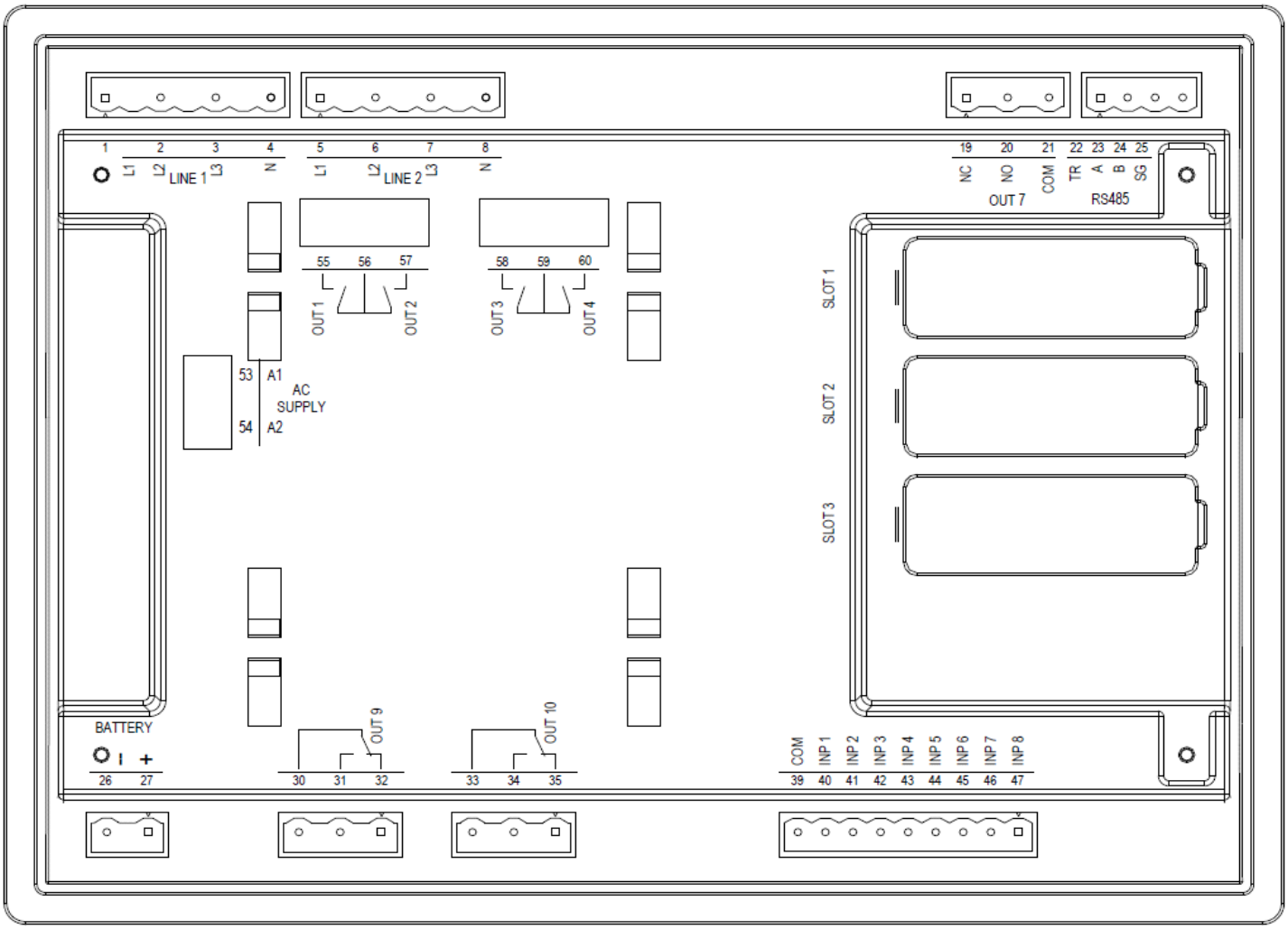
TRANSFER CONTROLLER TERMINAL LABELS – ATL610



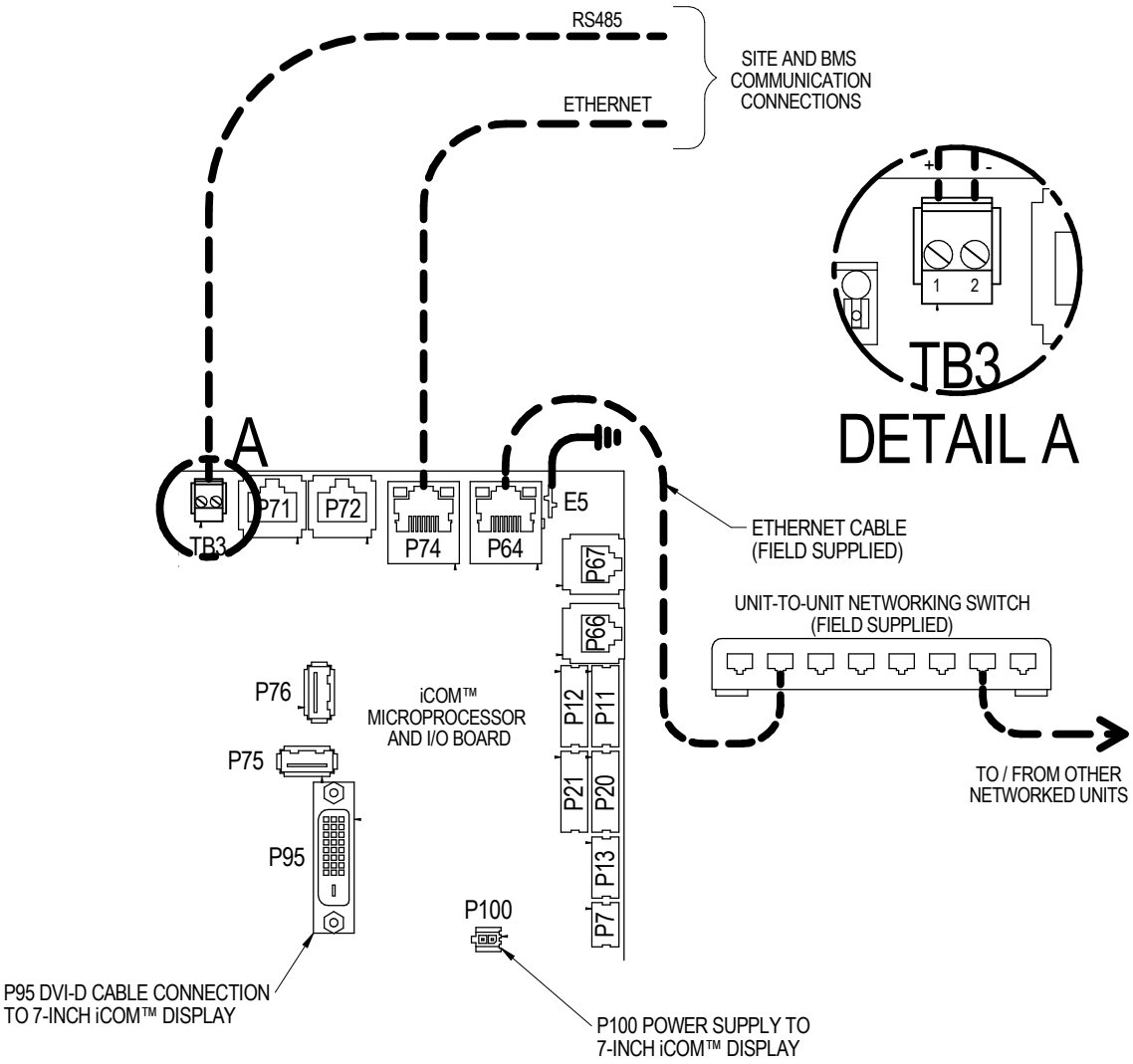
AUTOMATIC TRANSFER SWITCH

CONTROL MODULE

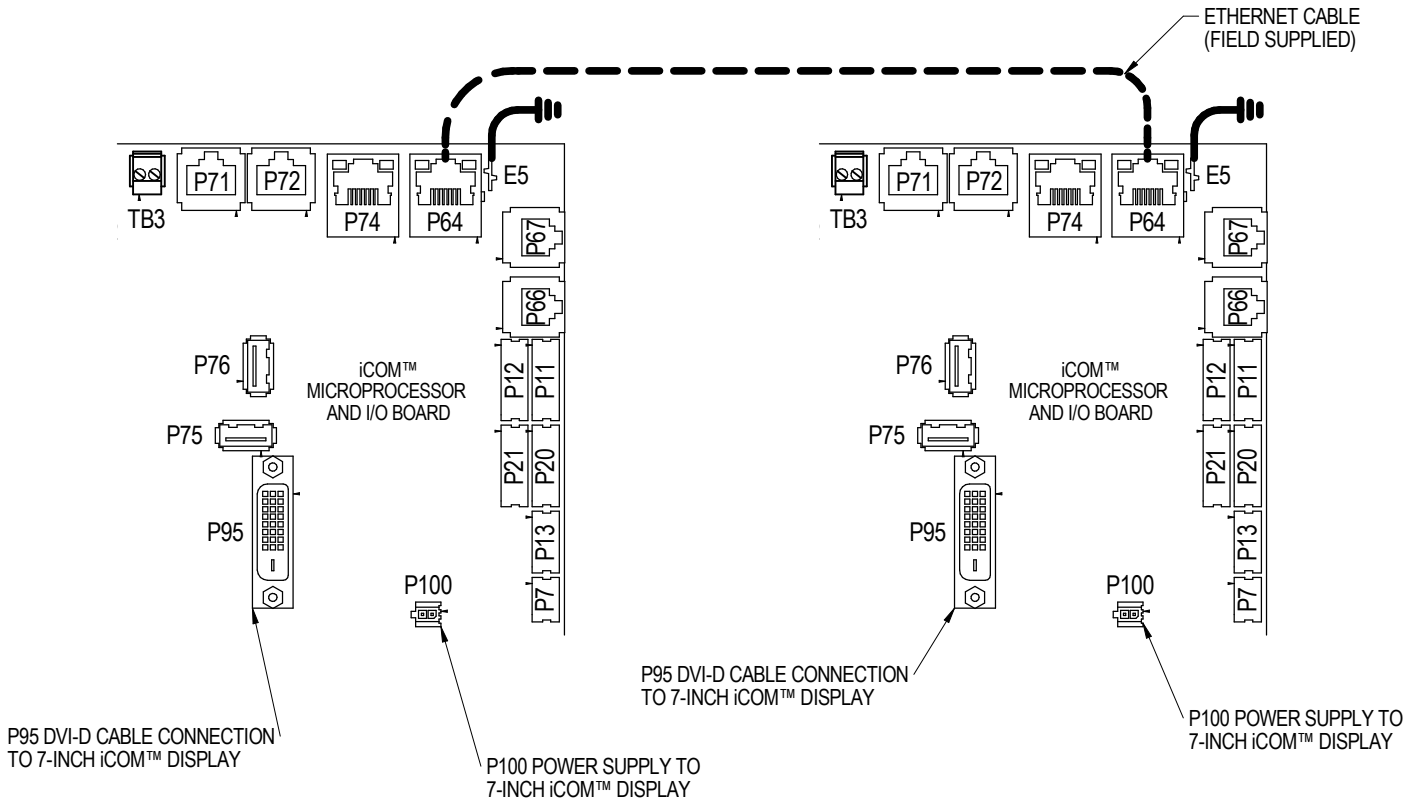
TRANSFER CONTROLLER TERMINAL LABELS – ATL800



UNIT TO UNIT NETWORK CONNECTIONS FOR COOLPHASE PERIMETER, COOLLOOP PERIMETER AND COOLLOOP THERMAL WALL



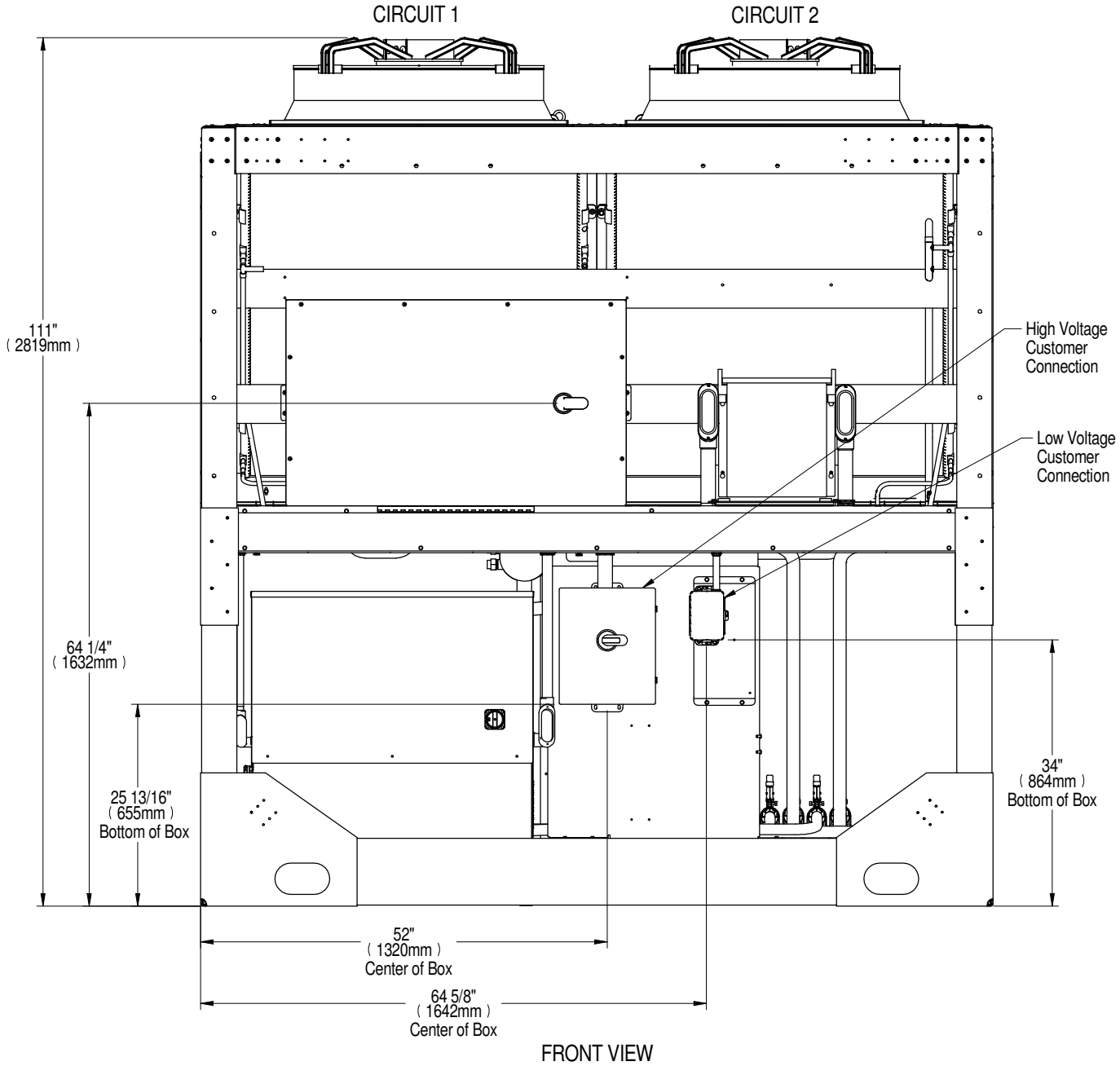
UNIT TO UNIT NETWORK CONNECTIONS FOR COOLPHASE PERIMETER, COOLLOOP PERIMETER AND COOLLOOP THERMAL WALL



NOTE* FOR DUAL-UNIT NETWORK CONFIGURATIONS ONLY

HEAT REJECTION SKID

PRIMARY CONNECTION LOCATIONS
MCV440 + ECONOPHASE + BASE ASSEMBLY



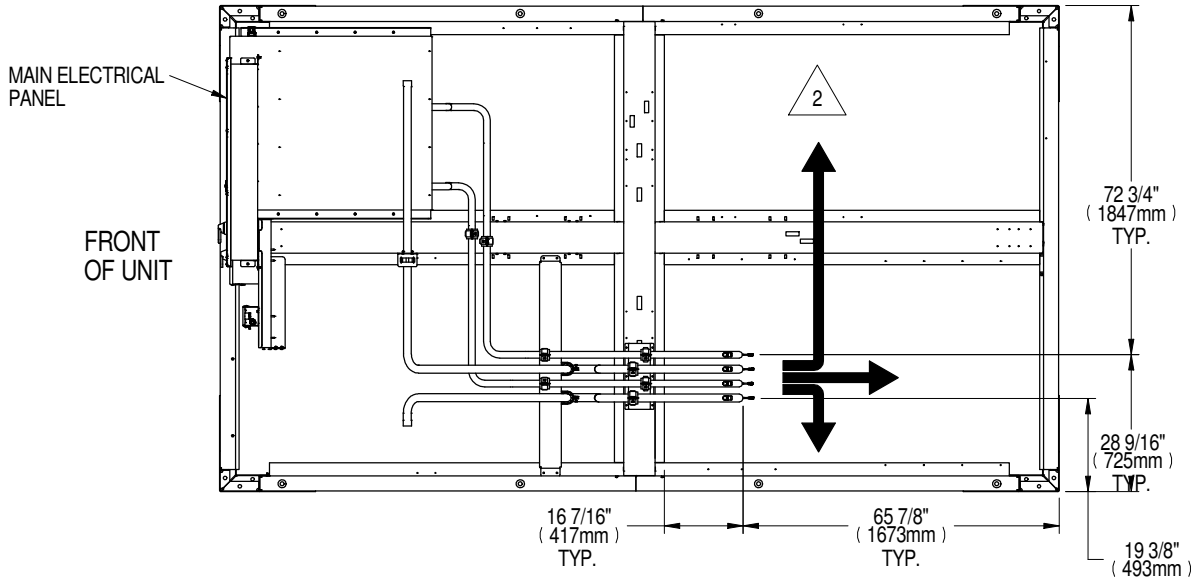
FRONT VIEW

Notes:

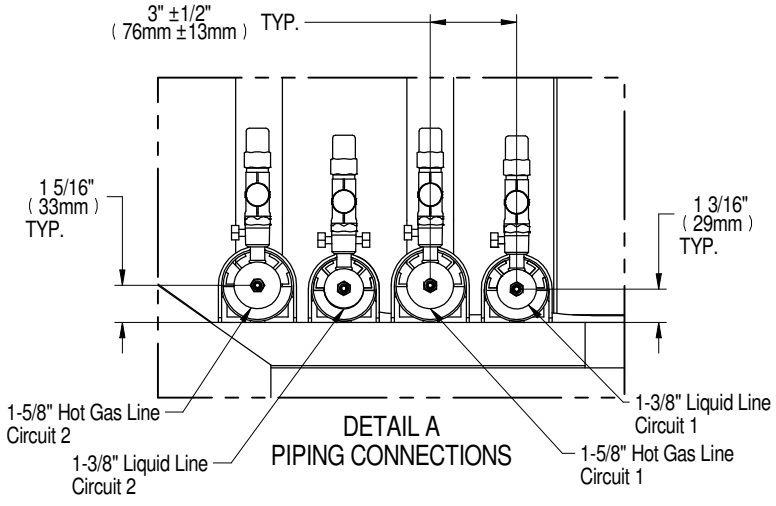
1. Field to provide hole for conduit for high voltage disconnect box and low voltage distribution panel.

HEAT REJECTION SKID

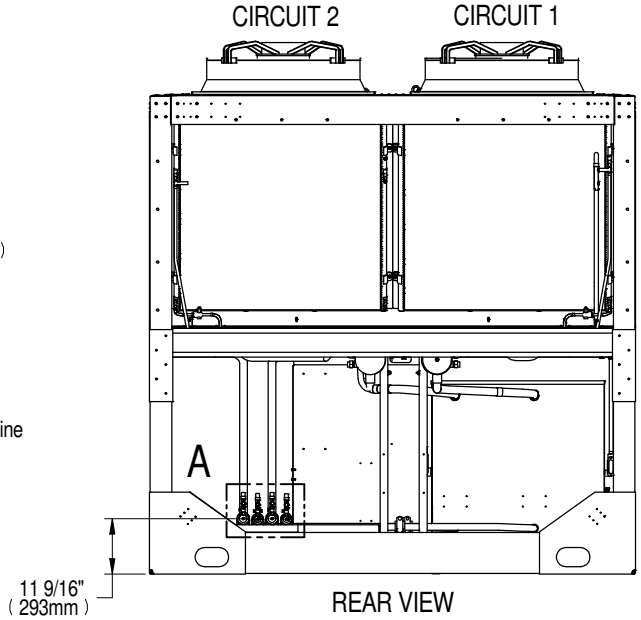
PRIMARY CONNECTION LOCATIONS
MCV440 + ECONOPHASE + BASE ASSEMBLY



TOP VIEW
RIGHT SIDE OF UNIT



DETAIL A
PIPING CONNECTIONS



REAR VIEW

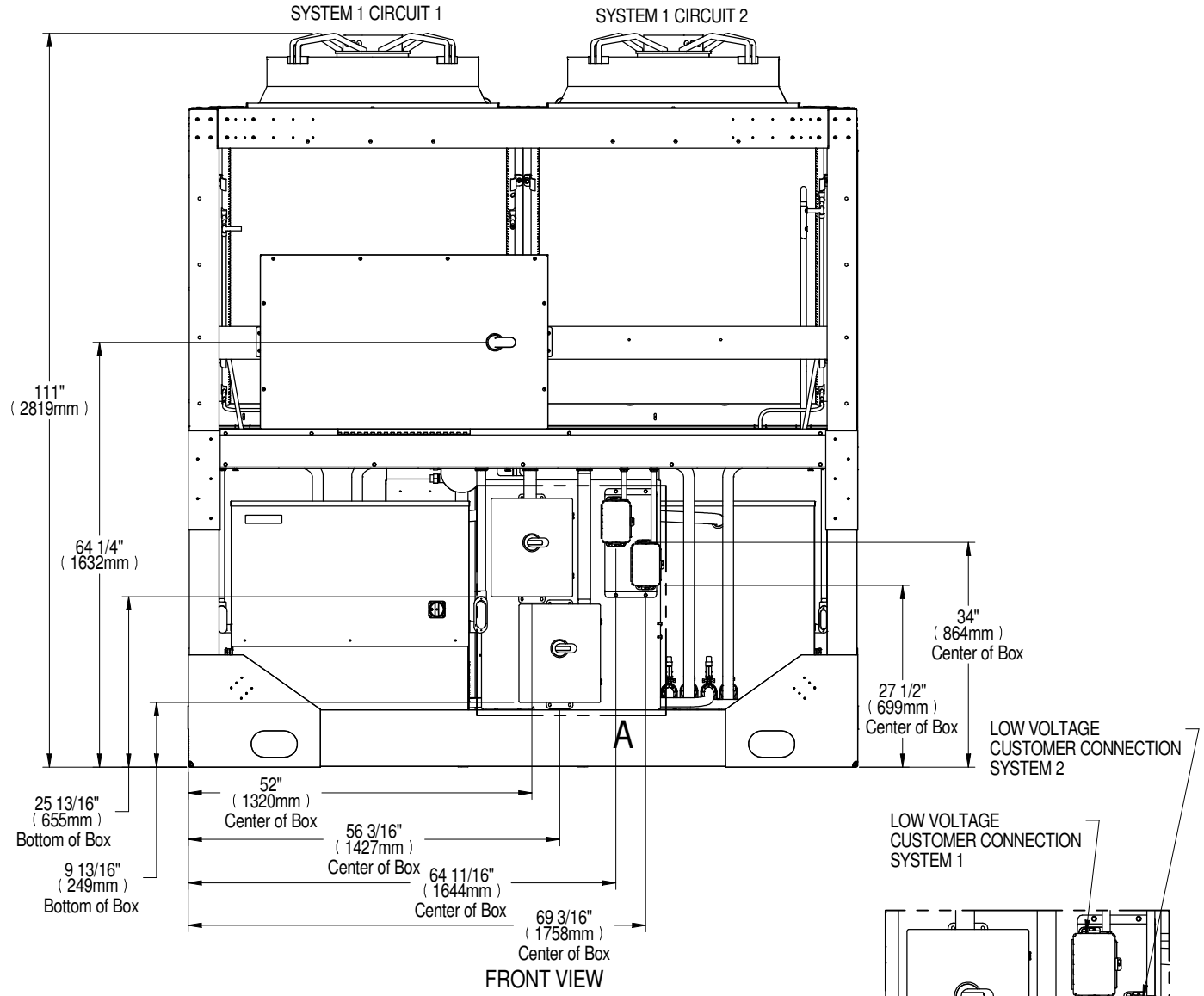
Notes:

1. Parts hidden for clarity.

2. Piping connections can exist out left or right side or rear of the unit.

HEAT REJECTION SKID

PRIMARY CONNECTION LOCATIONS
MCV440 (2) + ECONOPHASE (2) + BASE ASSEMBLY

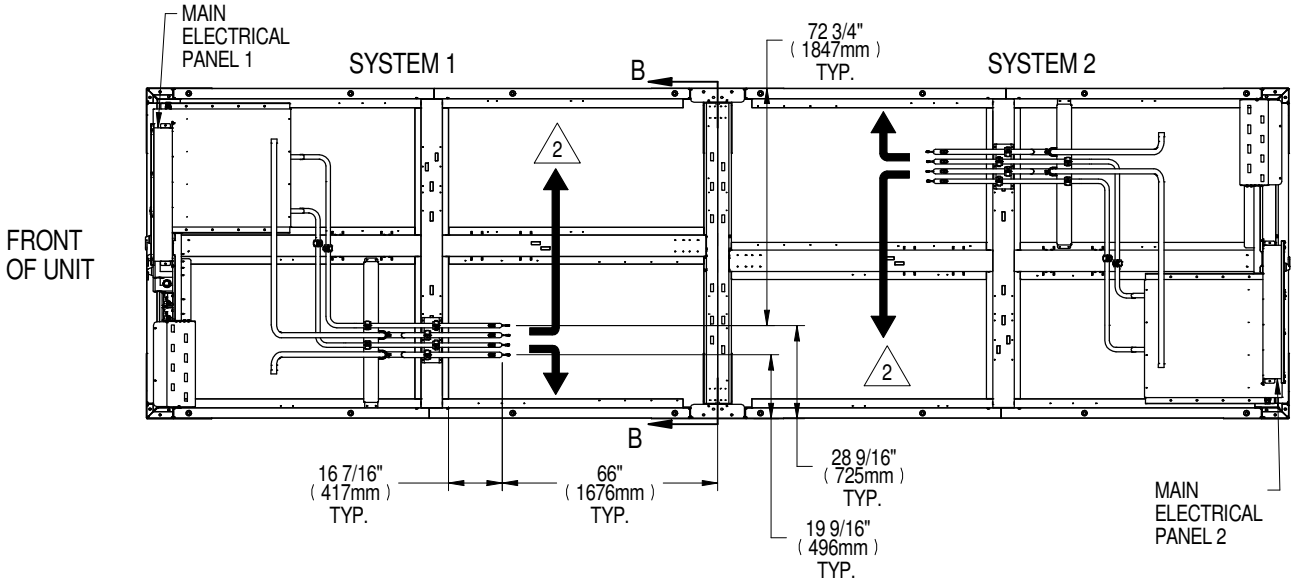


Notes:

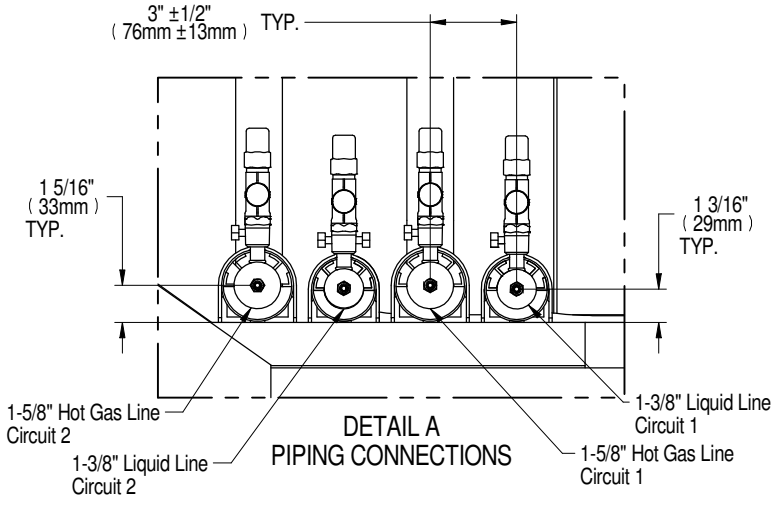
1. Field to provide hole for conduit for high voltage disconnect box and low voltage distribution panel.

HEAT REJECTION SKID

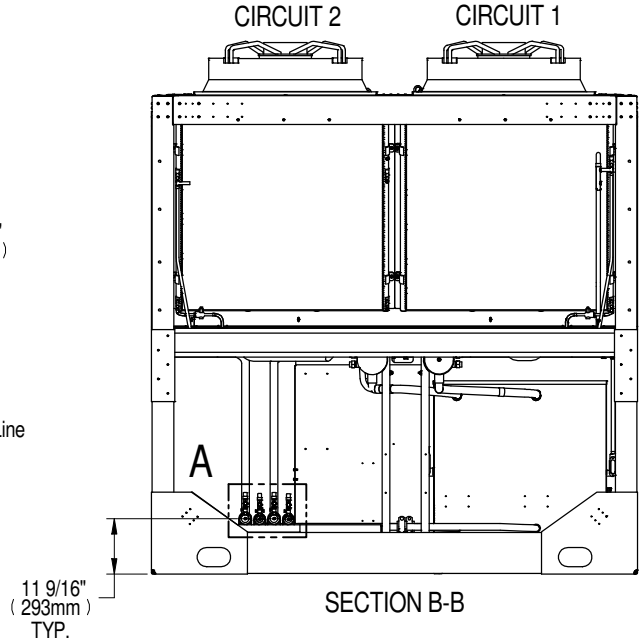
PRIMARY CONNECTION LOCATIONS
MCV440 (2) + ECONOPHASE (2) + BASE ASSEMBLY



TOP VIEW
RIGHT SIDE OF UNIT



DETAIL A
PIPING CONNECTIONS



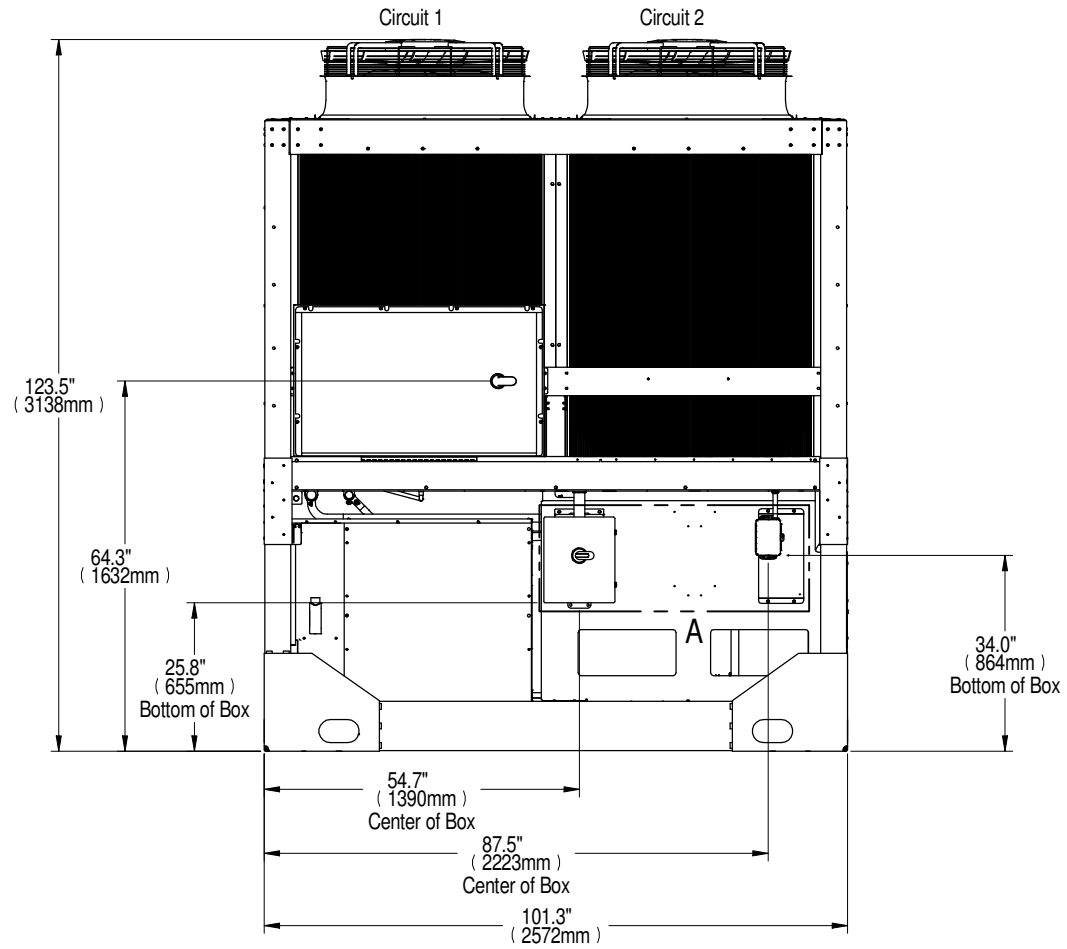
SECTION B-B

Notes:

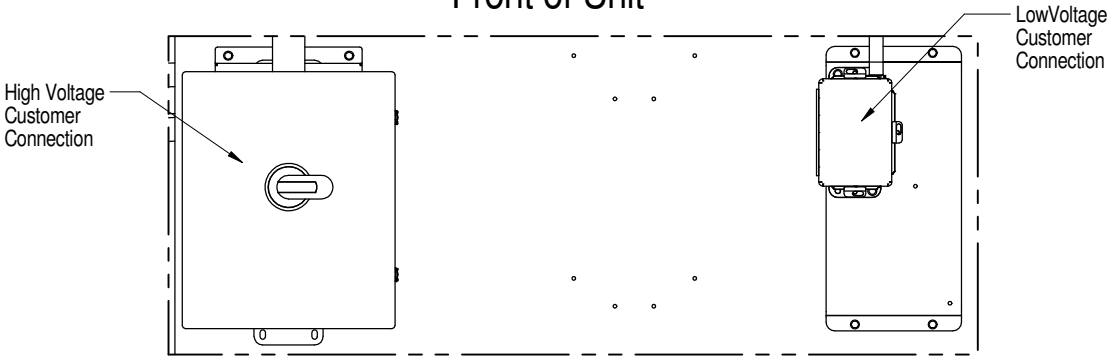
1. Parts hidden for clarity.
2. System 1 and 2 system piping connections can exist out left or right side of the unit.
3. Piping connection dimensions are typical for both systems.

HEAT REJECTION SKID

PRIMARY CONNECTION LOCATIONS
MCV430 + ECONOPHASE + BASE ASSEMBLY



Front of Unit



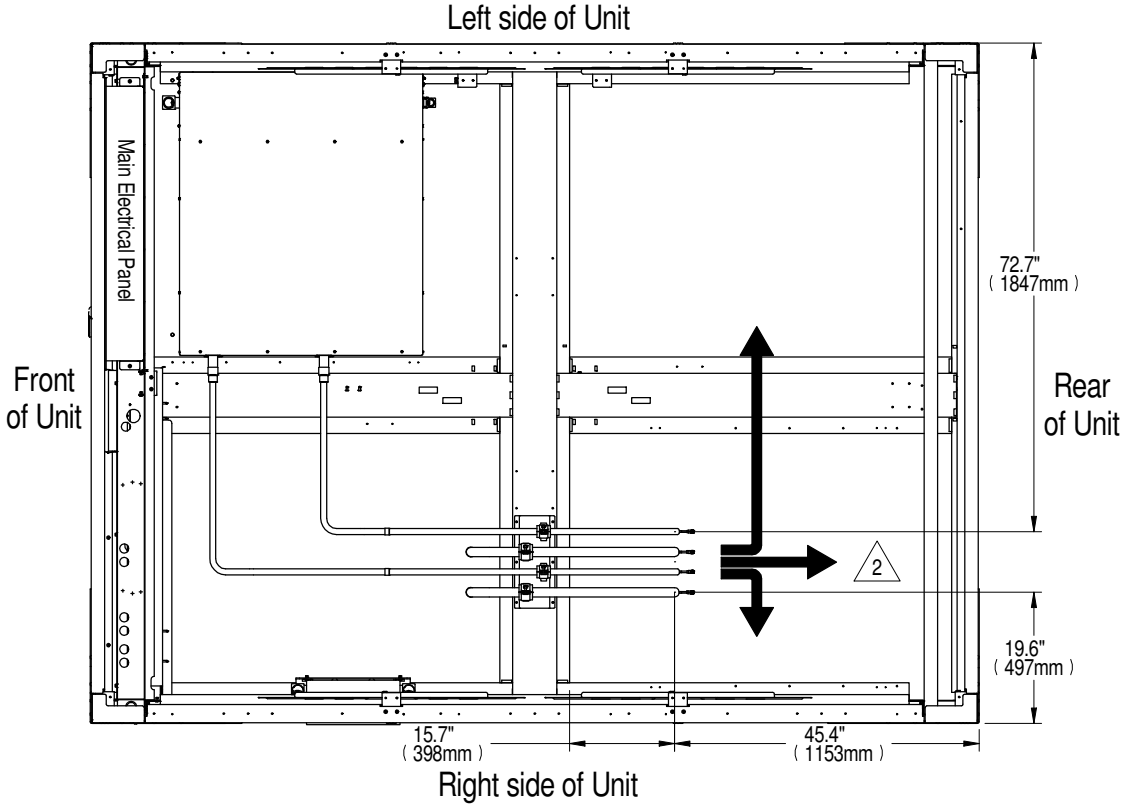
DETAIL A
(Field Electrical Connections)

Notes:
1. Field to provide hole for conduit for high voltage disconnect box and low voltage distribution panel.

HEAT REJECTION SKID

PRIMARY CONNECTION LOCATIONS

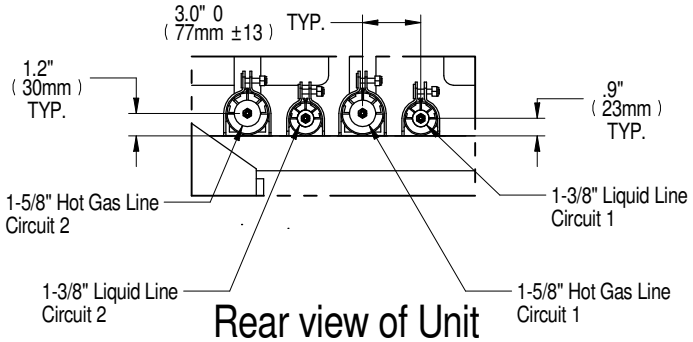
MCV430 + ECONOPHASE + BASE ASSEMBLY



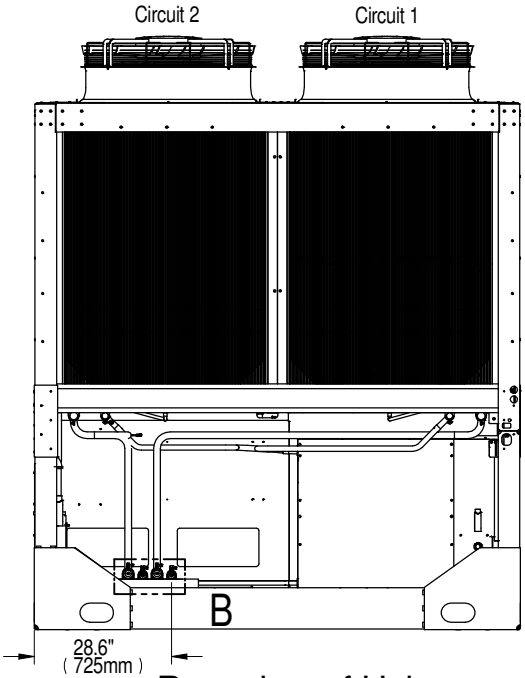
Top View

Multiple customer connection locations

DETAIL B
Piping Connections



Rear view of Unit



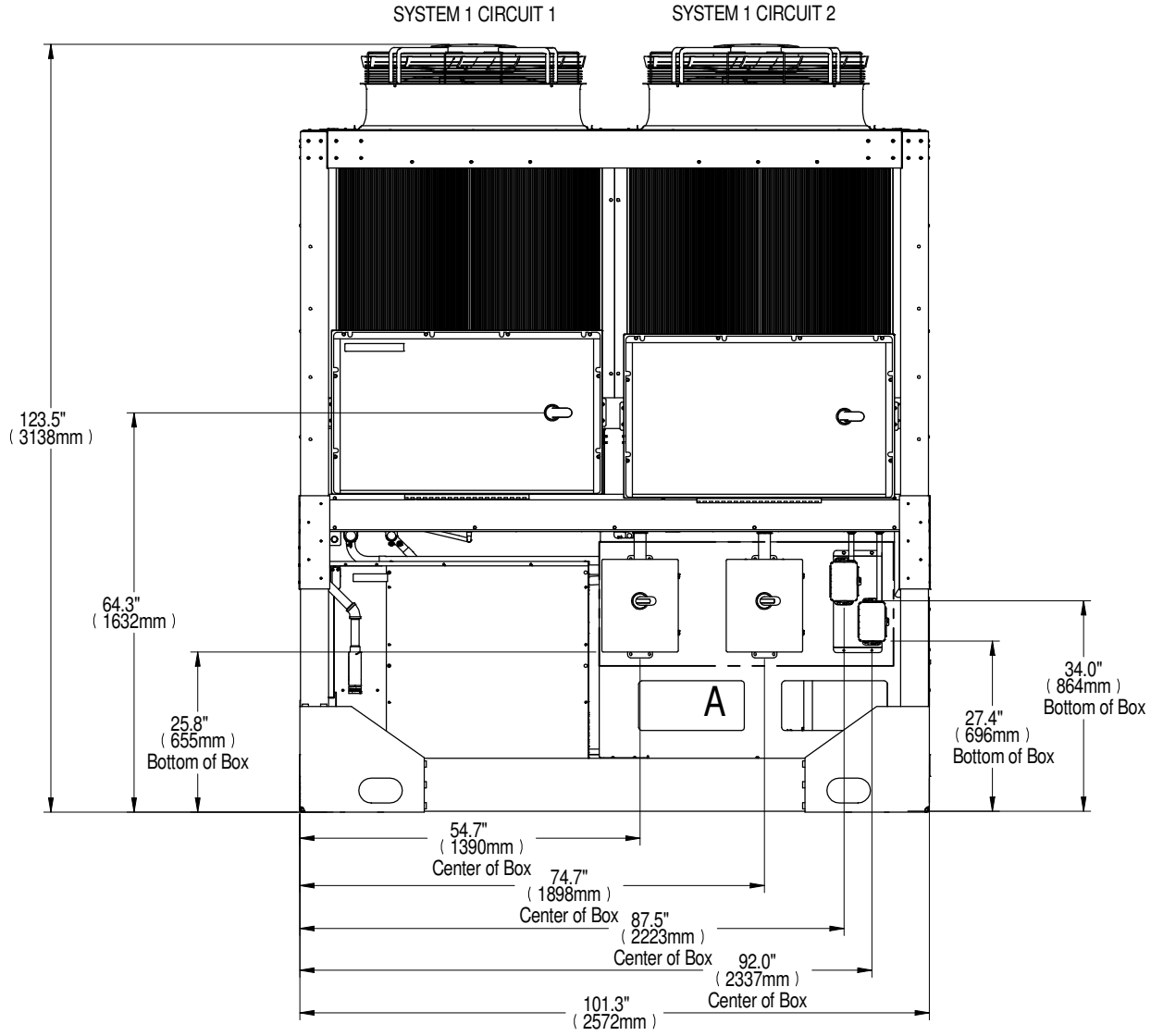
Rear view of Unit

NOTE:
1. For Top View, condenser section removed for clarity.

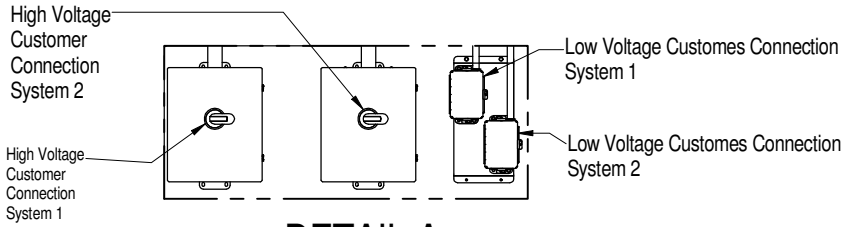
2. Piping connections can exist out left or right side or rear of the unit.

HEAT REJECTION SKID

PRIMARY CONNECTION LOCATIONS
MCV430 (2) + ECONOPHASE (2) + BASE ASSEMBLY



Front of Unit



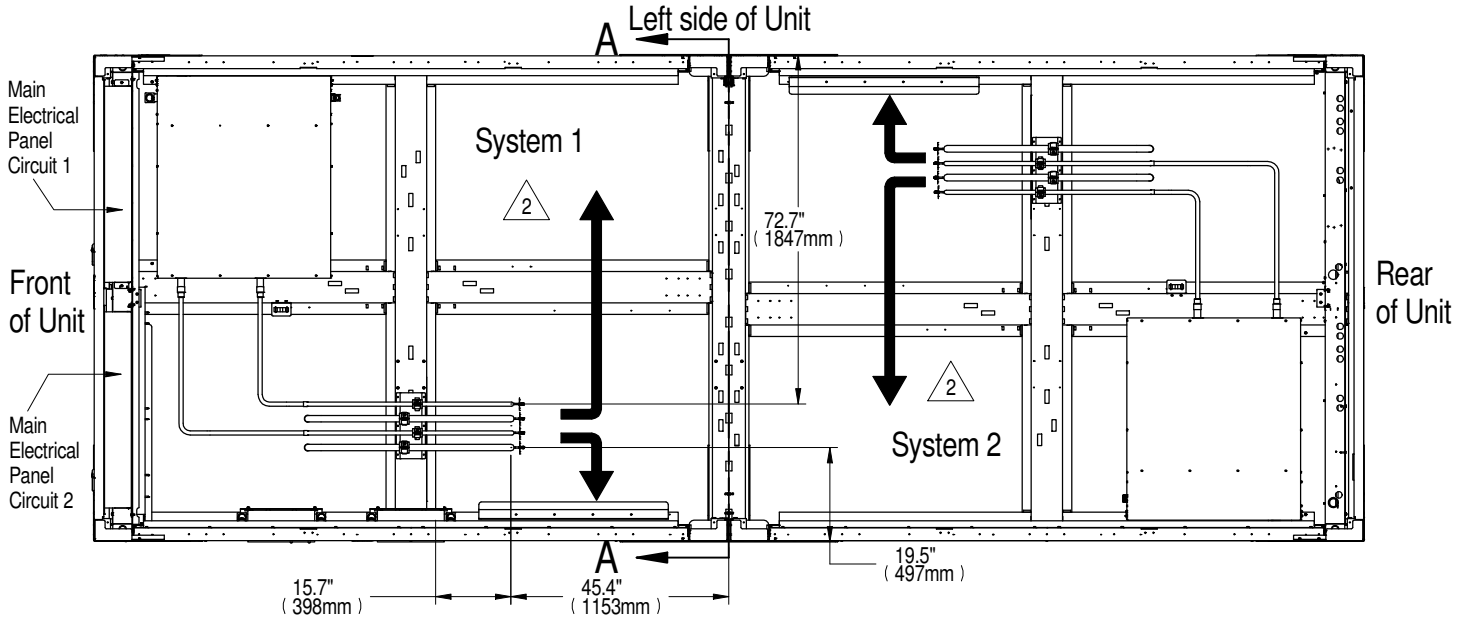
DETAIL A
Field Electrical Connections

Notes:
1. Field to provide hole for conduit for high voltage disconnect box and low voltage distribution panel.

HEAT REJECTION SKID

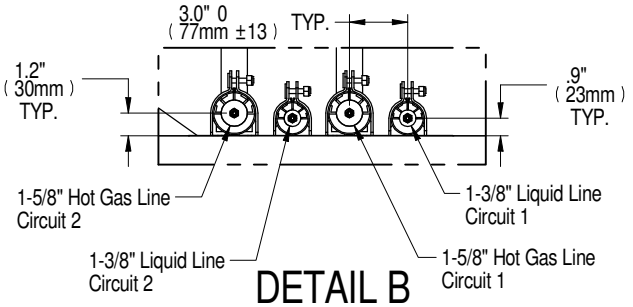
PRIMARY CONNECTION LOCATIONS

MCV430 (2) + ECONOPHASE (2) + BASE ASSEMBLY



Top View

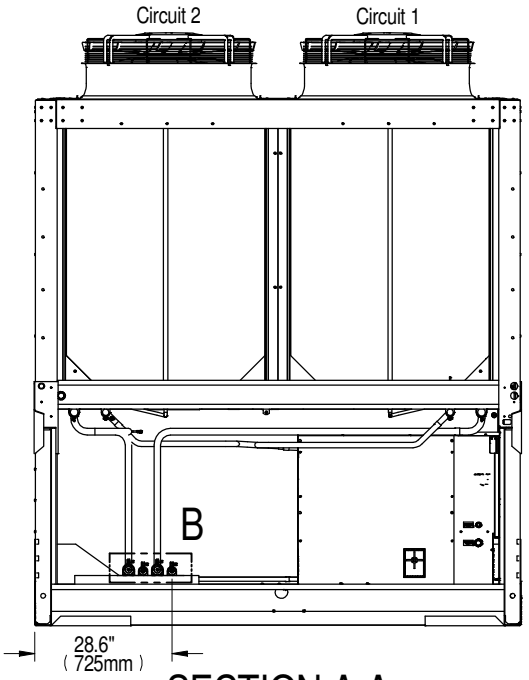
Multiple customer connection locations



DETAIL B

Piping Connections

Piping connection dimensions are typical for both systems.



SECTION A-A

NOTE:

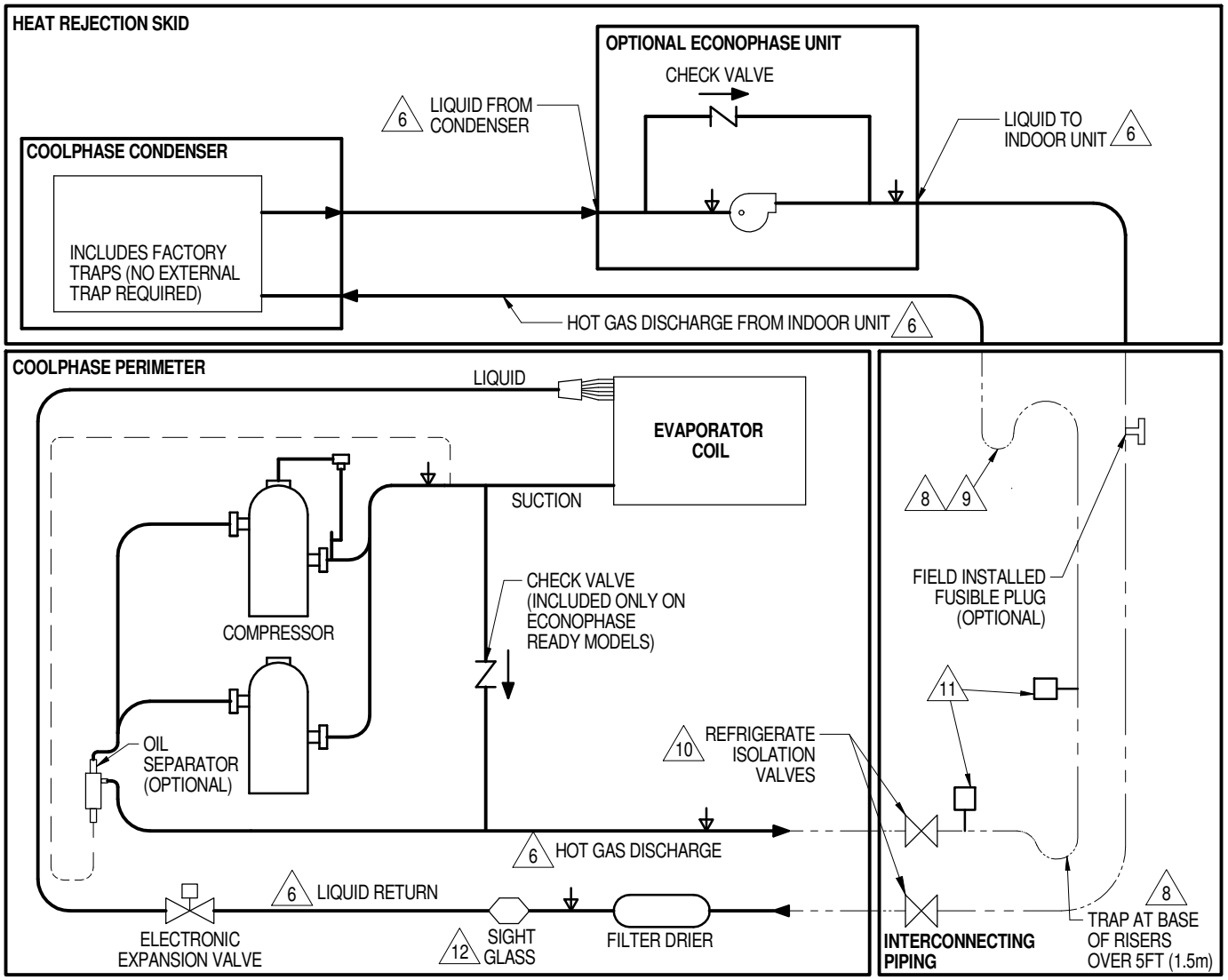
1. For Top View, condenser section removed for clarity.

2. System 1 and 2 system piping connections can exist out left or right side of the unit.

COOLPHASE PERIMETER

PIPING SCHEMATIC

DA250 - DA265 W/ MCV WITHOUT RECEIVERS WITH OPTIONAL OIL SEPARATOR



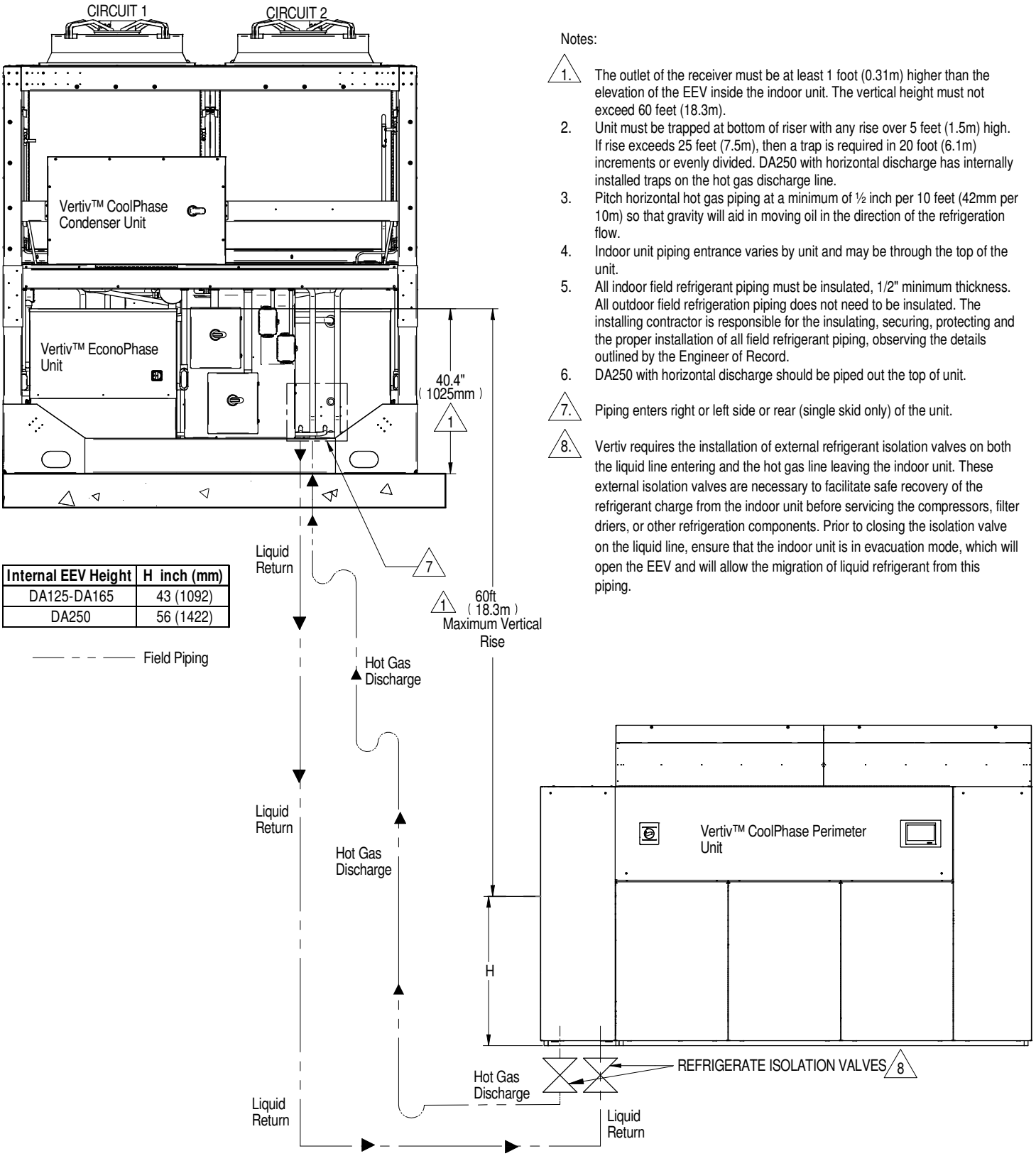
Notes:

1. Two refrigeration circuits provided. Single refrigeration circuit shown for clarity.
2. Schematic representation shown. Do not use for specific connection locations.
3. The bottom of the Condenser Coil must be no greater than 60ft. (18.3m) above, and less than 15ft. (4.6m) below the elevation of the EEV inside the indoor unit.
4. Do not isolate any refrigeration circuits from over pressurization protection.
5. All indoor field refrigerant piping must be insulated, 1/2" minimum thickness. All outdoor field refrigeration piping does not need to be insulated.The installing contractor is responsible for the insulating, securing, protecting and the proper installation of all field refrigerant piping, observing the details outlined by the Engineer of Record.
6. Circuit 1 and circuit 2 must be maintained between indoor unit, condenser and EconoPhase unit.
7. Traps must be installed and horizontal lines pitched to ensure proper oil return and to reduce liquid flood back to compressor. Pitch horizontal hot gas piping at a minimum of 1/2" per 10 feet (42mm per 10m) so that gravity will aid in moving oil in the direction of refrigeration flow.
8. Components are not supplied by Vertiv™ but are required for proper circuit operation and maintenance.
9. For rises over 25 ft (7.6 m), trap every 20 ft (6 m) or evenly divided.
10. Vertiv™ requires the installation of external refrigerant isolation valves on both the liquid line entering and the hot gas line leaving the indoor unit. These external isolation valves are necessary to facilitate safe recovery of the refrigerant charge from the indoor unit before servicing the compressors, filter driers, or other refrigeration components. Prior to closing the isolation valve on the liquid line, ensure that the indoor unit is in evacuation mode, which will open the EEV and will allow the migration of liquid refrigerant from this piping.
11. Unit rated maximum 650 psig (45 bar) (see local requirement for relief valve installation).
12. Typical location for Sight Glass on DA125, DA250, and DA265. On DA150 and DA165, sight glass is located between filter drier and customer piping connection.

COOLPHASE PERIMETER

AIR COOLED PIPING SCHEMATIC

MCV WITH RECEIVERS MOUNTED ABOVE DA125-DA250



Internal EEV Height	H inch (mm)
DA125-DA165	43 (1092)
DA250	56 (1422)

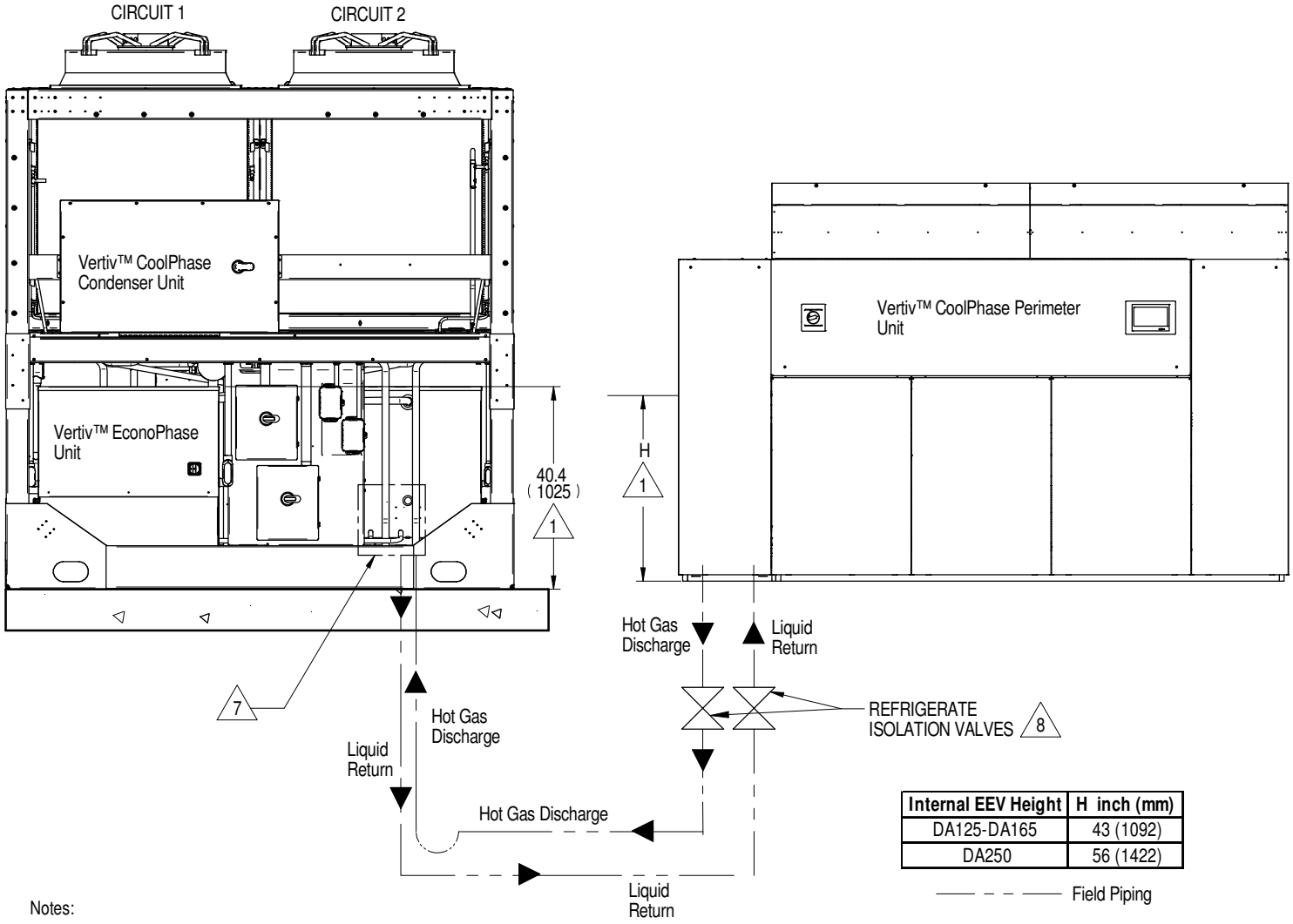
Field Piping

Notes:

1. The outlet of the receiver must be at least 1 foot (0.31m) higher than the elevation of the EEV inside the indoor unit. The vertical height must not exceed 60 feet (18.3m).
2. Unit must be trapped at bottom of riser with any rise over 5 feet (1.5m) high. If rise exceeds 25 feet (7.5m), then a trap is required in 20 foot (6.1m) increments or evenly divided. DA250 with horizontal discharge has internally installed traps on the hot gas discharge line.
3. Pitch horizontal hot gas piping at a minimum of ½ inch per 10 feet (42mm per 10m) so that gravity will aid in moving oil in the direction of the refrigeration flow.
4. Indoor unit piping entrance varies by unit and may be through the top of the unit.
5. All indoor field refrigerant piping must be insulated, 1/2" minimum thickness. All outdoor field refrigeration piping does not need to be insulated. The installing contractor is responsible for the insulating, securing, protecting and the proper installation of all field refrigerant piping, observing the details outlined by the Engineer of Record.
6. DA250 with horizontal discharge should be piped out the top of unit.
7. Piping enters right or left side or rear (single skid only) of the unit.
8. Vertiv requires the installation of external refrigerant isolation valves on both the liquid line entering and the hot gas line leaving the indoor unit. These external isolation valves are necessary to facilitate safe recovery of the refrigerant charge from the indoor unit before servicing the compressors, filter driers, or other refrigeration components. Prior to closing the isolation valve on the liquid line, ensure that the indoor unit is in evacuation mode, which will open the EEV and will allow the migration of liquid refrigerant from this piping.

COOLPHASE PERIMETER

AIR COOLED PIPING SCHEMATIC
DA125-DA250 AND MCV WITH RECEIVERS AT SIMILAR LEVELS



Internal EEV Height	H inch (mm)
DA125-DA165	43 (1092)
DA250	56 (1422)

——— – – – ——— Field Piping

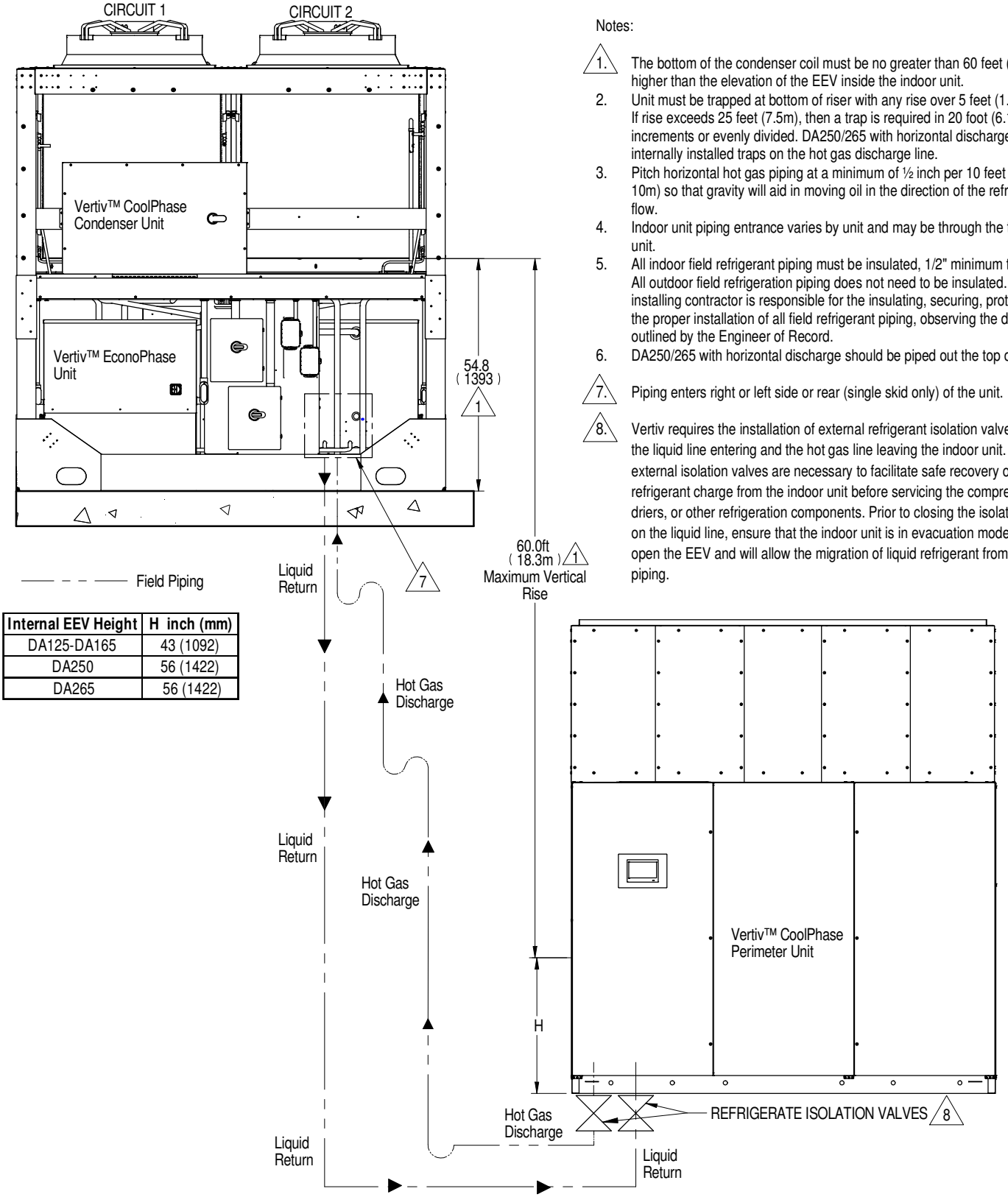
Notes:

1. The outlet of the receiver must be at least 1 foot (0.31m) higher than the elevation of the EEV inside the indoor unit. The vertical height must not exceed 60 feet (18.3m).
2. Unit must be trapped at bottom of riser with any rise over 5 ft (1.5 m) high. If rise exceeds 25 feet (7.5m), then a trap is required in 20 ft (6.1 m) increments or evenly divided. DA250 with horizontal discharge has internally installed traps on the hot gas discharge line.
3. Pitch horizontal hot gas piping at a minimum of ½ inch per 10 ft (42 mm per 10 m) so that gravity will aid in moving oil in the direction of the refrigeration flow.
4. Indoor unit piping entrance varies by unit and may be through the top of the unit.
5. All indoor field refrigerant piping must be insulated, ½ in. minimum thickness. All outdoor field refrigeration piping does not need to be insulated. The installing contractor is responsible for the insulating, securing, protecting and the proper installation of all field refrigerant piping, observing the details outlined by the Engineer of Record.
6. DA250 with horizontal discharge should be piped out the top of unit.
7. Piping enters right or left side or rear (single skid only) of the unit.
8. Vertiv requires the installation of external refrigerant isolation valves on both the liquid line entering and the hot gas line leaving the indoor unit. These external isolation valves are necessary to facilitate safe recovery of the refrigerant charge from the indoor unit before servicing the compressors, filter driers, or other refrigeration components. Prior to closing the isolation valve on the liquid line, ensure that the indoor unit is in evacuation mode, which will open the EEV and will allow the migration of liquid refrigerant from this piping.

COOLPHASE PERIMETER

AIR COOLED PIPING SCHEMATIC

MCV WITHOUT RECEIVERS MOUNTED ABOVE DA125-DA265



Internal EEV Height	H inch (mm)
DA125-DA165	43 (1092)
DA250	56 (1422)
DA265	56 (1422)

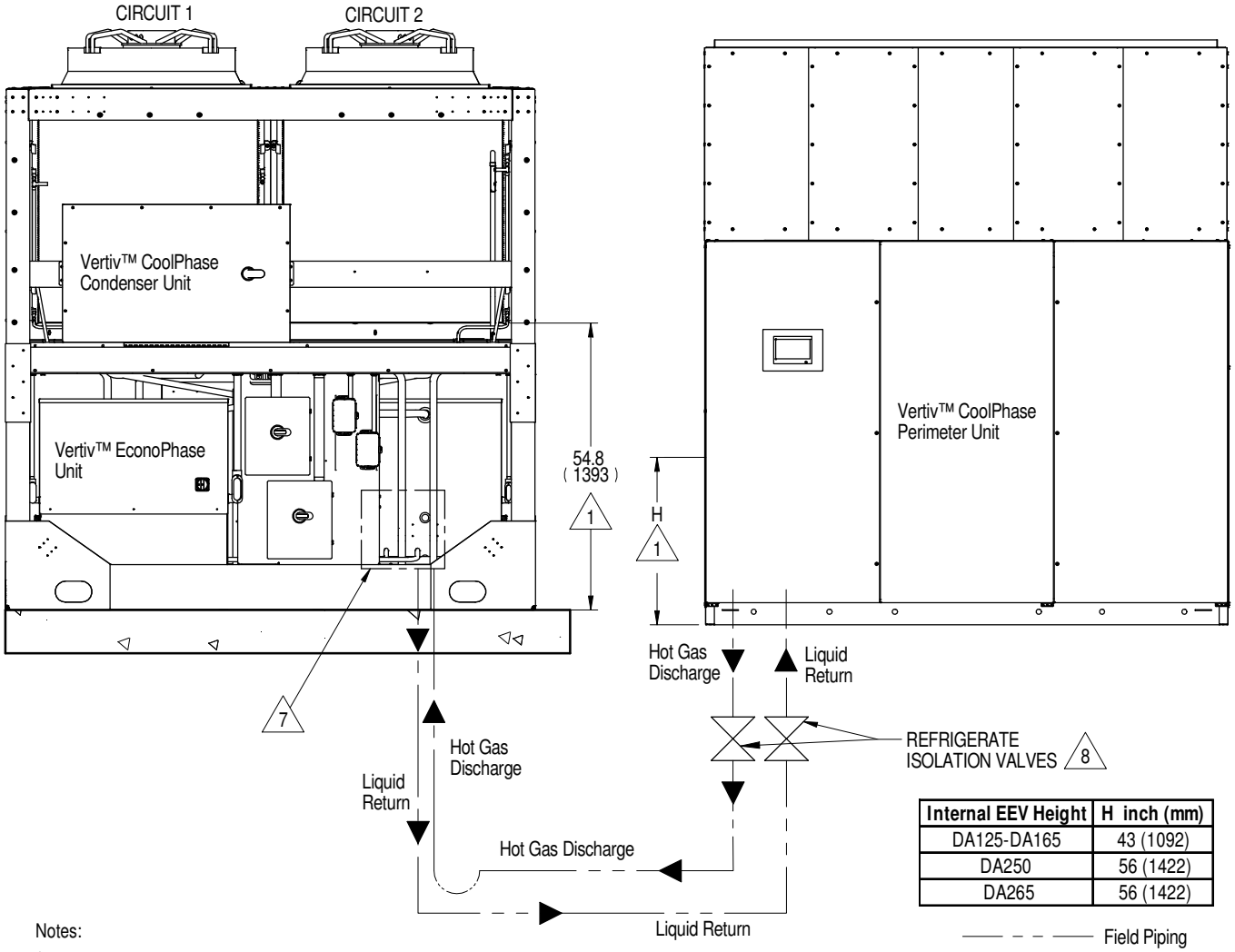
Notes:

1. The bottom of the condenser coil must be no greater than 60 feet (18.3m) higher than the elevation of the EEV inside the indoor unit.
2. Unit must be trapped at bottom of riser with any rise over 5 feet (1.5m) high. If rise exceeds 25 feet (7.5m), then a trap is required in 20 foot (6.1m) increments or evenly divided. DA250/265 with horizontal discharge has internally installed traps on the hot gas discharge line.
3. Pitch horizontal hot gas piping at a minimum of ½ inch per 10 feet (42mm per 10m) so that gravity will aid in moving oil in the direction of the refrigeration flow.
4. Indoor unit piping entrance varies by unit and may be through the top of the unit.
5. All indoor field refrigerant piping must be insulated, 1/2" minimum thickness. All outdoor field refrigeration piping does not need to be insulated. The installing contractor is responsible for the insulating, securing, protecting and the proper installation of all field refrigerant piping, observing the details outlined by the Engineer of Record.
6. DA250/265 with horizontal discharge should be piped out the top of unit.
7. Piping enters right or left side or rear (single skid only) of the unit.
8. Vertiv requires the installation of external refrigerant isolation valves on both the liquid line entering and the hot gas line leaving the indoor unit. These external isolation valves are necessary to facilitate safe recovery of the refrigerant charge from the indoor unit before servicing the compressors, filter driers, or other refrigeration components. Prior to closing the isolation valve on the liquid line, ensure that the indoor unit is in evacuation mode, which will open the EEV and will allow the migration of liquid refrigerant from this piping.

COOLPHASE PERIMETER

AIR COOLED PIPING SCHEMATIC

DA125-DA265 AND MCV WITHOUT RECEIVERS AT SIMILAR OR BELOW LEVELS



Internal EEV Height	H inch (mm)
DA125-DA165	43 (1092)
DA250	56 (1422)
DA265	56 (1422)

Notes:

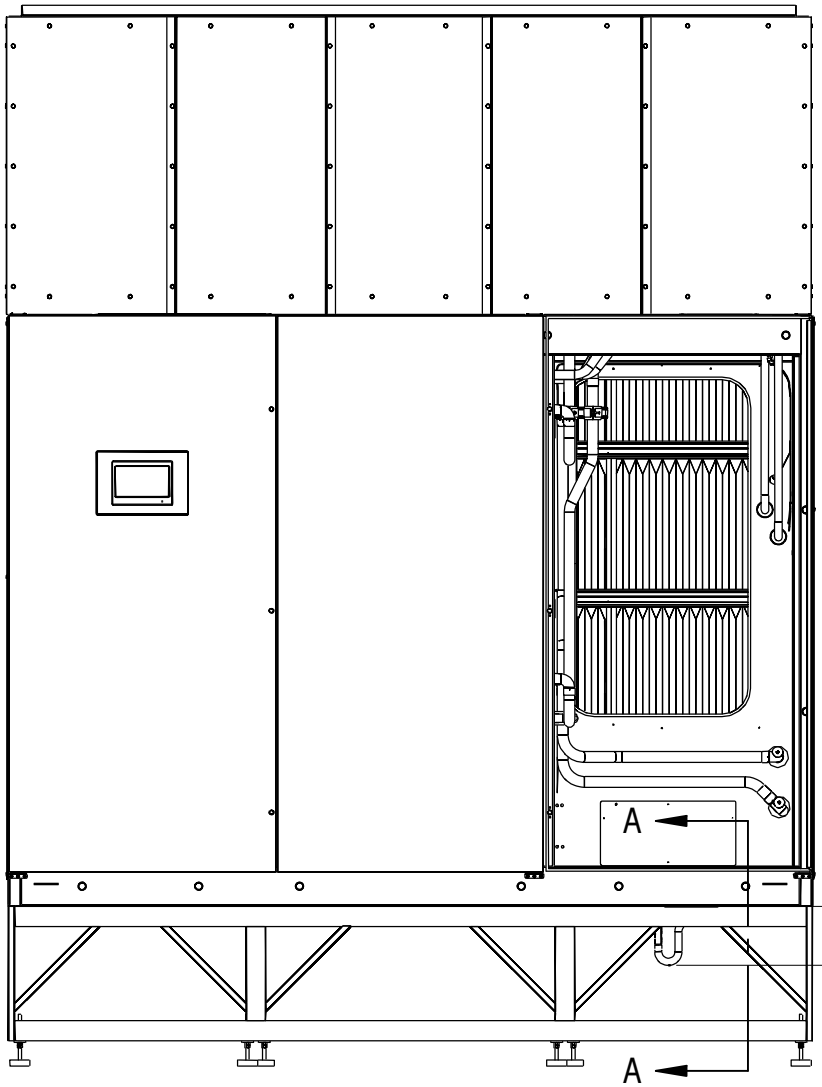
1. The bottom of the condenser coil must be less than 15 ft (4.6 m) below the elevation of the EEV inside the indoor unit.
2. Unit must be trapped at bottom of riser with any rise over 5 ft (1.5 m) high. If rise exceeds 25 feet (7.5m), then a trap is required in 20 ft (6.1 m) increments or evenly divided. DA250/265 with horizontal discharge has internally installed traps on the hot gas discharge line.
3. Pitch horizontal hot gas piping at a minimum of ½ inch per 10 ft (42 mm per 10 m) so that gravity will aid in moving oil in the direction of the refrigeration flow.
4. Indoor unit piping entrance varies by unit and may be through the top of the unit.
5. All indoor field refrigerant piping must be insulated, ½ in. minimum thickness. All outdoor field refrigeration piping does not need to be insulated. The installing contractor is responsible for the insulating, securing, protecting and the proper installation of all field refrigerant piping, observing the details outlined by the Engineer of Record.
6. DA250/265 with horizontal discharge should be piped out the top of unit.

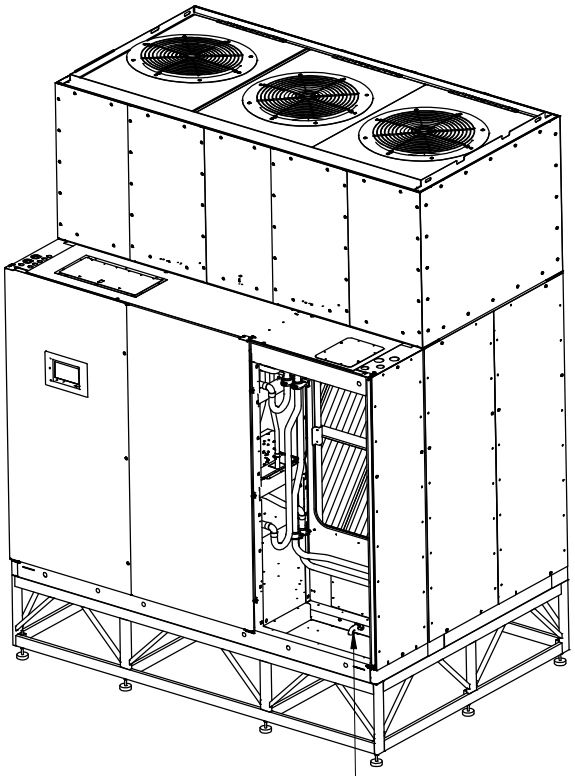
7. Piping enters right or left side or rear (single skid only) of the unit.

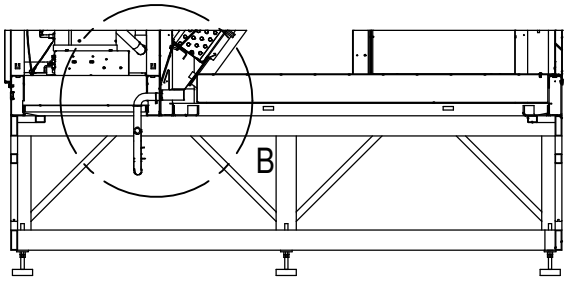
8. Vertiv requires the installation of external refrigerant isolation valves on both the liquid line entering and the hot gas line leaving the indoor unit. These external isolation valves are necessary to facilitate safe recovery of the refrigerant charge from the indoor unit before servicing the compressors, filter driers, or other refrigeration components. Prior to closing the isolation valve on the liquid line, ensure that the indoor unit is in evacuation mode, which will open the EEV and will allow the migration of liquid refrigerant from this piping.

COOLPHASE PERIMETER

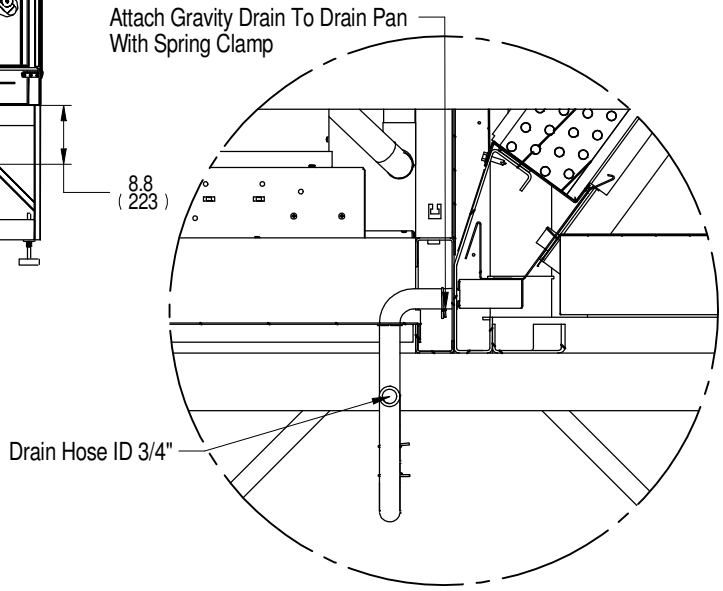
GRAVITY DRAIN INSTALLATION
DA250 - DA265 WITH FLOORSTAND







SECTION A-A

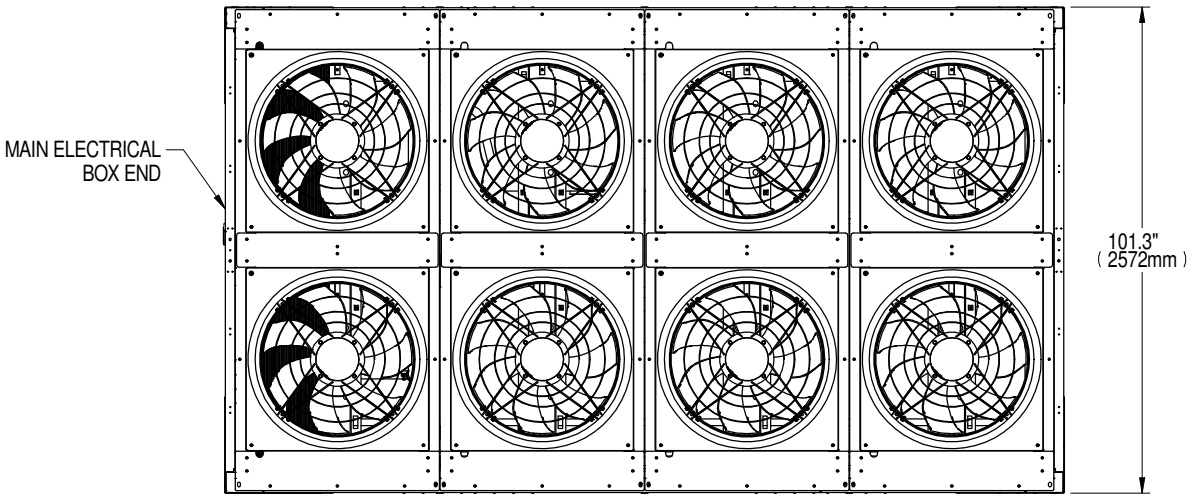


DETAIL B

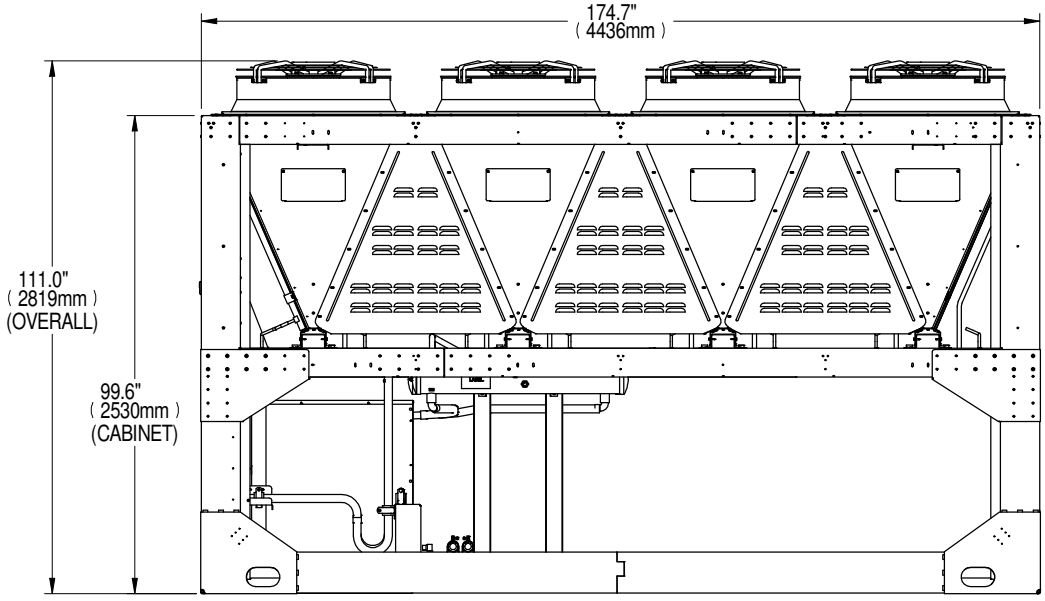
HEAT REJECTION SKID

CABINET & ANCHOR DIMENSIONAL DATA

MCV440 + ECONOPHASE + BASE ASSEMBLY



TOP VIEW



SIDE VIEW

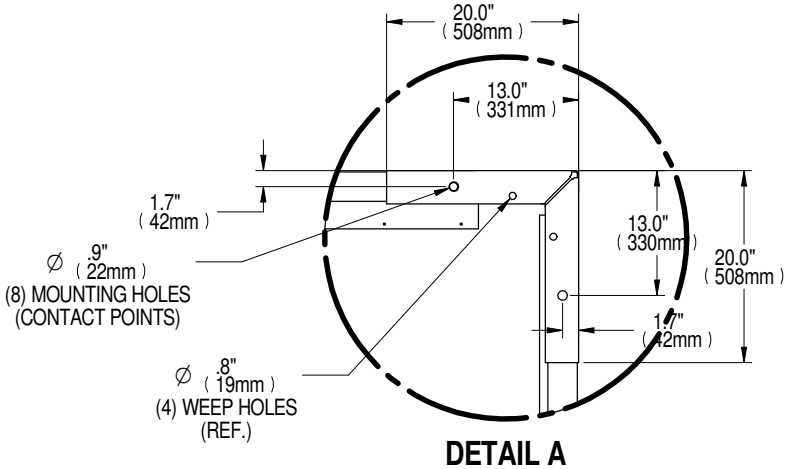
Model			No. of Fans	No. of MCV/PRE Pairs	Domestic Shipping		Export Shipping	
					lb	(kg)	lb	(kg)
MCV440	with PRE and with Receiver	(Single Skid)	8	1	5,998	(2,721)	6,115	(2,774)
MCV440	with PRE and without Receiver	(Single Skid)	8	1	5,898	(2,675)	6,015	(2,728)

Notes:
1. Minimum clearance on the Main Unit Disconnect Enclosure shall be 48" (1219mm) or per local code.
2. Recommended minimum 48" (1219mm) clearance when multiple skids are mounted side by side to ensure proper airflow. Contact the factory for other spacing requirements.

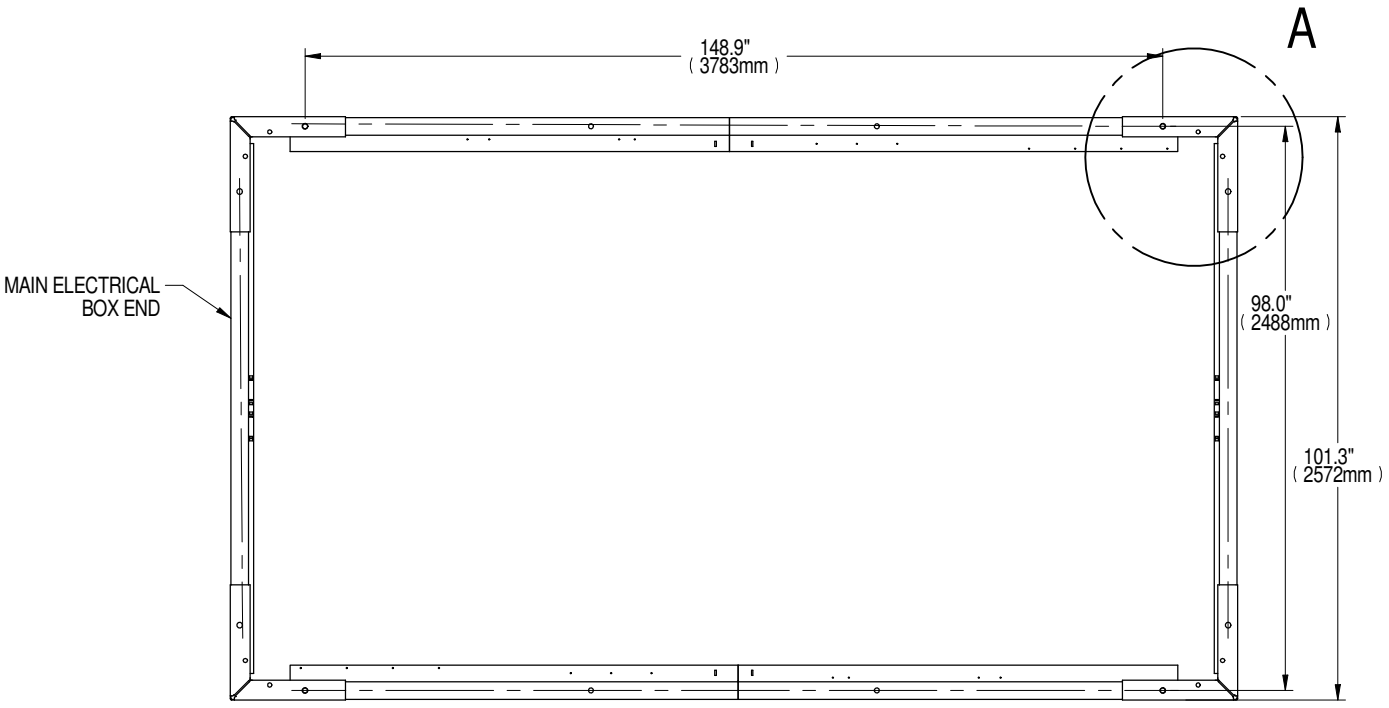
HEAT REJECTION SKID

CABINET & ANCHOR DIMENSIONAL DATA

MCV440 + ECONOPHASE + BASE ASSEMBLY



DETAIL A
TYP. (4) PLACES

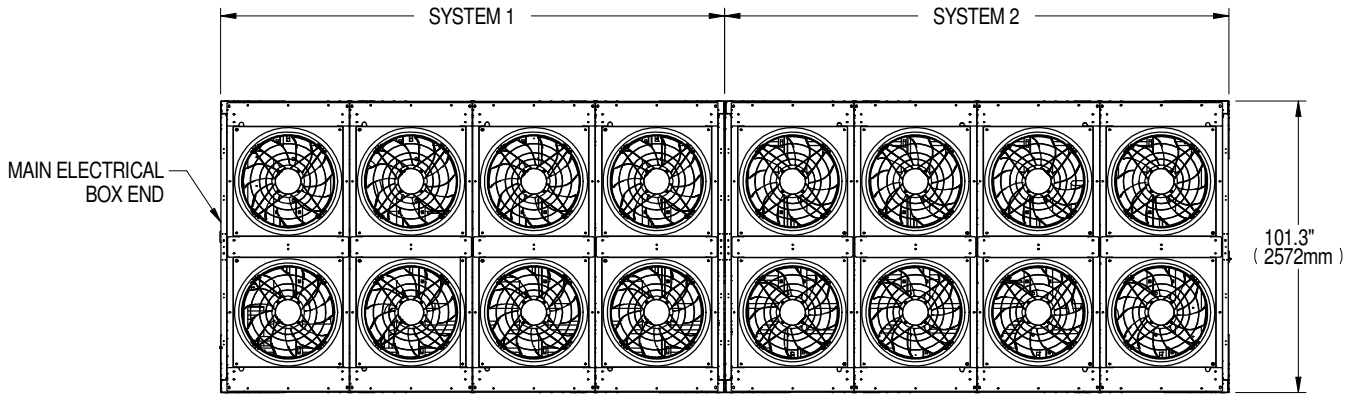


UNDERSIDE OF UNIT
COIL AND FANS REMOVED FOR CLARITY

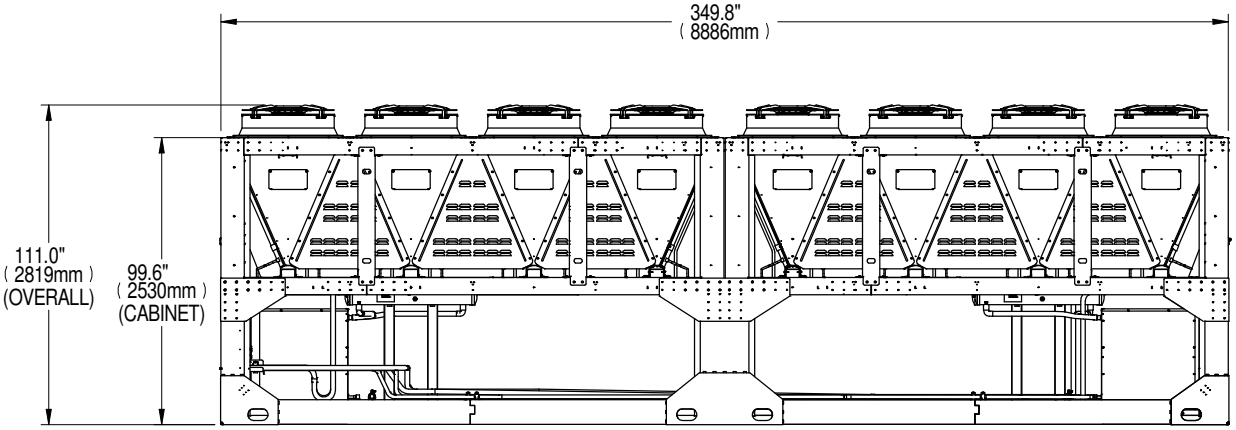
Notes:
1. Underside of unit, coil and fan removed for clarity.
2. Four mounting holes and four 3/4" field supplied bolts required to secure skid base assembly to customer support structure. Bolt grade to be specified by local requirements.

HEAT REJECTION SKID

CABINET & ANCHOR DIMENSIONAL DATA
MCV440 (2) + ECONOPHASE (2) + BASE ASSEMBLY



TOP VIEW



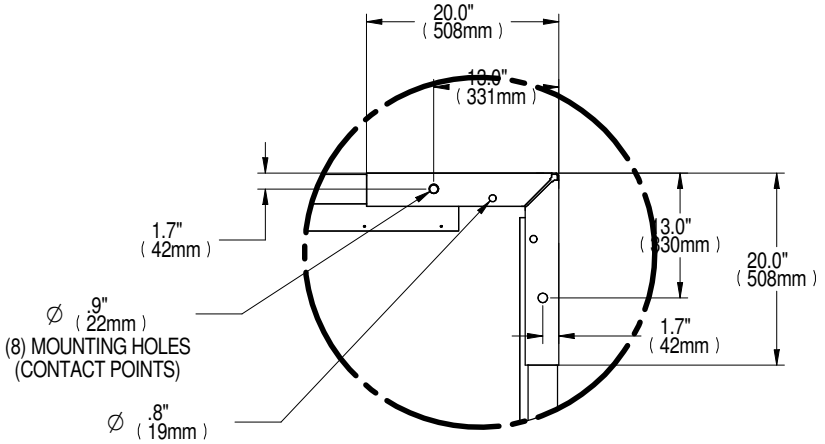
SIDE VIEW

Model			No. of Fans	No. of MCV/PRE Pairs	Domestic Shipping		Export Shipping	
					lb	(kg)	lb	(kg)
MCV440	with PRE and with Receiver	(Dual Skid)	16	2	11,766	(5,337)	12,003	(5,444)
MCV440	with PRE and without Receiver	(Dual Skid)	16	2	11,566	(5,246)	11,803	(5,354)

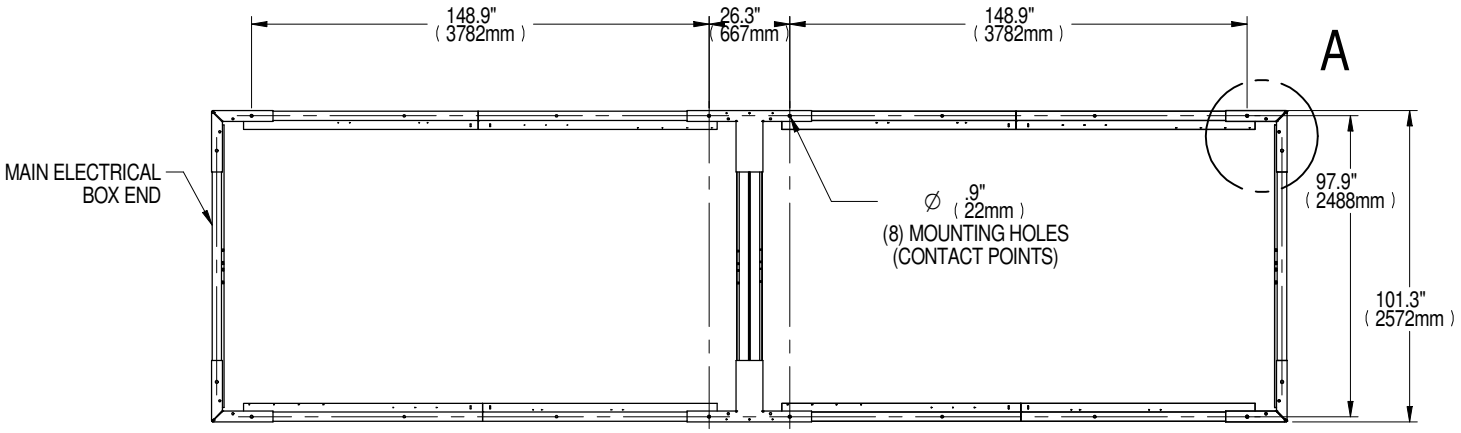
Notes:
1. Minimum clearance of the Main Unit Disconnect Enclosure shall be 48" (1219mm) or per local electrical code.
2. Recommended minimum 48" (1219mm) clearance when multiple skids are mounted side by side to ensure proper airflow. Contact the factory for other spacing requirments.

HEAT REJECTION SKID

CABINET & ANCHOR DIMENSIONAL DATA
MCV440 (2) + ECONOPHASE (2) + BASE ASSEMBLY



DETAIL A
TYP. (4) PLACES



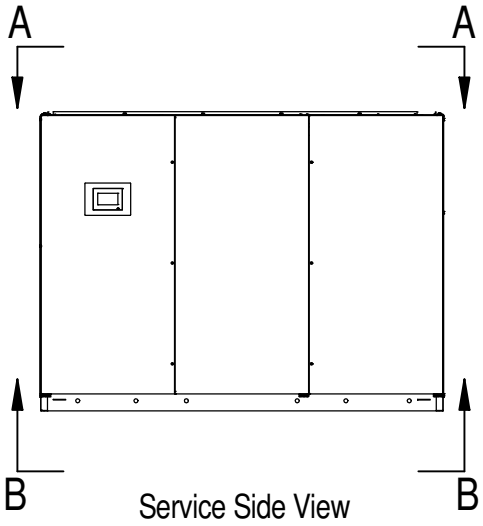
UNDERSIDE OF UNIT
COIL AND FANS REMOVED FOR CLARITY

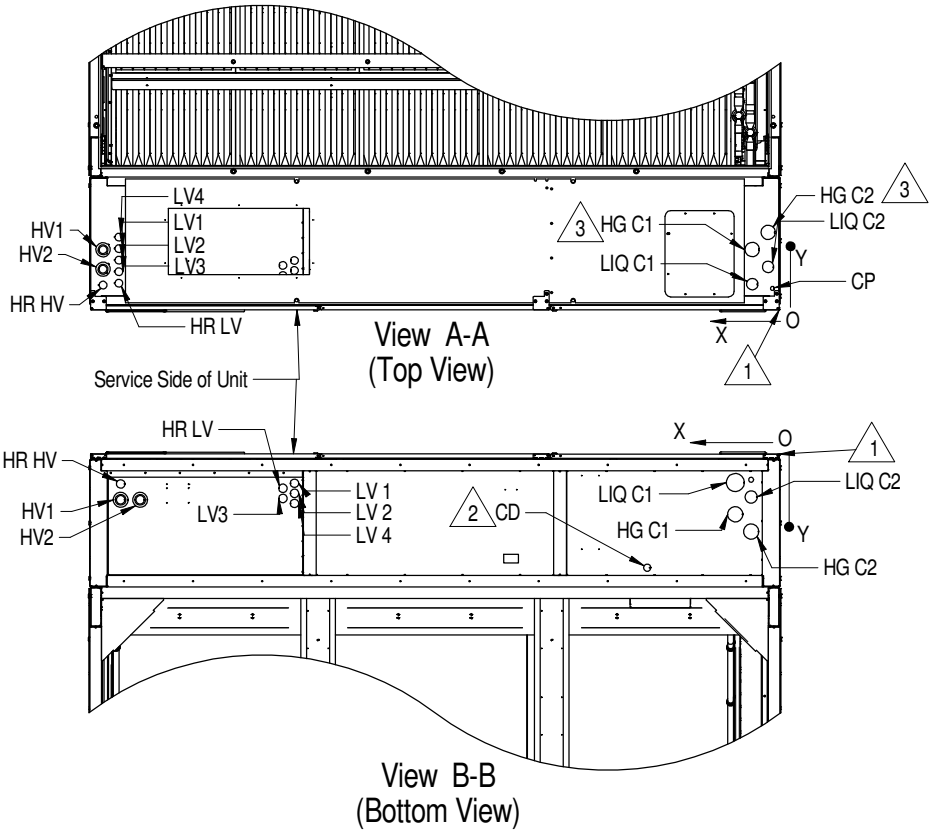
Notes:
1. Eight mounting holes and eight 3/4" field supplied bolts required to secure skid base assembly to customer support structure. Bolt grade to be specified by local requirements.

COOLPHASE PERIMETER

PRIMARY CONNECTION LOCATIONS

DA250 - DA265





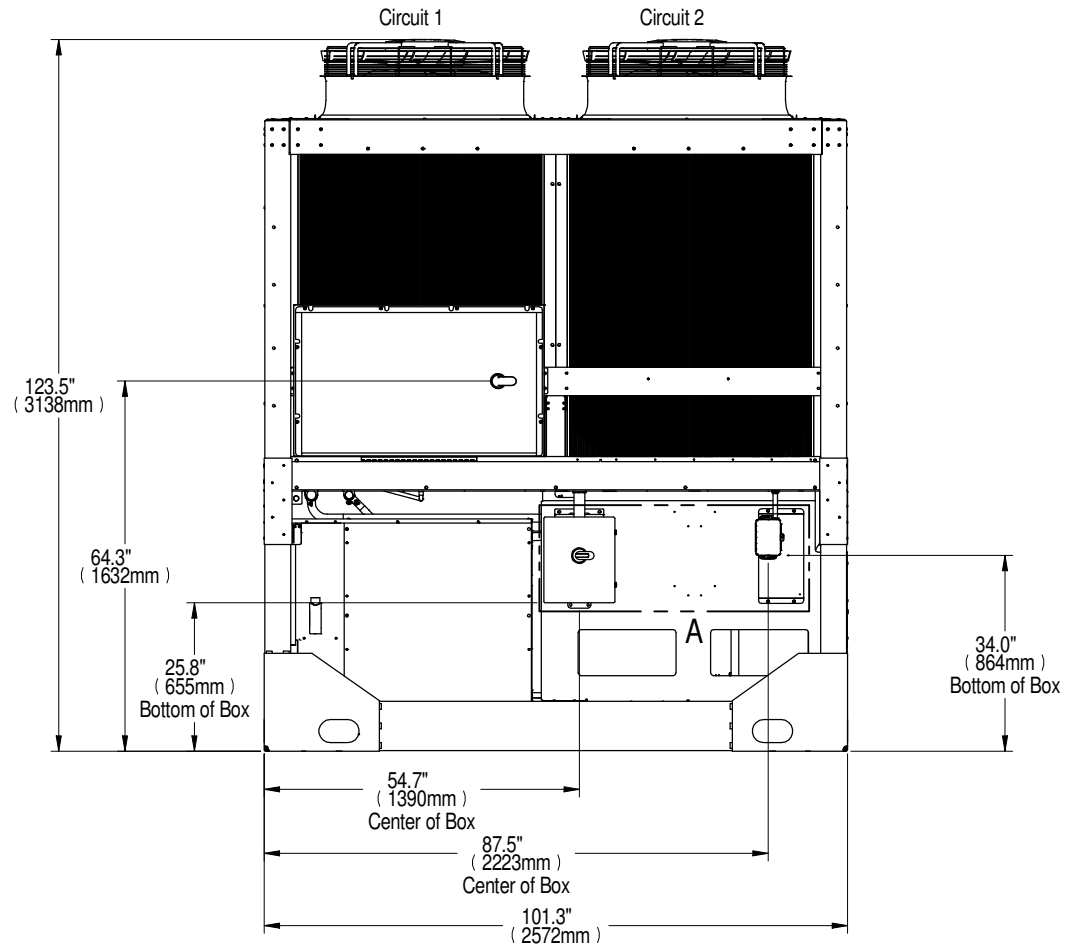
POINT	Description	Top View		Bottom View		Connection Size/Opening
		X in. (mm)	Y in. (mm)	X in. (mm)	Y in. (mm)	
HR HV	Heat Rejection High Voltage	117-3/8 (2981)	4-1/4 (109)	114-1/4 (2903)	5-1/8 (132)	1-3/8"
HR LV	Heat Rejection Low Voltage	114-5/8 (2911)	4-5/8 (117)	86-1/8 (2188)	5-7/8 (151)	
HV1	Electrical Conn. (High Volt)	117-3/8 (2981)	10-3/8 (264)	114-1/4 (2903)	7-7/8 (202)	2-1/2", 1-3/4", 1-3/8" Concentric Knockouts
HV2			7 (179)	110-7/8 (2818)		
LV1	Electrical Conn. (Low Volt)	114-5/8 (2911)	10-5/8 (270)	84-1/8 (2137)	5 (129)	1-3/8"
LV2			8-5/8 (219)		6-3/4 (173)	
LV3			6-5/8 (168)	86-1/8 (2188)	7-5/8 (195)	
LV4			12-5/8 (320)	84-1/8 (2137)	8-1/2 (217)	
CD	Condensate Drain 2	N/A	N/A	22-7/8 (581)	19-3/4 (501)	3/4" NPT Female
CP	Condensate Drain w/ Optional Pump	1-1/8 (29)	3-3/4 (94)	N/A	N/A	1/2" O.D. Cu
LIQ C1	Liquid Circuit 3	4-5/8 (118)	4-1/2 (113)	7-5/8 (193)	4-7/8 (125)	1-3/8" O.D. Cu
LIQ C2		1-7/8 (48)	7-3/8 (189)	4-7/8 (123)	7-1/2 (189)	
HG C1	Hot Gas Circuit 3	4-5/8 (118)	10-1/2 (265)	7-5/8 (193)	10-1/2 (265)	1-5/8" O.D. Cu
HG C2		1-7/8 (48)	13-3/8 (341)	4-7/8 (123)	13-1/2 (342)	

Notes:

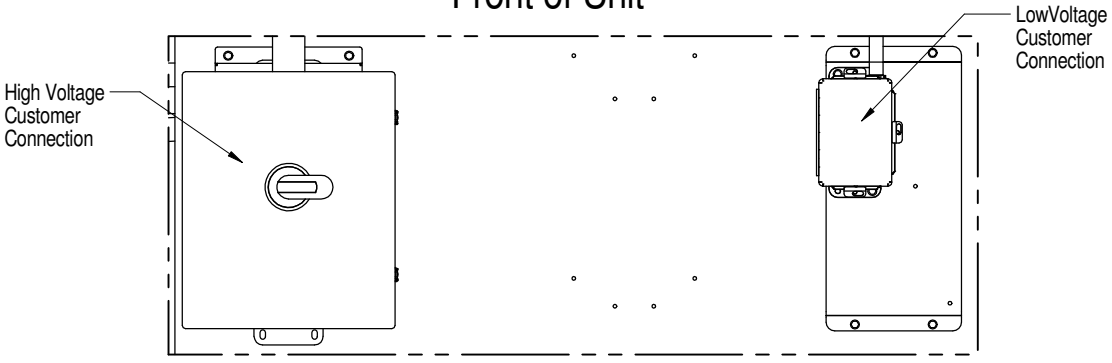
1. Drawing not to scale. All dimensions from right corner on service side and have a tolerance of ± 1/2" (13mm).
2. Field pitch Condensate Drain line a minimum of 1/8" (3.2mm) per 12" (305mm). All units contain a factory installed condensate trap. Do not trap external to the unit. Select appropriate drain system materials. The drain must comply with all local codes.
3. Unit has internally installed traps on the discharge lines. For rises over 25ft. (7.6m), trap every 20ft. (6m) or evenly divided.
4. Piping connection can be made at the top or bottom of the unit.

HEAT REJECTION SKID

PRIMARY CONNECTION LOCATIONS
MCV430 + ECONOPHASE + BASE ASSEMBLY



Front of Unit



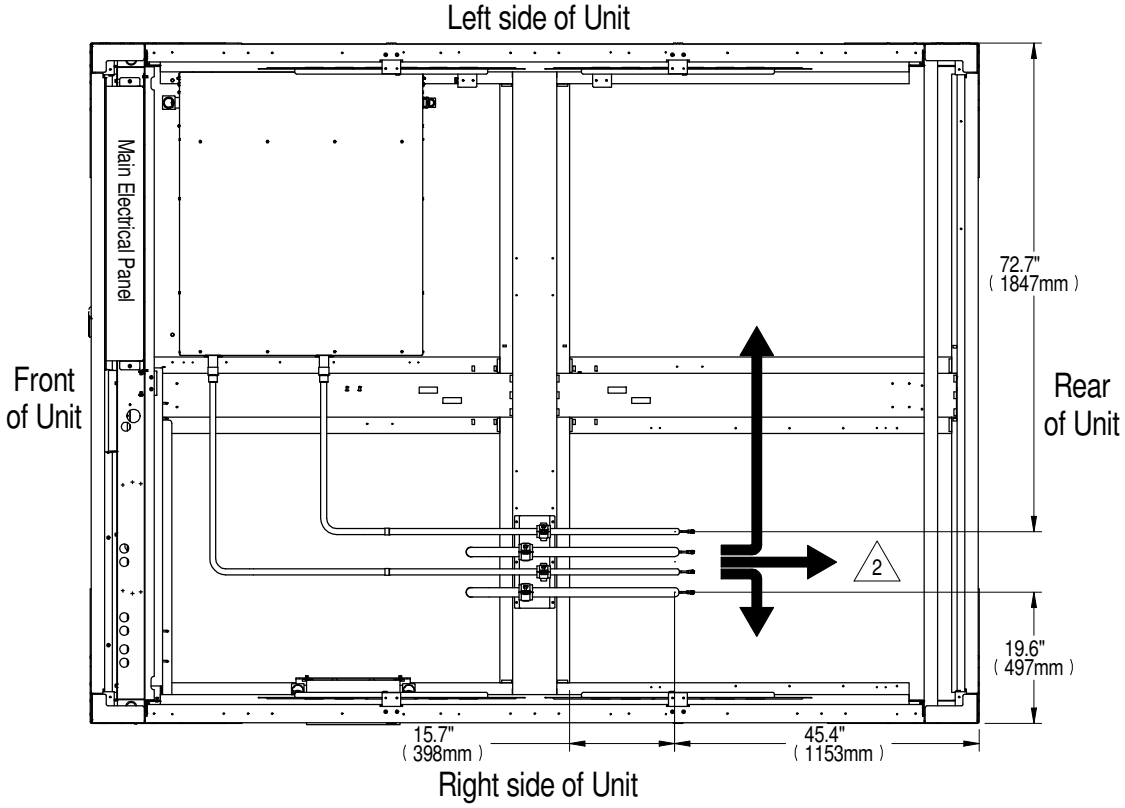
DETAIL A
(Field Electrical Connections)

Notes:
1. Field to provide hole for conduit for high voltage disconnect box and low voltage distribution panel.

HEAT REJECTION SKID

PRIMARY CONNECTION LOCATIONS

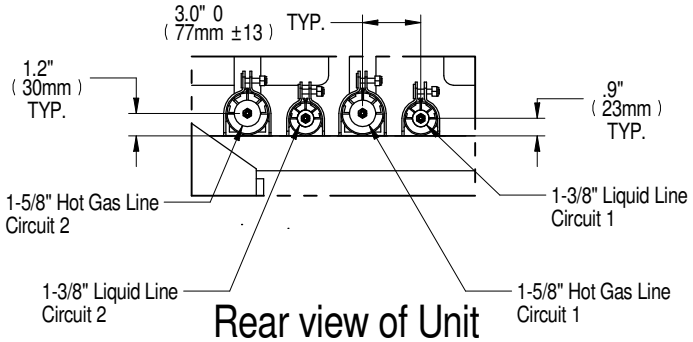
MCV430 + ECONOPHASE + BASE ASSEMBLY



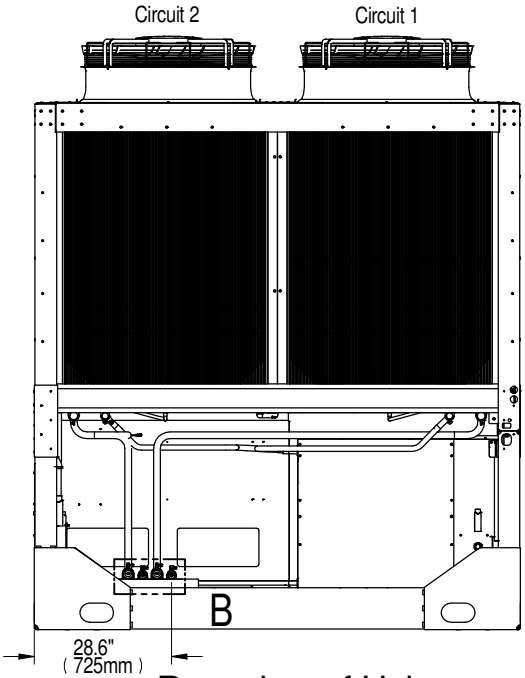
Top View

Multiple customer connection locations

DETAIL B
Piping Connections



Rear view of Unit



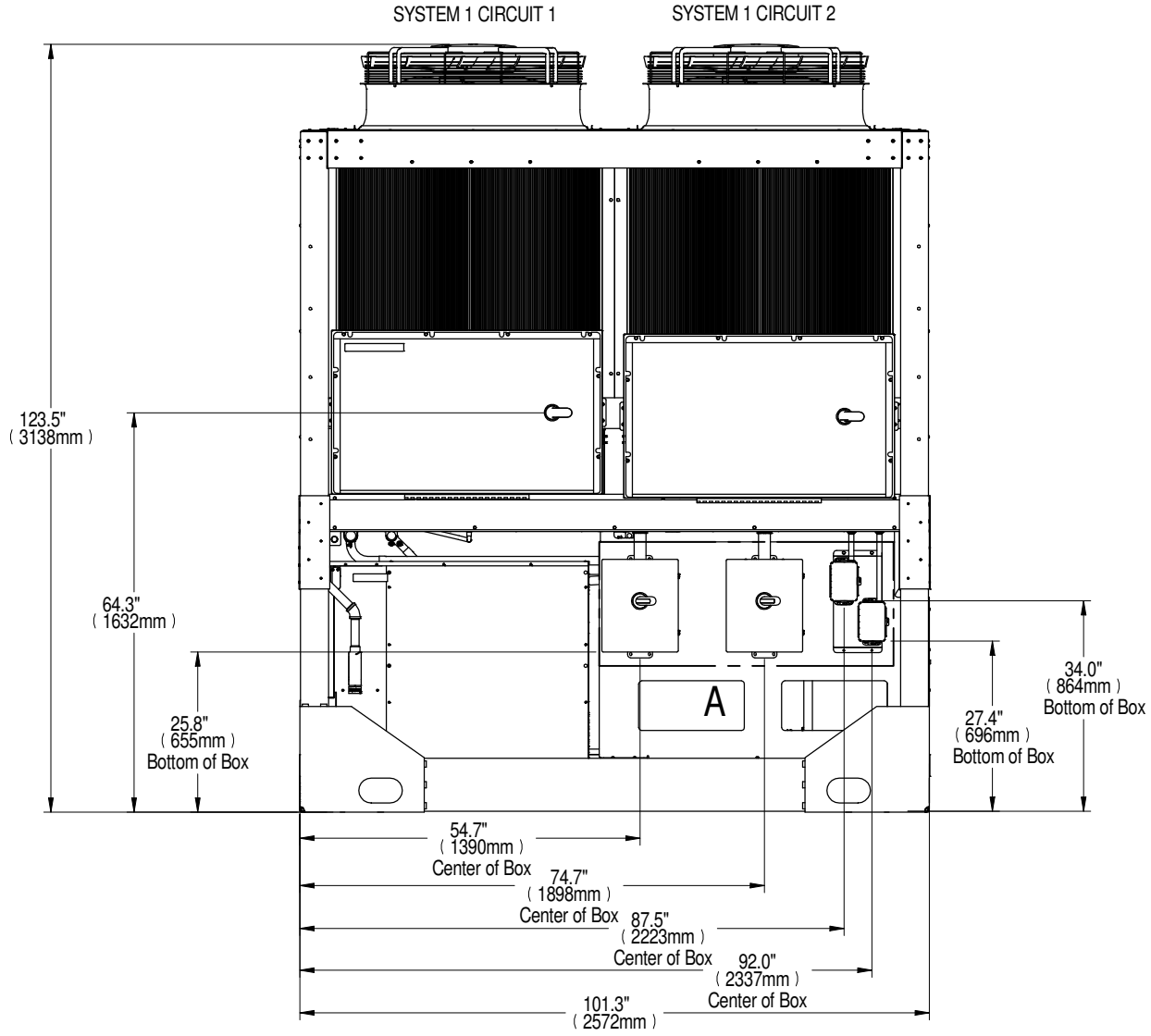
Rear view of Unit

NOTE:
1. For Top View, condenser section removed for clarity.

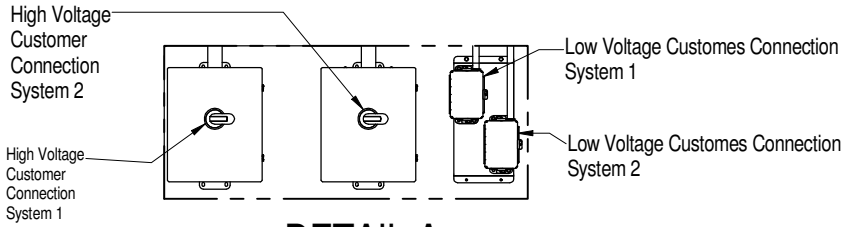
2. Piping connections can exist out left or right side or rear of the unit.

HEAT REJECTION SKID

PRIMARY CONNECTION LOCATIONS
MCV430 (2) + ECONOPHASE (2) + BASE ASSEMBLY



Front of Unit



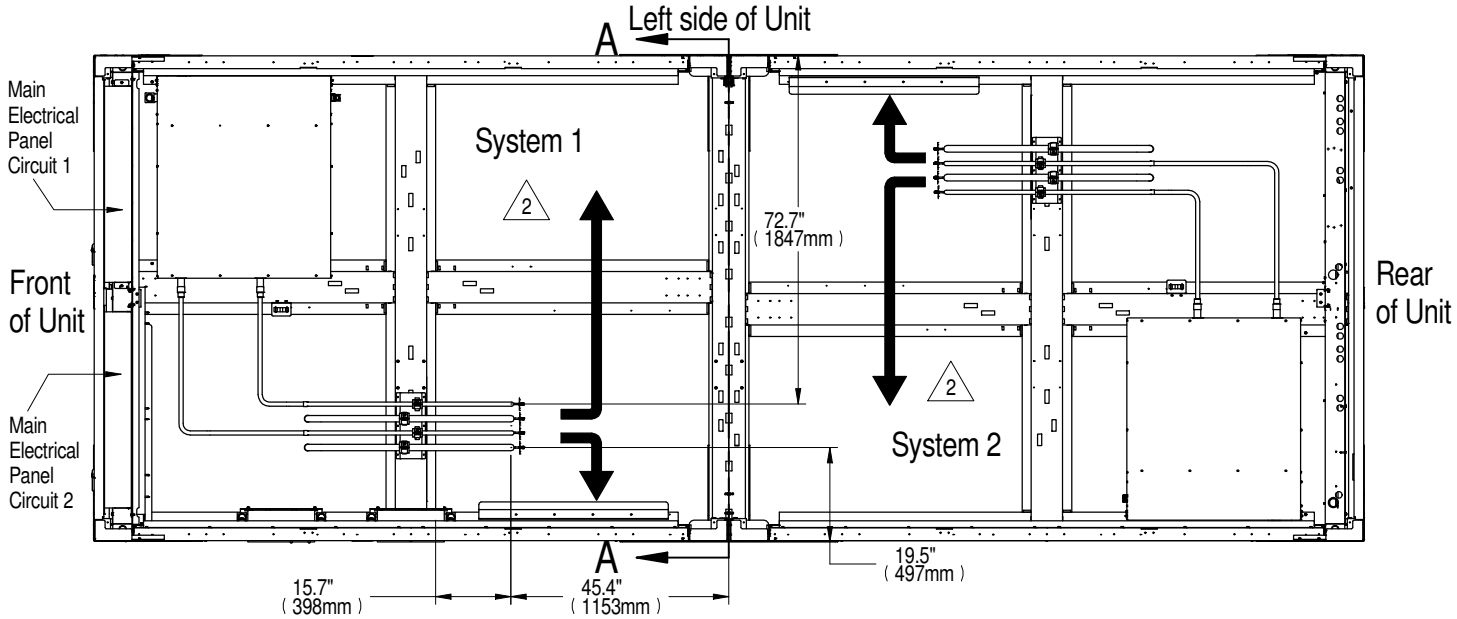
DETAIL A
Field Electrical Connections

Notes:
1. Field to provide hole for conduit for high voltage disconnect box and low voltage distribution panel.

HEAT REJECTION SKID

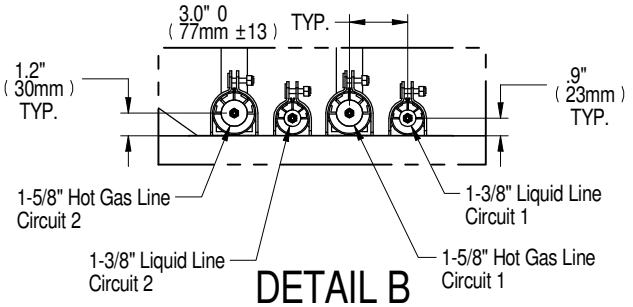
PRIMARY CONNECTION LOCATIONS

MCV430 (2) + ECONOPHASE (2) + BASE ASSEMBLY



Top View

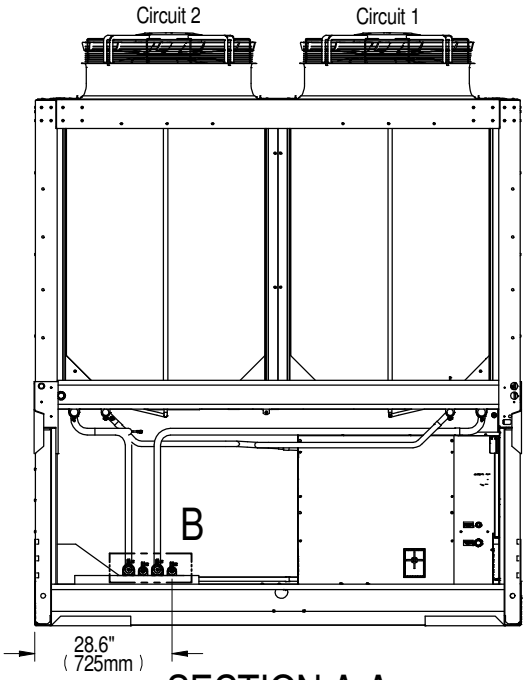
Multiple customer connection locations



DETAIL B

Piping Connections

Piping connection dimensions are typical for both systems.



SECTION A-A

NOTE:

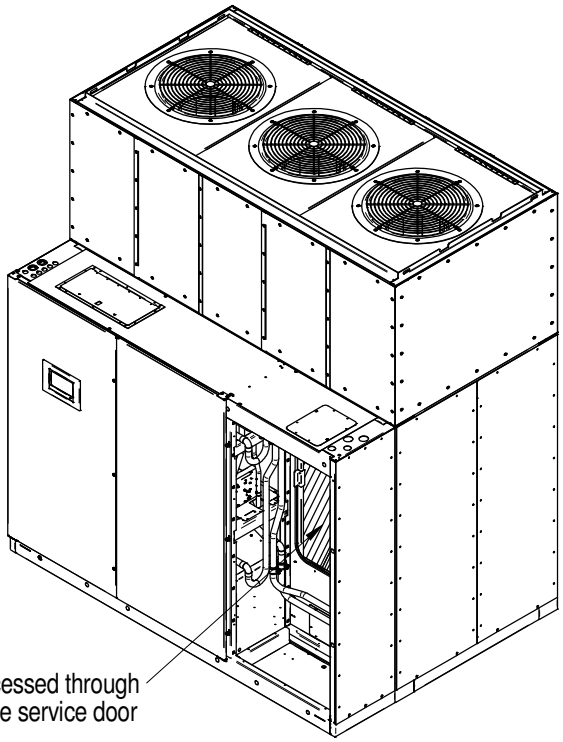
1. For Top View, condenser section removed for clarity.

2. System 1 and 2 system piping connections can exist out left or right side of the unit.

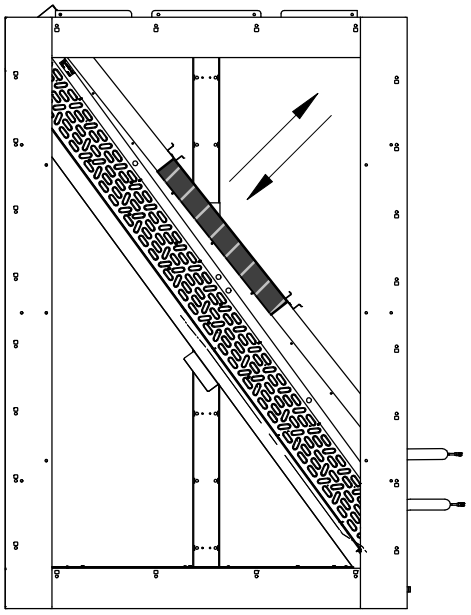
COOLPHASE PERIMETER

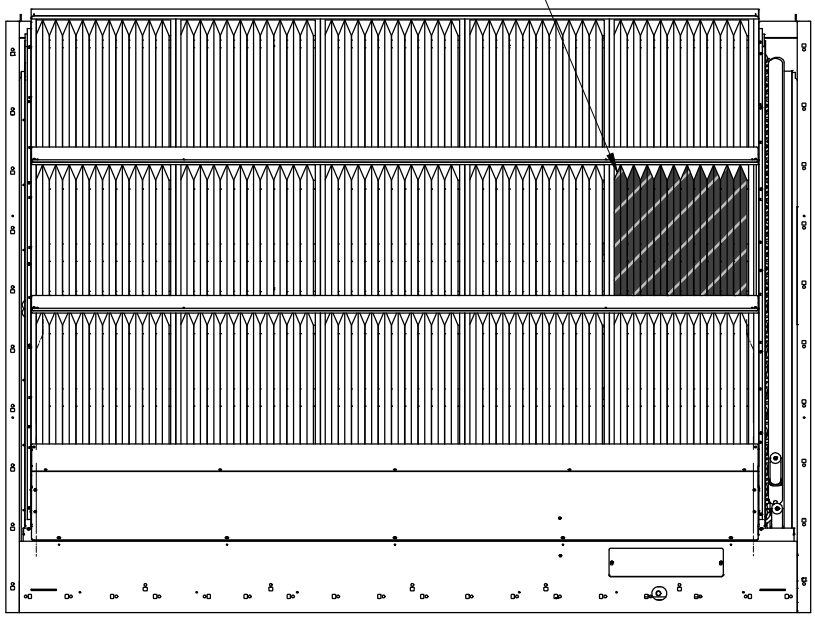
FILTER REPLACEMENT

DA250 - DA265



Filters are removed and installed through this position of the filter rack





Unit side panels, fan deck and compressor module hidden for clarity

Appendix D: Seismic Submittal Drawings

Table D.1 Seismic Submittal Drawings Contents

Document Number	Title
20000346	Vertiv™ CoolPhase Perimeter Seismic Application Assumptions and Requirements DA250/DA265 Horizontal and Bottom Discharge Unit
20000493	Vertiv™ CoolPhase Condenser Seismic

© 2026 Vertiv Group Corp.

All Rights Reserved.

This page intentionally left blank

© 2026 Vertiv Group Corp.

All Rights Reserved.

COOLPHASE PERIMETER

SEISMIC APPLICATION ASSUMPTIONS AND REQUIREMENTS DA250/DA265 HORIZONTAL & BOTTOM DISCHARGE UNIT

Vertiv has conducted analytical modeling of the **Vertiv™ CoolPhase Perimeter (DA250-DA265)** product to provide an option for those systems requiring seismic certification of compliance. This certification goes beyond the equipment's ability to withstand the seismic forces: the IBC (International Building Code) and ASCE (American Society of Civil Engineers) system approach includes the equipment, equipment anchorage, and the connections to the equipment [power, piping, and ducting].

Certification Criteria

The **Vertiv™ CoolPhase Perimeter (DA250-DA265)** certification is based on a maximum mapped, maximum considered earthquake spectral response acceleration value, **Ss, of 3.75g** adjusted by the soil site coefficient to Soil Site Class D as the default when the site soil properties or final equipment installation location is not known. The certification maximum spectral response coefficient is **Sds value of 2.50g** including Soil Class and Seismic Use group corrections. Soil Classes A, B, C, D, and E, and Seismic Design Categories A, B, C, D, E, and F are all covered under this certification, limited by the Sds value stated above. Structural analysis has been conducted to demonstrate that the equipment meets performance objectives required for a component importance factor (Ip) of 1.0. Specifically, structural integrity is demonstrated such as to not pose a life safety hazard. Although this unit is not certified for the performance objective associated with an Ip=1.5 (continued functionality after a seismic event), the analyses of non-active components has been conducted with increased seismic demands associated with Ip=1.5 to ensure a seismically robust unit (structural integrity).

A **Vertiv™ CoolPhase Perimeter (DA250-DA265)**, as described above, is approved for seismic application as a system when properly installed in the following configurations:

- **Vertiv™ CoolPhase Perimeter (DA250-DA265)** unit, with factory-installed seismic option, attached directly to a housekeeping pad using the anchoring system defined in this document.
- **Vertiv™ CoolPhase Perimeter (DA250-DA265)** unit, with factory-installed seismic option, installed on a Vertiv™-supplied, IBC-certified floor stand and attached securely to the building structure.
- The floor stand and mounting system must be Vertiv catalog items, purchased from Vertiv™.
- The system must be anchored as specified in this document.
- The certification excludes all non-Vertiv™ supplied accessories, including but not limited to floor stands, and isolators.

Certification		**IBC**
Internal Bracing Option		**Yes**
Floorstand Attachment		**Welded**
Unit	**Sds**	**Ip**
DA250-DA265	**2.5**	**1.0**

SEISMIC APPLICATION ASSUMPTIONS AND REQUIREMENTS DA250/DA265 HORIZONTAL & BOTTOM DISCHARGE UNIT

Requirements for Anchorage

Anchors

1) Mounting requirement details such as brand, type, embedment depth, edge spacing, anchor spacing, concrete strength, wall bracing, and special inspection must be outlined and approved by the project Structural Engineer of Record.

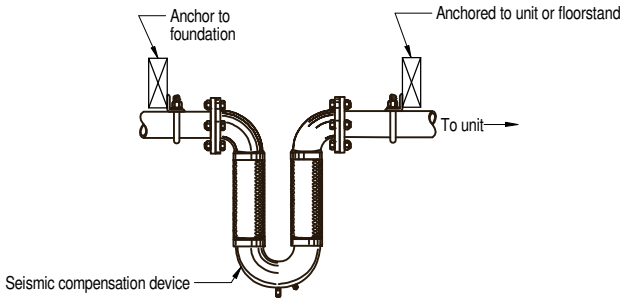
Anchorage Surface

2) Structural floors and housekeeping pads must also be seismically designed and approved by the project Structural Engineer of Record to withstand the seismic anchor loads as defined on the installation drawings. The installing contractor is responsible for the proper installation of all anchors and mounting hardware, observing the mounting requirement details outlined by the Engineer of Record. Contact the Manufacturer's Representative if a detailed Seismic Installation Calculation Package is required.

Unit Field Connections

△3) Piping Field Connections:

a. All units, either rigidly mounted or mounted on vibration isolators, shall be attached to the piping system using flexible loops designed for seismic movement.
b. Flexible loops shall be capable of movement in the three axes and must completely isolate the equipment from the piping.
c. The loops shall be suitable for an operating pressure and temperature of the system, refer to Vertiv™ installation instructions.
d. This includes condensate drainage, and refrigerant supply and return. Follow manufacturer's installation instructions for proper seismic application of flexible looping.



△3 Piping Field Connections

4) Electrical Connections:

a. Must have adequate flexibility for seismic movement.
b. Electrical wiring, conduit, and/or other connections to the equipment is the responsibility of others.
c. Data and recommendations are supplied here and in the unit installation supplement for seismic installation.

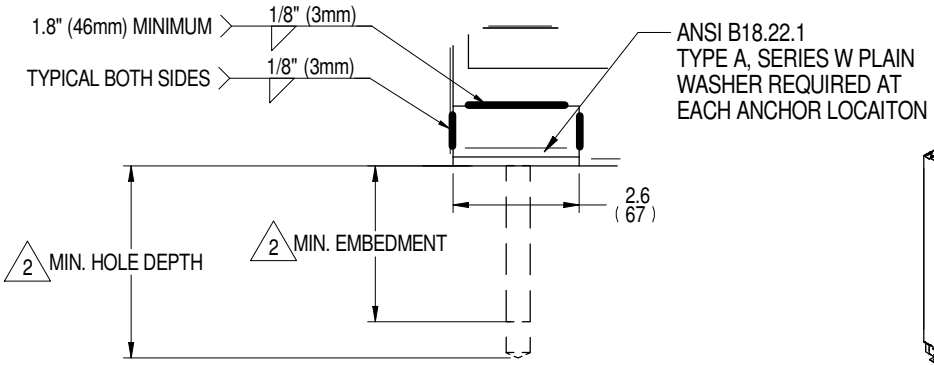
5) Duct Considerations:

a. Seismic compensation shall be field supplied between the field supplied duct work and unit. Flexible joints shall be capable of movement in the three axes and must completely isolate the equipment from the duct work. Follow duct manufacturer's installation instructions for proper seismic application of flexible ducts.

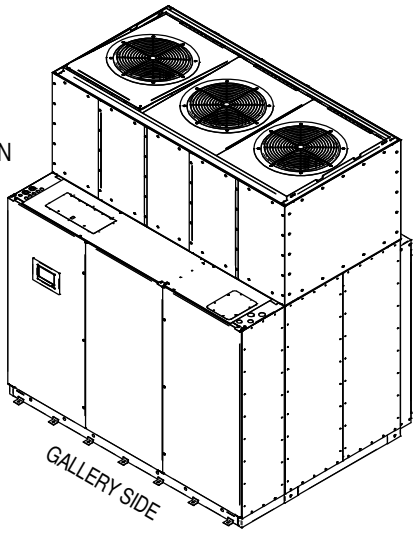
COOLPHASE PERIMETER

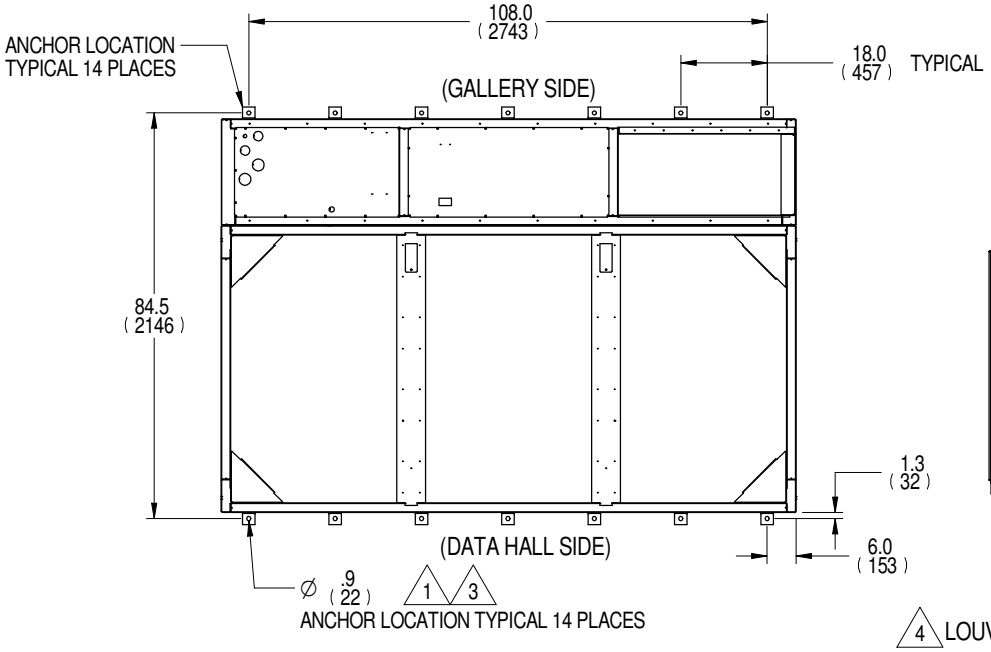
DIMENSIONAL DATA

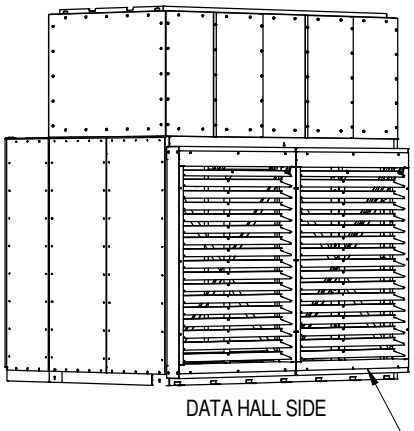
SEISMIC ANCHORAGE FOR DA250/DA265 HORIZONTAL DISCHARGE UNITS



FIELD WELDING OF ANCHOR BRACKET
TYP. (14) PLACES







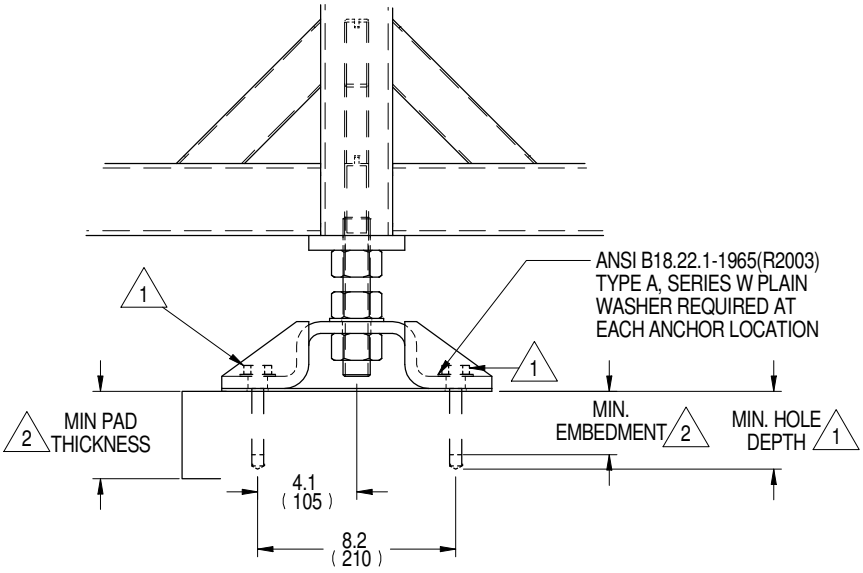
4 LOUVER ASSEMBLIES SHIPPED SEPERATELY

FLOOR ANCHORING DIMENSIONS
(TOP VIEW OF UNIT)

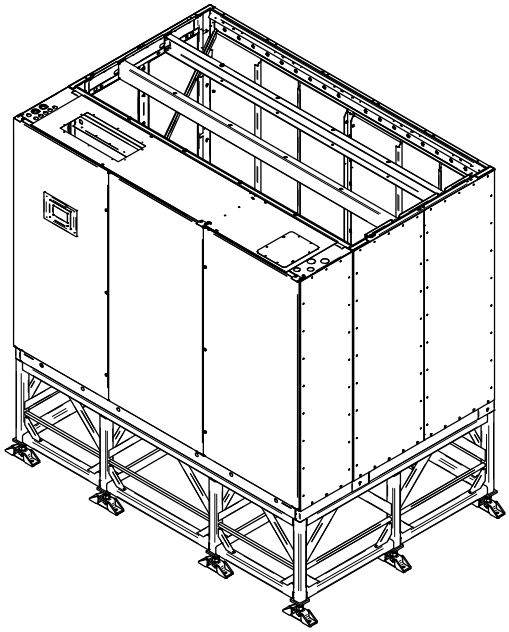
Notes:

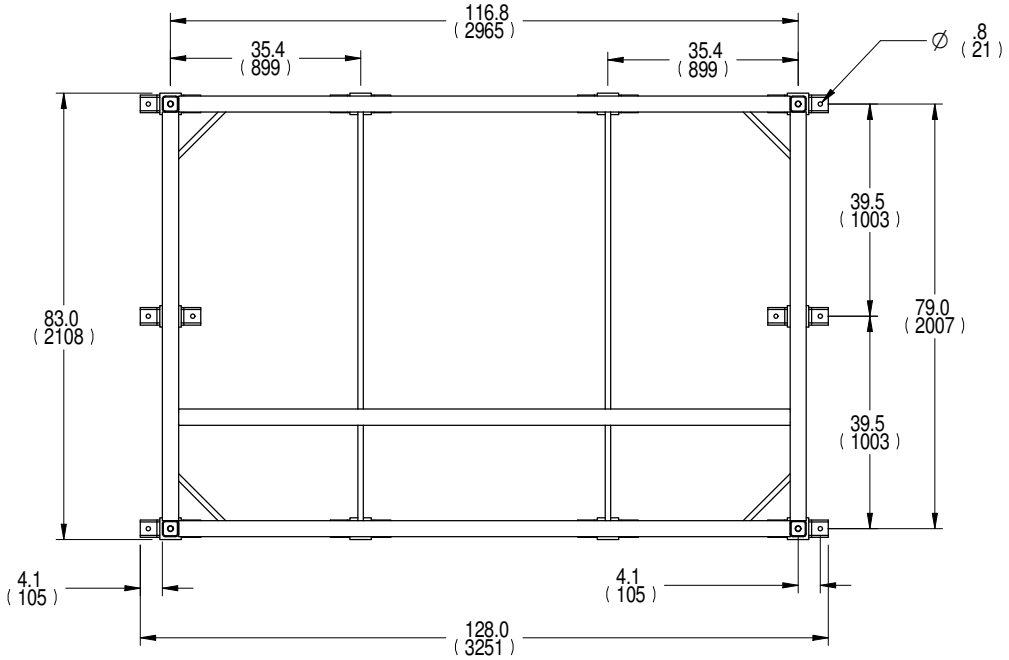
1. Anchor Bolt sized per Engineer of Record.
2. Specified by Engineer of Record.
3. If the Engineer of Record specifies an anchor diameter less than 3/4", a washer should be welded over the 7/8" hole to accomdate the smaller diameter anchor.
4. Louvers must be removed to access floor anchors on Data Hall Side.

DIMENSIONAL DATA
SEISMIC ANCHORAGE RIGID FLOORSTAND FOR DA250/DA265 HORIZONTAL & BOTTOM DISCHARGE UNIT



ANCHOR DETAIL
TYP. (14) PLACES



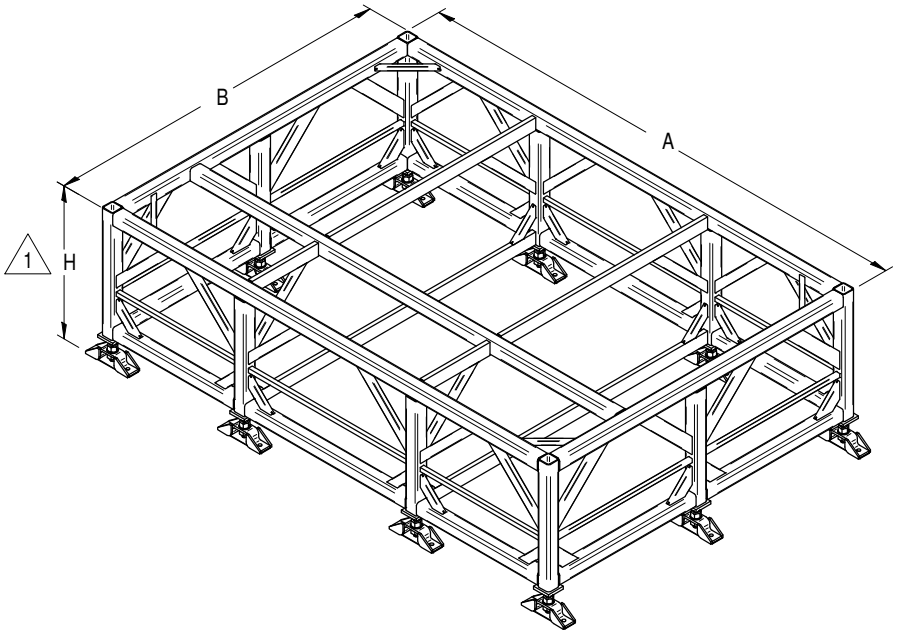


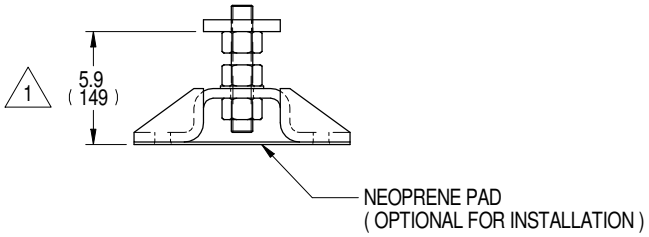
FLOOR ANCHORING DIMENSIONS

Notes:

1. Anchor Bolt sized per Engineer of Record.
2. Specified by Engineer of Record.
3. Floorstand feet can be oriented in any direction.

DIMENSIONAL DATA
SEISMIC ANCHORAGE RIGID FLOORSTAND FOR DA250/DA265 HORIZONTAL & BOTTOM DISCHARGE UNIT





FOOT DETAIL

MODEL	A		B	
	INCHES	MM	INCHES	MM
DA250	119.8	3042	82.0	2083

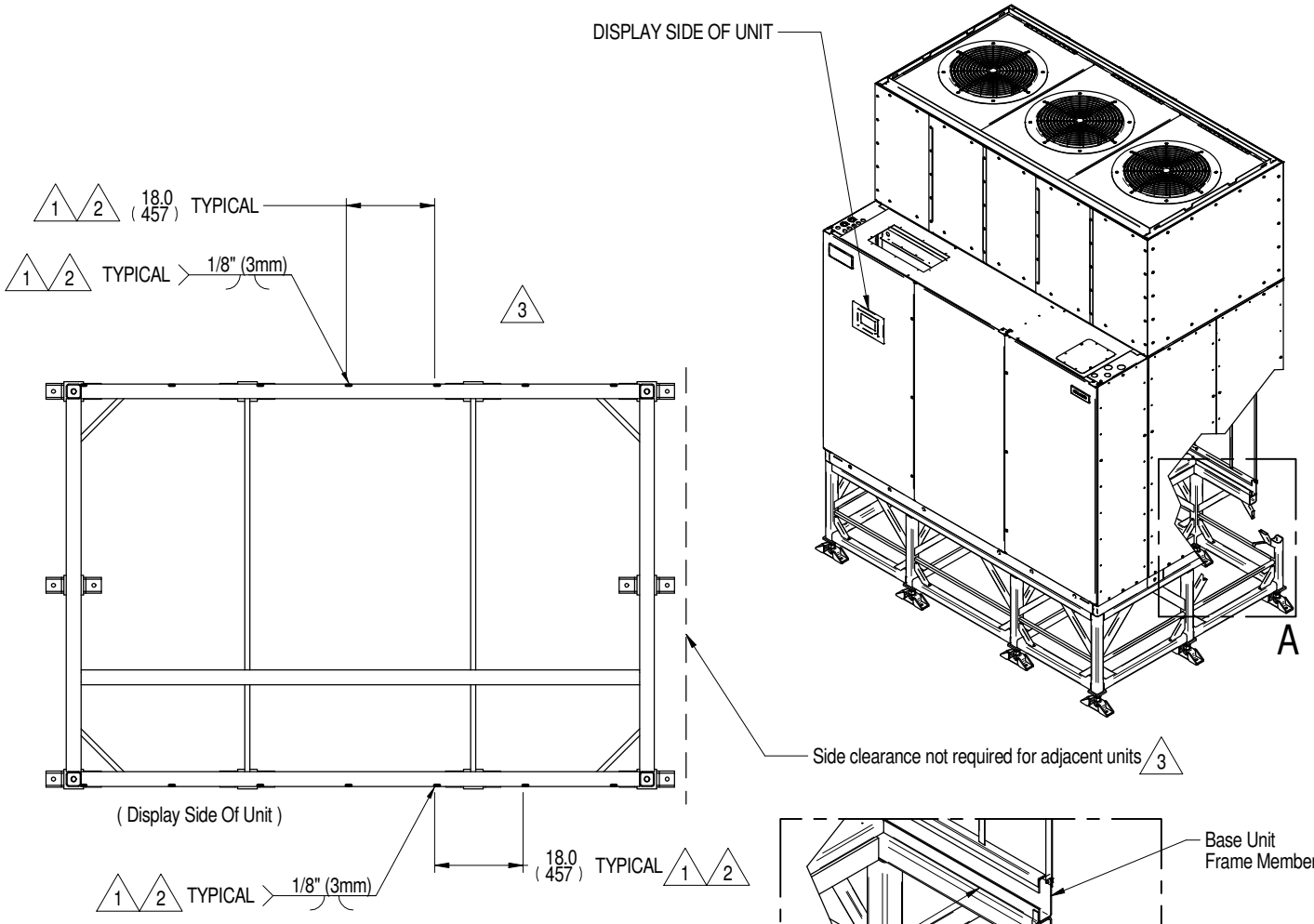
HEIGHT	
"H" NOMINAL	
INCHES	MM
24.0	610
30.0	762
36.0	914
42.0	1067
48.0	1219

Notes:

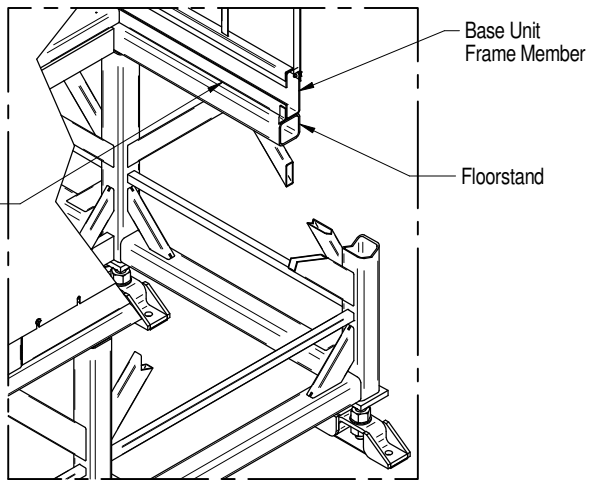
1. Foot provides ±0.25" (6mm) adjustment from nominal height "H".
2. Floorstand is used on DA250 units with both Bottom Discharge or Horizontal Discharge configurations.
3. Floorstand feet can be oriented in any direction.

COOLPHASE PERIMETER

DIMENSIONAL DATA
SEISMIC ANCHORAGE RIGID FLOORSTAND FOR DA250/265 HORIZONTAL & BOTTOM DISCHARGE UNIT



TOP VIEW OF FLOORSTAND
(MAIN UNIT REMOVED FROM VIEW FOR CLARITY)



DETAIL A
INTERNAL WELD

Notes:

1. For welded connection of unit to floorstand:
Front and rear sides of unit to be welded to floorstand.
Apply 1/8" (3mm) by 1" (25.4mm) long welds every 18" (457mm) maximum.
to interior or external face of long sides.

2. In lieu of welds, screwed clips (3" wide 1/8" thick) can be used.
Screwed clips to be attached attached via (6) 1/4" self-threading screws to unit and (6) 1/4" self-threading screws to floorstand per each screwed clip.

3. For units that will be installed against a wall:
Complete attachment of unit to floorstand before moving into place.
Welds or screwed clips may also be applied internally to the floorstand.
For internal weld refer to Detail A

HEAT REJECTION SKID

SEISMIC APPLICATION
ASSUMPTIONS AND REQUIREMENTS

Vertiv™ has conducted analytical modeling of the Vertiv™ Coolphase Condenser product to provide an option for those systems requiring seismic certification of compliance. This certification goes beyond the equipment's ability to withstand the seismic forces: the IBC (International Building Code) and ASCE (American Society of Civil Engineers) system approach includes the equipment, equipment anchorage, and the connections to the equipment [power and piping].

Certification Criteria

The Vertiv™ Coolphase Condenser certification is based on a maximum mapped, maximum considered earthquake spectra response acceleration value, Ss (in table below) adjusted by the soil site coefficient to Soil Site Class D as the default when the site soil properties or final equipment installation location is not known. The certification maximum spectral response coefficient is Sds (table below) including Soil Class and Seismic Use group corrections. Soil Classes A, B, C, D, and E, and Seismic Design Categories A, B, C, D, E, and F are all covered under this certification, limited by the Sds value shown in the table below.

Vertiv™ Coolphase Condenser unit, with factory-installed seismic option, attached directly to a pad and steel substrate using the anchoring system defined in this document.

Certification	IBC			IBC		
Unit	Sds	Ss	Ip	Sds	Ss	Ip
MCV 440 - 8 Fan with PRE	2.5	3.75	1.0	1.25	1.875	1.5
MCV440 - 16 Fan with PRE						

Note:

1. Ip=1.0 - Structural analysis has been conducted to demonstrate that the equipment meets performance objectives required for a component importance factor (Ip) shown in the table below. Specifically, structural integrity is demonstrated such as to not pose a life safety hazard.

2. Ip=1.5 - Although this unit is not certified for the performance objective associated with the Ip shown in the above table (continued functionality after a seismic event), the analyses of non-active components has been conducted with increased seismic demands associated with Ip to ensure a seismically robust unit (structural integrity).

SEISMIC APPLICATION
ASSUMPTIONS AND REQUIREMENTS

Requirements for Anchorage Anchors

1. Mounting requirement details such as brand, type, embedment depth, edge spacing, anchor spacing, concrete strength, wall bracing, and special inspection must be outlined and approved by the project Structural Engineer of Record.

Anchorage Surface

2. Structural floors and housekeeping pads must also be seismically designed and approved by the project Structural Engineer of Record to withstand the seismic anchor loads as defined on the installation drawings. The installing contractor is responsible for the proper installation of all anchors and mounting hardware, observing the mounting requirement details outlined by the Engineer of Record. Contact the Manufacturer's Representative if a detailed Seismic Installation Calculation Package is required.

Unit Field Connections

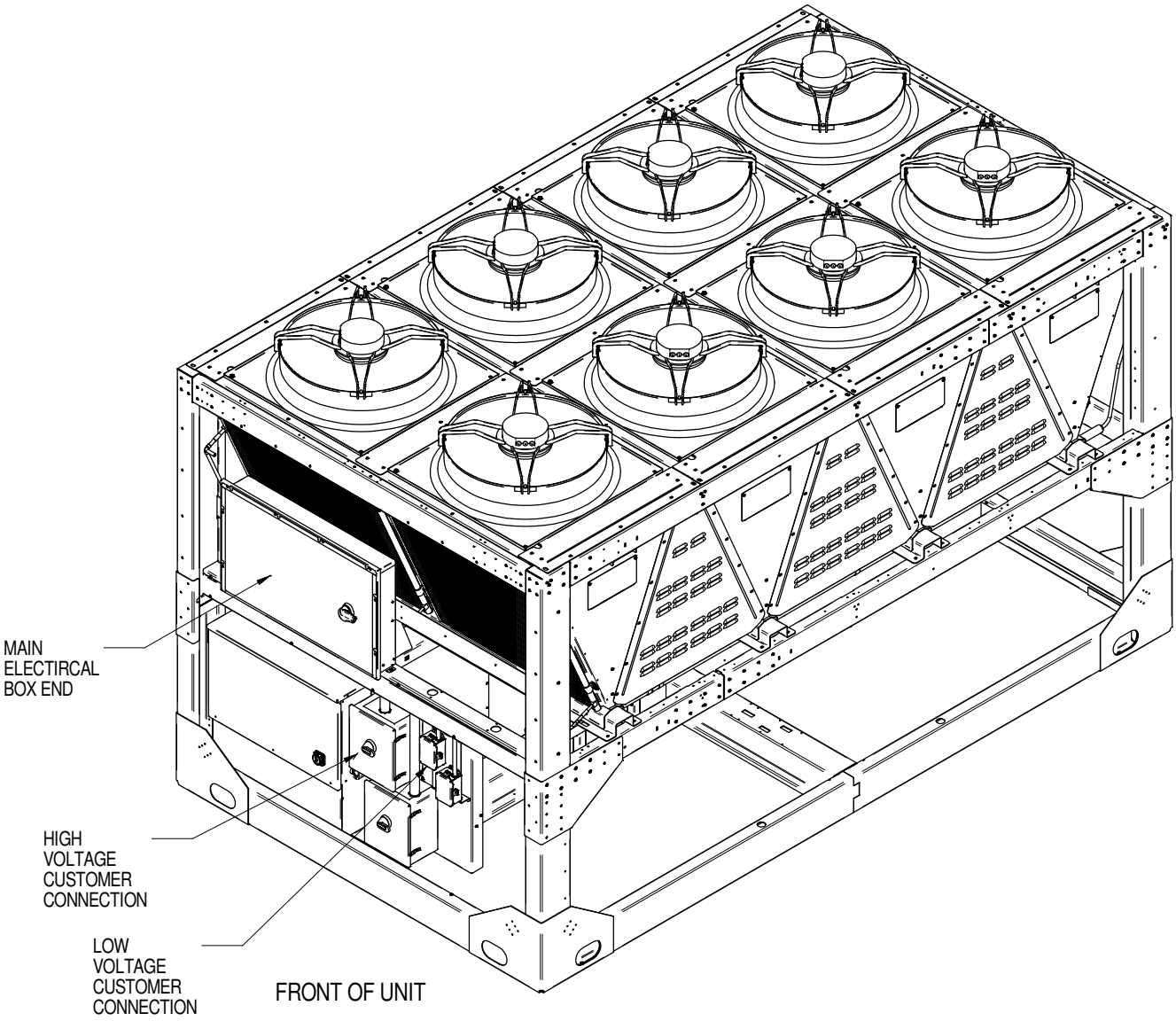
3. Piping Considerations
   Condensers for seismic application, shall be attached to the piping system using field supplied flexible loops designed for seismic movement. Flexible loops shall be capable of movement in three dimensions and must isolate the condenser from field piping. The loops shall be suitable for an operating pressure and temperature of the system. Follow manufacturer's installation instructions for proper seismic application of flexible loops. The selection of isolation brand and type must be outlined and approved by the engineer of record for the project or building.

4. Electrical Wiring Considerations
   Condensers for seismic application, shall be connected to power and control circuits using field supplied flexible conduit and conductors to allow for movement of the condenser in three dimensions during a seismic event. The flexible conduit shall have at least one bend between the rigid connection at the unit cabinet and the connection to rigid conduit or foundation. The selection of flexible conduit and type must be outlined and approved by the engineer of record for the project or building.

HEAT REJECTION SKID

SEISMIC ANCHORAGE DATA

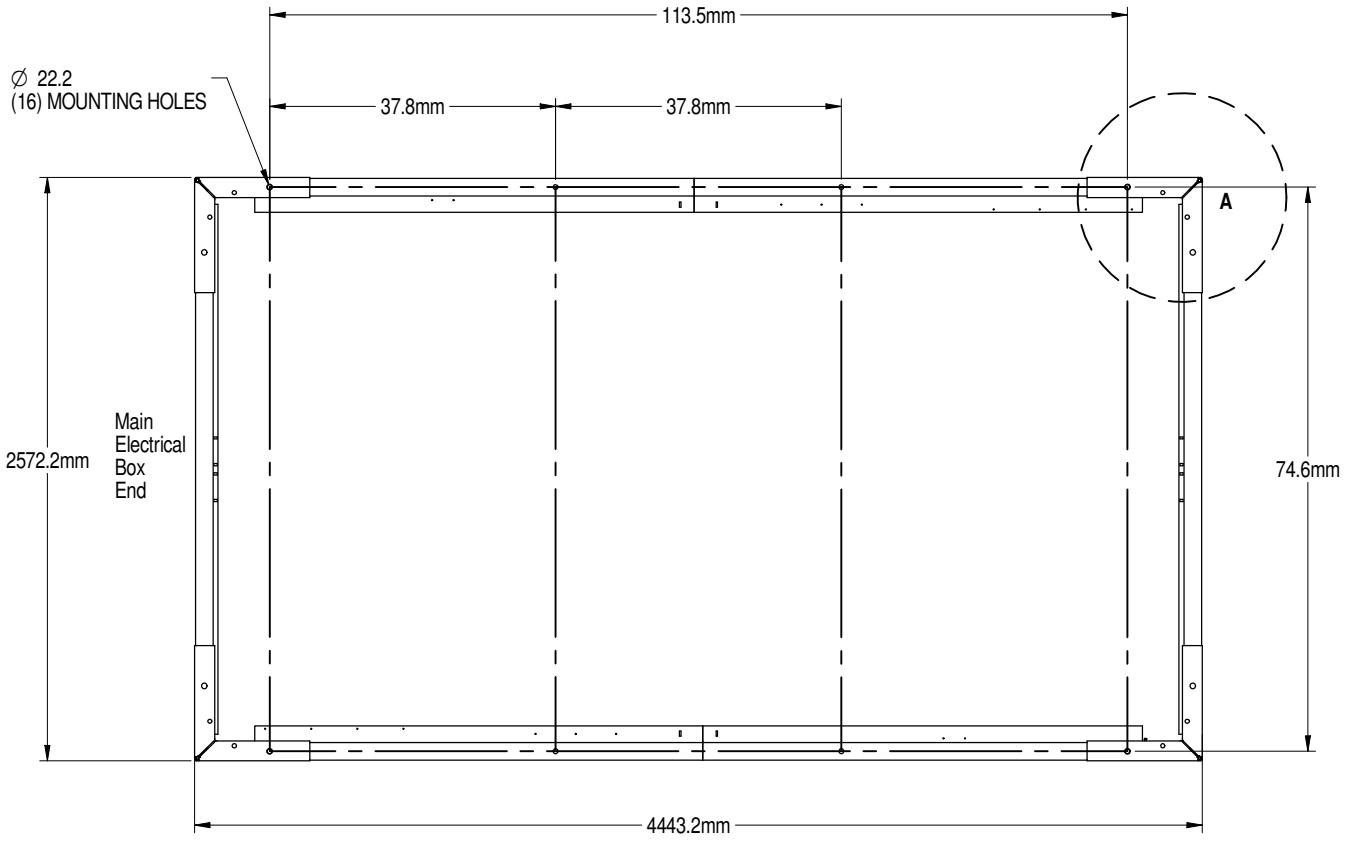
MCV440 + ECONOPHASE + BASE ASSEMBLY



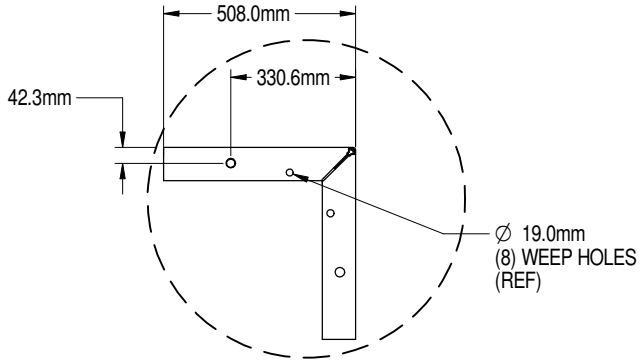
HEAT REJECTION SKID

SEISMIC ANCHORAGE DATA

MCV440 + ECONOPHASE + BASE ASSEMBLY



UNDERSIDE OF UNIT
COIL AND FANS REMOVED FOR CLARITY

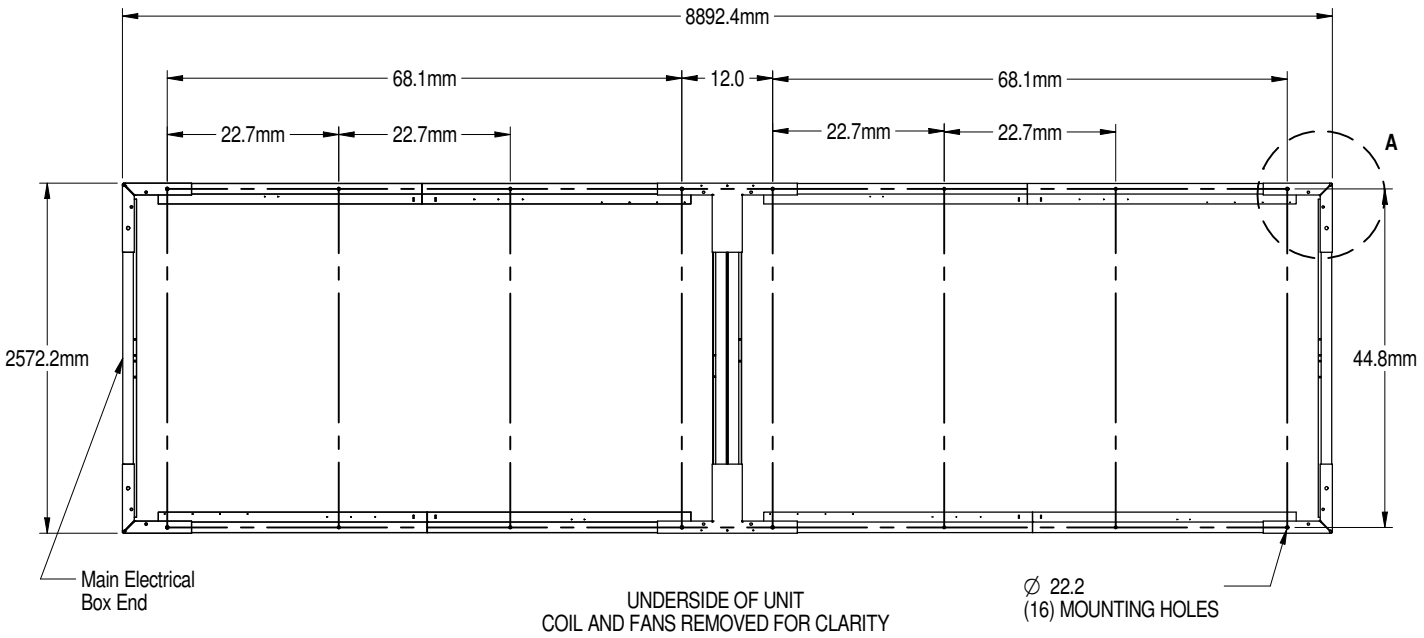


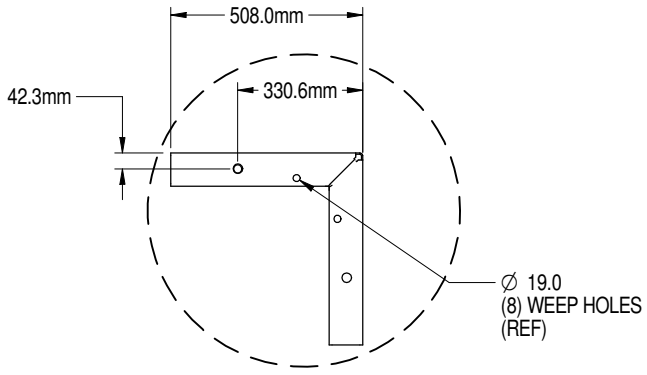
DETAIL A
Typical (4) places

HEAT REJECTION SKID

SEISMIC ANCHORAGE DATA

MCV440(2) + ECONOPHASE (2) + BASE ASSEMBLY





DETAIL A
Typical (4) places

Appendix E: Guide Specifications

The following are the guide specifications for the Vertiv™ CoolPhase Perimeter.

© 2026 Vertiv Group Corp.

All Rights Reserved.

This page intentionally left blank

© 2026 Vertiv Group Corp.

All Rights Reserved.

Vertiv™ CoolPhase Perimeter
Guide Specifications
DA250-DA265 Models
1.0 GENERAL

1.1 Summary

These specifications describe requirements for a Vertiv Thermal Management system. The system shall be designed to control temperature in rooms containing electronic equipment, with good insulation and a vapor barrier. The manufacturer shall design and furnish all equipment to be fully compatible with the heat dissipation requirements of the room.

1.2 Design Requirements

The Vertiv Thermal Management system shall be a factory assembled self-contained unit. Standard 60 Hz units shall be CSA-certified to the harmonized U.S. and Canadian product safety standard, "CSA C22.2 No 236/UL 1995 for Heating and Cooling Equipment" and are marked with the CSA c-us logo. The system shall be AHRI Certified, the trusted mark of performance assurance for heating, ventilation, air conditioning and commercial refrigeration equipment, using AHRI Standard 1360. The system sensible coefficient of performance (SCOP) shall meet ASHRAE 90.1.

The unit is to be supplied for operation using a _____V, 3 phase, _____ Hz power supply.

1.3 Submittals

Submittals shall be provided with the agreement of the proposal and shall include single-line diagrams, as well as dimensional, electrical and capacity data, piping, and electrical connection drawings.

1.4 Serviceability/Access

The cabinet shall be designed so that all components are easily accessible for service and maintenance through the unit's service (non-data center) side.

1.5 Acceptable Alternatives

Acceptable alternatives shall be permitted with engineer's prior approval only. Contractor to submit a detailed summary form listing all variations to include size deviations, electrical load differences, functional and component changes, and savings to the end user.

1.5.1 Quality Assurance

The specified system shall be factory-tested before shipment. Testing shall include, but not be limited to: Quality Control Checks, "Hi-Pot." The system shall be designed and manufactured according to world-class quality standards. The manufacturer shall be ISO 9001 certified.

Proprietary and Confidential © 2025 Vertiv Group Corp.

2.0 PRODUCT

2.1 Frame DA250 and DA265

The unit frame section and fan plenum frame shall be welded, formed sheet metal. They shall be protected against corrosion using the autophoretic coating process. The unit section and the fan plenum shall be shipped as two separate sections. The fan plenum shall be field mounted on top of the unit frame section.

2.1.1 IBC Seismic Rated Option

The unit frame shall be rated for IBC certification with Sds = 2.5 and Ip = 1.0, using optional bracing and when installed properly per 20000346.

2.1.2 Downflow Air-Supply Configurations

2.1.2.1 Downflow Air Bottom Discharge

The supply air shall exit from the bottom of the unit.

2.1.2.2 Downflow Air Horizontal Discharge

The supply air shall exit from the front (data hall side) of the unit.

2.1.3 Downflow Air Return

The return air shall enter the unit from the top.

2.1.4 Exterior Panels

The exterior panels shall be insulated with a minimum 1 in. (25 mm), 1.5 lb. (0.68 kg) density fiber insulation. The main front panel shall have captive quarter-turn fasteners. The main unit color shall be _RAL-7021 (gray black). The fan plenum shall be painted to match the color of the main unit.

2.2 Filters—DA250 and DA265

The filter chamber shall be located within the evaporator coil cabinet, and filters shall be removable from the service side (non-data center side) of the unit.

2.2.1 Filters, 4 in. MERV 8 or MERV11

Filters shall be deep-pleated, 4 in. (102 mm) filters with an ASHRAE 52.2-2007 MERV8 or MERV11 rating.

Extra Filter Set

____ extra set(s) of filters shall be provided per system.

2.3 Locking Disconnect Switch

The manual disconnect switch shall be mounted in the high voltage section of the electrical panel. The switch shall prevent access to the high voltage electrical components until switched to the OFF position.

2.4 Short-Circuit Current Rating (SCCR)

The electrical panel shall provide at least 65,000A SCCR.

Short-circuit current rating (SCCR) is the maximum short-circuit current a component or assembly can safely withstand when protected by a specific overcurrent protective device(s) or for a specified time.

Proprietary and Confidential © 2025 Vertiv Group Corp.

2.5 Fan Section

Plenum Fans with Direct Drive Motors and Variable Speed Drive

The fans shall be plug/plenum type, motorized impellers, single inlet and dynamically balanced. The drive package shall be direct drive and provided with variable speed drives (three drives per unit). The fans shall be located to blow air over the slab coil to ensure even air distribution and maximum coil performance.

- Downflow DA250 and DA265 fan motors shall be nominal 15 hp (11.2 kW) each, with a maximum operating speed of 1800 rpm; quantity, three.
    - Nominal 15 hp (11.2 kW) each
    - Maximum operating speed of 1800 rpm
    - Quantity, three

2.6 Fan Overload

The fan fault alarm shall be standard on all models.

2.7 Refrigeration System

2.7.1 Dual Circuit - DA250 and DA265

Each unit shall include two independent refrigeration circuits, and each circuit shall include liquid line filter driers, refrigerant sight glass with moisture indicator and electronic expansion valves. Compressors shall be located outside the air stream and shall be removable and serviceable from the service side of the unit. Each compressor circuit shall be connected to the full-face area of the evaporator coil.

2.8 Compressors

2.8.1 Tandem Digital Scroll Compressors—DA250 and DA265

The compressors shall be tandem, digital scroll-type with a variable capacity operation capability of one compressor of the pair. Compressor solenoid valve shall unload the compressor and allow for variable capacity operation. The compressor shall have vibration isolators, thermal overloads, automatic reset high pressure switch with lockout after three failures, service valves, suction line strainer and a maximum operating speed of 3500 rpm. The compressor motor shall be suction gas cooled.

2.8.2 Compressor Overload

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

2.9 Crankcase Heaters

The compressors shall include crankcase heaters, powered from the indoor unit electric panel.

2.10 Evaporator Coil

2.10.1 DA250

The evaporator coil shall be Slab design for bottom/horizontal discharge units and have ___67.5___ sq. ft. (___6.3___ sq m) face area, __4__ rows deep. It shall be constructed of rifled copper tubes and aluminum fins with a maximum face velocity of __541___ ft. per minute (__2.7___ m/s) at __36,500___ CFM (__62,014___ CMH). A stainless-steel condensate drain pan shall be provided.

Proprietary and Confidential © 2025 Vertiv Group Corp.

2.10.2 DA265

The evaporator coil shall be Slab design for bottom/horizontal discharge units and have ___67.5___ sq. ft. (___6.3___ sq m) face area, __5__ rows deep. It shall be constructed of rifled copper tubes and aluminum fins with a maximum face velocity of __541___ ft. per minute (__2.7___ m/s) at __36,500___ CFM (__62,014___ CMH). A stainless-steel condensate drain pan shall be provided.

2.11 R-454B Refrigerant

The system shall be designed for use with R-454B refrigerant, which meets the U.S. Clean Air Act for phase-out of HCFC refrigerants. Refrigerant shall be field supplied, and field charged by the installing contractor.

2.12 Air Cooled Systems

The indoor evaporator unit shall include refrigerant piping and shall have a factory holding charge of nitrogen. The hot gas and liquid lines shall be spun shut and each shall include a factory-installed Schrader valve. Field-relief of the Schrader valve shall indicate a leak free system from the factory. The installing contractor shall cut the evaporator piping and shall evacuate and charge the system. Refrigerant shall be supplied by the installing contractor.

Proprietary and Confidential © 2025 Vertiv Group Corp.

3.0 CONTROLS

3.1 Vertiv™ Liebert® iCOM™ Microprocessor Control with 7 in. Color Touchscreen

The Vertiv Liebert iCOM shall be microprocessor-based with a 7 in., high definition, capacitive, color touchscreen display and shall be mounted in an ergonomic, aesthetically pleasing housing. The display and housing shall be viewable while the front panel is open or closed. The controls shall be menu driven. The system shall display user menus for active alarms, event log, graphic data, unit view/status overview (including the monitoring of room conditions, operational status in percentage of each function, date, and time), total run hours, various sensors, display setup and service contacts. A password shall be required to make system changes. Service menus shall include setpoints, standby settings (lead/lag), timers/sleep mode, alarm setup, sensor calibration, maintenance/wellness settings, options setup, system/network setup, auxiliary boards, and diagnostics/service mode. The Vertiv Liebert iCOM control shall provide Ethernet/RS-485 ports dedicated for BMS connectivity (i.e., Base Comms).

- Password Protection – The Vertiv Liebert iCOM shall contain two unique passwords to protect against unauthorized changes. An auto hide/show feature allows the user to see applicable information based on the login used.
- Unit Backup and Restore – The user shall be able to create safe copies of important control parameters. The Vertiv Liebert iCOM shall have the capacity for the user to automatically backup unit configuration settings to internal memory or USB storage drive. Configuration settings may be transferred to another unit for a more streamlined unit startup.
- Parameter Download – The Vertiv Liebert iCOM shall enable the user to download a report that lists parameter names, factory default settings and user-programmed settings in .csv format for remote reference.
- Parameter Search – The Vertiv Liebert iCOM shall have search fields for efficient navigation and parameter lookup.
- Parameter Directory – The Vertiv Liebert iCOM shall provide a directory that lists all parameters in the control. The list shall provide Line ID numbers, parameter labels, and current parameter values.
- Context-sensitive Help – The Vertiv Liebert iCOM shall have an on-board help database. The database shall provide context sensitive help to assist with setup and navigation of the menus.
- Display Setup – The user shall have the ability to configure the Vertiv Liebert iCOM information based on the specific user's preference. Language, units of measure, screen contrast, home screen layout, back-light timer and the hide/show of certain readouts shall be configurable through the display.

Proprietary and Confidential © 2025 Vertiv Group Corp.

- Additional Readouts – The Vertiv Liebert iCOM shall permit the user to configure custom widgets on the main screen. Widget options shall include items such as fan speed, call for cooling, call for free-cooling, maintenance status, call for hot water reheat, call for electric reheat, call for dehumidification, call for humidification, airflow, static pressure, fluid flow rate and cooling capacity.
- Status LEDs – The Vertiv Liebert iCOM shall provide the user with the unit's operating status using an integrated LED. The LED shall indicate if the unit has an active alarm; if the unit has an active alarm that has been acknowledged; or if the unit is On, Off or in standby status.
- Event Log – The Vertiv Liebert iCOM shall automatically store the last 400 unit-only events (messages, warnings, and alarms).
- Service Contact Information – The Vertiv Liebert iCOM shall have the ability to store the local service or sales contact information.
- Upgradeable – Vertiv Liebert iCOM firmware upgrades shall be performed through a USB connection.
- Timers/Sleep Mode – The menu shall allow various customer settings for turning the unit on/off.
- Menu Layout – The menus shall be divided into two main menu screens: User and Service. The User screen shall contain the menus to access parameters required for basic unit control and setup. The Service screen shall be designed for service personal and provides access to advanced control setup features and diagnostic information.
- Sensor Calibration – The menus shall allow unit sensors to be calibrated with external sensors.
- Maintenance/Wellness Settings – The menus shall allow reporting of potential component problems before they occur.
- Options Setup – The menus shall provide operation settings for the installed components.
- Auxiliary Boards – The menus shall allow setup of optional expansion boards.
- Various Sensors – The menus shall allow setup and display of optional custom sensors. The control shall include four customer-accessible analog inputs for field-provided sensors. The analog inputs shall accept a 4 to 20mA signal. The user shall be able to change the input to 0 to 5VDC or 0 to 10VDC. The gains for each analog input shall be programmable from the front display. The analog inputs shall be able to be monitored from the front display.
- Diagnostics/Service Mode – The Vertiv Liebert iCOM shall be provided with self-diagnostics to aid in troubleshooting. The microcontroller board shall be diagnosed and reported as pass/not pass. Control inputs shall be indicated as On or Off at the front display. Control outputs shall be able to be turned On or Off from the front display without using jumpers or a service terminal. Each control output shall be indicated by an LED on a circuit board.
- Base-Comms for BMS Connectivity – The Vertiv Liebert iCOM controller shall provide one Ethernet Port and RS-485 port dedicated for BMS connectivity. Provides ground fault isolated RS-485 Modbus, BACnet IP, and Modbus IP network connectivity to building management systems for unit monitoring and management. Also provides ground fault isolated 10/100 BaseT Ethernet connectivity for unit monitoring and management. The supported management interfaces include SNMP for network management systems, HTTP for web page viewing, SMTP for email, and SMS for mobile messaging. The Vertiv Liebert iCOM controller can support dual IP on a single network and one 485 protocol simultaneously.

Proprietary and Confidential © 2025 Vertiv Group Corp.

- Vertiv™ CoolPhase Perimeter System Optimization – Allows for efficiency improvements for the Vertiv CoolPhase Perimeter system during Vertiv™ EconoPhase mode. By optimizing liquid refrigerant temperature and pressure setpoints, the result is a reduction in power consumption of the condenser fan during mid and high ambient conditions. Vertiv CoolPhase Perimeter System Optimization provides an opportunity for additional energy savings by increasing the utilization of the Vertiv EconoPhase pumps and decreasing the utilization of the condenser fans but always maintaining appropriate heat capacity rejection during mid to high ambient outdoor conditions. Energy savings occur when utilizing the Vertiv EconoPhase pump package; a pump consumes roughly 1/10th of the power consumed by the compressor.

3.2 Alarms

All unit alarms shall be annunciated through both audio and visual cues, clearly displayed on the screen, automatically recorded in the event log, and communicated to the customer's building management system/building automation system. The Vertiv Liebert iCOM shall activate an audible and visual alarm in the event of any of the following conditions:

- High Temperature
- Low Temperature
- High Humidity
- Low Humidity
- Fan Fault
- Change Filters
- Loss of Air Flow
- Loss of Power
- Compressor Overload
- High Head Pressure
- Low Suction Pressure
- Refrigerant Leak Detection
- Custom Alarms

Custom alarm inputs shall be provided to indicate facility-specific events. Custom alarms can be identified with programmable labels. Frequently used alarm inputs shall include:

- Leak Under Floor
- Smoke Detected
- Standby Unit On

Each alarm (unit and custom) shall be separately enabled or disabled, selected to activate the common alarm and programmed for a delay of 0 to 255 seconds.

A complete listing of alarms is available in the Vertiv Liebert iCOM Installer/User Guide, SL-80185.

3.3 Vertiv™ Liebert® iCOM™ Control Methods and Options

The Vertiv Liebert iCOM shall be factory-set to allow precise monitoring and control of the condition of the air entering and leaving the unit. This control shall include predictive methods to control air flow and cooling capacity-based control sensors installed. Proportional and Tunable PID shall also be user-selectable options.

Proprietary and Confidential © 2025 Vertiv Group Corp.

3.3.1 Controlling Sensor Options

The Vertiv Liebert iCOM shall be flexible in the sense that it shall allow controlling the capacity and fan from multiple different sensor selections. The sensor selections shall be:

Cooling Capacity

- Supply
- Remote
- Return

Fan Speed

- Supply
- Remote
- Return
- Manual (for diagnostics or to receive a signal from the BMS through remote monitoring devices or analog input)
- Static Pressure

3.3.2 Temperature Compensation

The Vertiv Liebert iCOM shall have the ability to adjust the capacity output based on supply and return temperature conditions to meet SLA guidelines while operating to the highest efficiency.

3.4 Multi-Unit Coordination

Vertiv Liebert iCOM teamwork shall save energy by preventing multiple units in an area from operating in opposing modes. Teamwork allows the control to optimize a group of connected equipped with Vertiv Liebert iCOM using the U2U (Unit-to-Unit) network. There shall be three modes of teamwork operation:

- Teamwork Mode 1 (Parallel) – Is best in small rooms with balanced heat loads. The controlling temperature and humidity sensor readings of all units in operation (fan On) are collected to be used for an average or worst-case sensor reading (user selectable). The master unit shall send the operating requirements to all operating units in the group. The control band (temperature, fan, and humidity) is derived and shared among the units in the group. Each unit will receive instructions on how to operate from the master unit based on how far the system deviates from the setpoints. Evaporator fans and cooling capacity are ramped in parallel.
- Teamwork Mode 2 (Independent) – The Vertiv Liebert iCOM calculates the worse-case demand for heating, cooling humidification and dehumidification. Based on the greatest demand within the group, each unit operates independently, meaning that the unit may respond to the thermal load and humidity conditions based on the unit's controlling sensors. All sensor readings are shared.

Proprietary and Confidential © 2025 Vertiv Group Corp.

- Teamwork Mode 3 (Optimized Aisle) – May be applied in large and small rooms with varying heat loads. Optimized Aisle is the most efficient teamwork mode that allows the unit to match cooling capacity with heat load. In the Optimized Aisle mode, the fans operate in parallel. Fans can be controlled exclusively by remote temperature or using static pressure with a secondary remote temperature sensor(s) as an override to ensure that the inlet rack temperature is being met. Cooling (Compressors, Vertiv™ Economizer or Vertiv EconoPhase) is controlled off unit supply air conditions. The Vertiv Liebert iCOM calculates the average or worst-case sensor reading (user-selectable) for heating, cooling humidification and dehumidification. Based on the demand within the group, units will be allowed to operate within that mode until room conditions are satisfied. This is the best form of control for a room with an unbalanced load.

3.5 Standby/Lead Lag

The Vertiv Liebert iCOM shall allow planned rotation to keep equal run time on units and provide automated emergency rotation of operating and standby units.

3.6 Standby Unit Cascading

The Vertiv Liebert iCOM cascade option shall allow the units to turn On and Off based on heat load when utilizing Teamwork Mode 3–Optimized Aisle mode with remote temperature sensors. In Teamwork Mode 3, Cascade mode will stage units On based on the temperature and humidity readings and their deviation from setpoint. Cascade mode coordinates the fan speed dynamically to save energy and to meet cooling demands. For instance, with a Vertiv Liebert iCOM group of six units and only 50% of the heat load, the Vertiv Liebert iCOM shall operate only four units at 80% fan speed and leave the other two units in standby. As the heat load increases, the Vertiv Liebert iCOM shall automatically respond to the new load and bring on another unit, increasing the units in operation to five. As the heat load shifts up or down, the control shall meet the needs by cascading units On or putting them back into standby.

3.7 Virtual Master

As part of the robust architecture of the Vertiv Liebert iCOM control, it shall allow for a virtual master that coordinates operation. The Virtual Master function shall provide smooth control operation if the group's communication is compromised. When the lead unit, which is in charge of component staging in teamwork, unit staging and standby rotation, becomes disconnected from the network, the Vertiv Liebert iCOM automatically assigns a virtual master. The virtual master shall assume the same responsibilities as the master until communication is restored.

3.8 Virtual Backdraft Damper

The Vertiv Liebert iCOM shall allow the use of a virtual backdraft damper, eliminating the need for a mechanical damper. This shall allow the fans of a standby unit to spin in reverse at a low speed (15% or less) to act as a damper.

3.9 Compressor Short Cycle Control

Compressor short cycle control shall be available to prevent compressor short-cycling and needless compressor wear.

3.10 Vertiv™ CoolPhase Condenser and Vertiv™ EconoPhase Communication

Units shall be matched with Vertiv CoolPhase Condenser Premium Condensers and/or optional Vertiv EconoPhase unit and shall communicate with them via field supplied CANbus wires. This communication shall allow Vertiv Liebert iCOM to control Vertiv CoolPhase Condenser/Vertiv EconoPhase modes and operation and to monitor their health and alarm status.

3.11 Wired Supply Sensor

Each Vertiv Liebert iCOM shall have one factory-supplied and connected supply air sensor that may be used as a controlling sensor or reference. When multiple sensors are applied for control purposes, the user shall be able to control based on a maximum or average temperature reading.

Proprietary and Confidential © 2025 Vertiv Group Corp.

3.12 System Auto Restart

The auto restart feature shall automatically restart the system after a power failure. Time delay shall be programmable. An optional capacitive buffer may be provided for continuous control operation through a power outage.

3.12.1 Sequential Load Activation

On initial startup or restart after power failure, each operational load shall be sequenced with a minimum of one second delay to minimize total inrush current.

3.12.2 Low Pressure Monitoring

Units shall ship standard with low pressure transducers for monitoring individual compressor suction pressure. If the pressure falls due to loss of charge or other mechanical cause, the corresponding circuit shall shut down to prevent equipment damage. The user shall be notified of the low-pressure condition through the local display and remote monitoring.

3.13 Winter Start Time Delay

An adjustable software timer shall be provided to assist with compressor starting during cold weather. When the compressor starts, the low-pressure input shall be ignored for the period set in the user-adjustable timer. Once the delay after the compressor start has elapsed, the low-pressure input should remain in the normal state. If the low-pressure input does not remain in the normal state after the delay has elapsed, the circuit shall lock out on low-pressure. The low-pressure alarm shall be announced on the local display and communicated to remote monitoring systems.

3.13.1 Advanced Freeze Protection

Units shall ship standard with advanced freeze protection enabled. The advanced freeze protection shall monitor the pressure of each circuit using a transducer. The control shall interact with the fan and compressor to prevent the unit coil from freezing if circuit suction pressure drops. Applying fan speed to direct expansion systems requires limitations to avoid freezing condensate on the coil when the unit operates below 100% fan speed. Vertiv Liebert iCOM's advanced freeze protection provides the ability to predict freeze conditions and correct this condition automatically by the adjusting fan speed and compressor capacity. If a freeze condition is detected, the user shall be notified through the local display and remote monitoring systems.

3.13.2 Advanced High-Pressure Protection

When the compressor is initially activated, the system shall be monitored for a high pressure. When high pressure is detected, the control shall reduce the system discharge pressure by altering the compressor loading and the condenser fan speed, preventing circuit shut down. If the unit is unsuccessful in correcting the problem through this interaction, an alarm shall occur, and the affected compressor shall be immediately locked off. The control shall automatically re-enable the compressor when pressure returns to a safe level.

3.14 Refrigerant Pressure Transducer Failure

The control shall monitor the high side and low side refrigerant pressure transducers. If the control senses that the transducer has failed, has been disconnected, shorted or the reading has gone out of range, the user shall be notified through the local display and remote monitoring. The corresponding circuit that the failure has occurred on shall be disabled to prevent unit damage.

3.15 Oil Return Protection

The control shall monitor compressor operation and staging to ensure that liquid and hot gas velocity are maintained for proper oil return to the compressor.

Proprietary and Confidential © 2025 Vertiv Group Corp.

3.16 Digital Scroll High Temperature Protection

The control shall monitor digital scroll temperature during unit operation. A compressor temperature limit shall be imposed to help prevent damage to the compressor. If the temperature reaches the maximum temperature limit, the compressor shall be locked out for 30 minutes and an alarm shall be annunciated on the local display and through monitoring. After the initial lockout, the control shall continue to monitor compressor temperature during the off cycle and re-enable the circuit once a safe operating temperature is reached and the 30 minutes has elapsed. The control shall store the number of high temperature trips. The number of trips shall be accessible through the local display.

3.17 Digital Scroll Sensor Failure

The control shall monitor the status of the digital scroll sensor(s). If the control senses the thermistor becomes disconnected, shorted or the reading goes out of range, the user will be notified through an event on the local display and remote monitoring.

3.18 Compressor Sequencing

A user-selectable compressor sequencing parameter shall be provided and access through the local control. This sequencing parameter presents the user with three choices:

- Always use Compressor 1 as lead compressor.
- Always use Compressor 2 as lead compressor.
- Auto: The unit shall automatically stage compressors to keep each unit's run time within eight hours of the other unit's run time. NOTE: The Auto setting attempts to maintain equal run times between compressors. However, the control will not turn Off a compressor to equalize run time when it is needed to control the space.
    - **First priority –** If the safety timings are acceptable for only one compressor, that compressor shall be the next to be started/stopped.
    - **Second priority –** If both compressors are Off, the one with fewer working hours shall be the next to start.
    - **Third priority –** If both compressors are in operation, the one that has been operating longer since the last start shall be the next to be stopped.

3.19 Compressor High and Low Temperature Limit Protection

The control shall monitor the return air to ensure that the compressor(s) are operated within the manufacturer's defined window of operation. If the return air temperature deviates from the manufacturer's window of operation, the Vertiv Liebert iCOM shall automatically adjust to prevent damage to the cooling unit or reduction in its reliability.

Proprietary and Confidential © 2025 Vertiv Group Corp.

3.20 Compressor Run Time Monitoring

- The control shall log these compressor statistics:
  - Number of compressor starts
  - Run hours
  - Average run time
  - Starts per day
  - Starts per day worst
  - Number of high-pressure alarms
  - Operating phase in which the high-pressure alarm occurred
  - Number of low-pressure alarms
  - Operating phase in which the low-pressure alarm occurred
  - Number of compressor overloads
  - Number of high temperature alarms

The user shall have the ability to monitor compressor operating temperature and pressure from the local display to be used as a diagnostic tool.

3.21 Manual Compressor Disablement

The user shall have the ability to disable compressor operation using a set of either normally open or normally closed dry contacts tied directly to the control or through remote monitoring. An additional enable/disable feature shall be provided to allow the user to permanently disable an individual compressor circuit for maintenance using the local display.

3.22 Manual Compressor Operation

The user shall be able to operate each compressor manually from the local display. The user shall be able to energize refrigeration components including liquid-line solenoid valves, compressor contactors, electronic expansion valves and adjust capacity for troubleshooting or repair. The control shall monitor the compressor during manual operation and shall shut the compressor down if needed to prevent electrical or mechanical damage.

3.23 Refrigerant Leak Detection (RLS) System

The refrigerant leak detection system is a solid-state sensor with no moving components. Upon detecting a refrigerant leak, it triggers an alarm, stops cooling, closes safety shutoff valves (if equipped), and activates the fans at the appropriate mitigation speed.

Proprietary and Confidential © 2025 Vertiv Group Corp.

4.0 MISCELLANEOUS OPTIONS

4.1 High Temperature Sensor—Optional

The high temperature sensor shall be factory-installed in the unit and shall be factory-set to 125°F (52°C). It shall immediately shut down the environmental control system when activated. The sensor shall be mounted with the sensing element in the return air.

4.2 Smoke Sensor—Optional

The smoke sensor shall immediately shut down the Vertiv Thermal Management system and activate the alarm system when activated. The smoke sensor shall be mounted in the electrical panel with the sensing element in the return air compartment. The smoke sensor is not intended to function as or replace any room smoke detection system that may be required by local or national codes. The smoke sensor shall include a supervision contact closure.

4.3 Condensate Pump, Dual Float—Optional

The pump shall have a capacity of _____ GPM (_____ L/m) at _____ ft head (_____ kPa). It shall be complete with integral dual-float switches, pump-and-motor assembly, and reservoir. The secondary float shall send a signal to the local alarm and shut down the unit upon high water condition.

4.4 Dual Input Power—Optional

The unit shall be provided with two manual disconnect switches mounted in the high voltage section of the electrical panel. In addition, the unit shall include a reversing starter with an automatic transfer switch (ATS) control. In the event of a loss of primary power, the unit will automatically switch over to a secondary power source. Upon the return of primary power, the unit will automatically return to the primary power source.

On the DA250 and DA265, this configuration includes:

- Dual disconnect with reversing starter
- High-voltage subfeed from indoor unit to condenser and Vertiv EconoPhase—Vertiv CoolPhase Condenser Heat Rejection Skid (includes condenser and Vertiv EconoPhase) is powered from the indoor unit. The indoor unit and heat rejection skid should be on the same power source.
- Capacitive buffer and quick start feature—When enabled, the quick-start feature will become available in the event the capacitive buffer is no longer able to maintain power to the Vertiv Liebert iCOM controller and Vertiv Liebert iCOM powers down. Upon power restoration to the Vertiv Liebert iCOM controller, the quick-start feature shall activate and provide fan/cooling output. The quick-start feature shall support the full range of cooling operating modes for the Vertiv CoolPhase Perimeter system: DX Mode, Mixed Mode, and Pump Mode (Vertiv EconoPhase). Upon a system power restoration, the Vertiv CoolPhase Perimeter unit will continue operation and start in the last known cooling operating mode that was active prior to the loss of power. Unit restart time for full cooling shall be 40 seconds or less after power to the unit has been restored, with fans starting within 15 seconds. The unit shall be equipped with capacitive buffer to provide the Vertiv Liebert iCOM with a minimum of three minutes of ride-through power. The capacitive buffer shall provide power for continuous connectivity to the Building Management System(s) via Vertiv Liebert iCOM control.

Proprietary and Confidential © 2025 Vertiv Group Corp.

4.5 Low Voltage Terminal Package—Optional

Factory-installed and factory-wired terminals shall be provided.

- **Remote Shutdown Terminals** – Two additional pairs of terminals provide the customer with additional locations to remotely shut-down the unit by field-installed devices or controls.
- **Extra Common Alarm Contacts** – Two additional pairs of terminals provide the customer with normally open contacts for remote indication of unit alarms.
- **Main Fan Auxiliary Switch** – One set of normally-open contacts wired to the fan enable relay will close when fan operation is required. This set of dry contacts could also be used to initiate the air economizer operation. Air economizer and associated devices by others.
- **Vertiv™ Liebert® Liqui-Tect™ Shutdown** – One pair of dry contacts for the Vertiv Liebert Liqui-Tect sensor signal will provide unit shut down. (The Vertiv Liebert Liqui-Tect sensor is not included.)

4.6 Remote Humidifier Contact—Optional

A pair of N/O contacts provided for connection to a remote humidifier that allow the unit's humidity controller to control a humidifier outside the unit. Power to operate the remote humidifier does not come from the unit.

4.7 Compressor Power Factor Correction—Optional

Capacitors are installed in the compressor circuit to increase the power factor (PF), improving the efficiency of the compressor. The capacitors help to minimize the reactive power (kVAR) required for the compressor to operate, will reduce the compressor current draw and improve voltage, resulting in more efficient compressor performance and longer compressor life. The Vertiv Power Factor Correction option is designed to achieve a power factor around 0.88-0.93 during full load. Do not add additional power factor correction that leads to overcompensation as it may damage the compressors and other equipment.

4.8 Wired Remote Sensor(s)—Optional

Each Vertiv Liebert iCOM can have up to ten 2T sensors (20 sensor readings total) for control or reference. As part of the U2U network, those sensors shall be shared and used to control the cooling units and provide greater flexibility, visibility, and control to respond to changes in the conditioned space. When the sensors are used for control, the user may set the control to be based off a maximum or average of a selected highest temperature reading.

4.9 Vertiv™ Liebert® vNSA Network Switch—Optional

The Vertiv Liebert vNSA network switch is designed for networking multiple Vertiv Liebert iCOM unit-level controllers together. There shall be two different styles of the Vertiv Liebert vNSA14 panel available:

- Vertiv Liebert vNSA14 – enclosure with network switches only
- Vertiv Liebert vNSA14- Vertiv™ Liebert® iCOM™-H – enclosure with network switches and 9 in. Vertiv Liebert iCOM color touchscreen display

Each offering shall be housed inside a steel enclosure secured with a key lock and contain two network switches, providing a total of 14 Ethernet ports available for Vertiv Liebert iCOM controller unit-to-unit networking. The Vertiv Liebert vNSA requires field supplied, hard wiring, 16AWG, 100-240VAC universal (12V, 1.5A) single-phase input power supply for 120V or 230V operation with factory supplied power connector.

4.10 Vertiv™ Liebert® Liqui-Tect™ Sensors (Maximum of Two Per Unit)—Optional

____ (quantity) solid state water sensors shall be provided for installation under the raised floor.

Proprietary and Confidential © 2025 Vertiv Group Corp.

4.11 Floor Stand—Optional for Raised Floor Applications

The floor stand shall be constructed of a welded steel frame. The floor stand shall have adjustable legs with vibration isolation pads. The floor stand shall be ____ in. (_____mm) high.

4.12 Seismic Rated Floor Standard—Optional for Raised Floor Applications

The floor stand shall be rated to meet IBC certification when properly installed with Vertiv CoolPhase Perimeter evaporator unit with IBC certified seismic rated bracing per 20000346. The floor stand shall be constructed of a welded steel frame. The floor stand shall be _____ in. (_____mm) high.

Proprietary and Confidential © 2025 Vertiv Group Corp.

5.0 HEAT REJECTION

5.1 Vertiv™ CoolPhase Condenser Summary

These specifications describe requirements for an air-cooled condenser for a Vertiv Thermal Management system. The condenser shall be designed to reject waste heat to outdoor air and to control refrigerant head pressure as indoor equipment loading and outdoor ambient conditions change.

The manufacturer shall design and furnish all equipment in the quantities and configurations shown on the project drawings. Standard 60 Hz units are CSA-certified to the harmonized U. S. and Canadian product safety standard CSA C22.2 No 236/UL 1995 for “Heating and Cooling Equipment” and are marked with the CSA c-us logo.

The condenser model number shall be: _____

5.1.1 Vertiv™ Heat Rejection Skid

The heat rejection skid integrates the Vertiv CoolPhase Condenser, Vertiv EconoPhase pump, and Vertiv CoolPhase Perimeter receivers (when used with DA250 units only) onto a common base. Skid assemblies include all internal plumbing and wiring completed. These assemblies allow for a single crane lift of heat rejection equipment and fast job site completion. All field piping and wiring connections are made on one common end.

5.1.2 Single or Dual Skid Assemblies

These are available to provide heat rejection needs of one or two Vertiv CoolPhase Perimeter units, respectively. Dual skids have two Vertiv CoolPhase Condensers, two Vertiv EconoPhase units, four Vertiv CoolPhase Perimeter receivers (when used with DA250 units only), two sets each of piping connections, two high voltage connection boxes, and two low voltage communication connection boxes.

5.2 Vertiv™ CoolPhase Condenser Design Requirements

The air-cooled condenser shall be a factory-assembled unit, complete with an integral electrical panel, Vertiv EconoPhase pump package, and designed for outdoor installation. The condenser shall be a draw-through design.

The unit is to be supplied for operation using a _____V, 3 phase, _____Hz power supply.

5.2.1 Voltage Configurations

There are four voltage configurations

1. 460V, 3 phase, 60 Hz

2. 380V, 3 phase, 60 Hz

3. Customer connection is 575V with 575/460V stepdown transformer to 460V condenser and PRE components. Condenser and PRE will have 460V serial tag values.

4. 415V with a 380-415V condenser and 415V PRE.

5.3 Vertiv™ CoolPhase Condenser Standard Features—All Condensers

The condenser shall consist of microchannel condenser coil(s), propeller fan(s) direct driven by individual fan motor(s), and electrical controls. The air-cooled condenser shall provide positive refrigerant head pressure control to the indoor cooling unit by adjusting heat rejection capacity. Microchannel coils shall provide superior heat transfer, reduce air-side pressure drop, increase energy efficiency, and significantly reduce the system refrigerant volume required. EC fans and fan operating techniques shall provide reduced maximum sound levels.

Proprietary and Confidential © 2025 Vertiv Group Corp.

5.4 Vertiv™ CoolPhase Condenser Coil

5.4.1 Aluminum Microchannel Coil

Microchannel coils shall be constructed of aluminum microchannel tubes, fins, and manifolds. Tubes shall be flat and contain multiple, parallel flow microchannels and span between aluminum headers. Full-depth louvered aluminum fins shall fill spaces between the tubes. Tubes, fins, and aluminum headers shall be oven brazed to form a complete refrigerant-to-air heat exchanger coil. Copper stub pipes shall be electric resistance welded to aluminum coils and joints protected with polyolefin to seal joints from corrosive environmental elements. Coil assemblies shall be factory leak-tested at a minimum of 300 psig (2068k Pag). Hot gas and liquid lines shall be copper and shall be brazed using nitrogen gas flow to the stub pipes with spun closed ends for customer piping connections.

5.4.2 Aluminum Microchannel Coil with E-Coat (Optional)

Aluminum microchannel coil with E-coat shall be epoxy-coated for extended coil life in corrosive environments, such as coastal areas. Factory-applied E-coat using immersion and baking process shall provide a flexible epoxy-coating to all coil surfaces. Coil color shall be black and shall be protected from solar UV ray degradation with a factory-applied UV topcoat. E-coat shall increase coil corrosion protection and shall reduce heat rejection capacity degradation to less than 10% after a severe 2000 hour 5% neutral salt spray test (ref. ASTM B117). The coating process shall ensure complete coil encapsulation.

5.5 Condenser Fan

The fan motor/blade assembly shall have an external rotor motor, fan blades and fan/finger guard. Fan blades shall be constructed of cast aluminum or glass-reinforced polymeric material. Fan guards shall be heavy gauge, close meshed steel wire, coated with a black corrosion resistant finish. Fan terminal blocks shall be located in an IP54 enclosure located on the top of the fan motor. Fan assemblies shall be factory-balanced, tested before shipment and mounted securely to the condenser structure.

5.5.1 EC Fan Motor

The EC Fan motors shall be electronically commutated for variable speed operation and shall have ball bearings. The EC fans shall provide internal overload protection through built-in electronics. Each EC fan motor shall have a built-in controller and communication module, linked via RS485 communication wire to each fan and the Premium Control Board, allowing each fan to receive and respond to precise fan speed inputs from the Premium Control Board.

5.6 Condenser Electrical Controls

Electrical controls and service connection terminals shall be provided and factory wired inside the attached control panel section. A locking disconnect switch shall be factory-mounted and wired to the electrical panel and controlled via an externally mounted locking and lockable door handle. Only high voltage supply wiring and low voltage indoor unit communication/interlock wiring are required at condenser installation.

5.7 Premium Efficiency Fan Control

The Vertiv CoolPhase Condenser EC Fan/Premium Control System shall include an electronic control board, EC fan motor(s) with internal overload protection, refrigerant and ambient temperature thermistors, and refrigerant pressure transducers. The Premium Control Board shall communicate directly with the indoor unit's Vertiv Liebert iCOM control via field supplied CANbus communication wires and via field-supplied low voltage interlock wires. The control board shall use sensor and communication inputs to maintain refrigerant pressure by controlling each EC fan on the same refrigerant circuit to the same speed. The control system provides refrigerant head pressure and system starting for outdoor ambient temperature as low as -30°F (-35 °C), provided the total temperature design range (from minimum to maximum) is 125°F (70°C) or less.

Proprietary and Confidential © 2025 Vertiv Group Corp.

The mode of the Vertiv CoolPhase Condenser shall be controlled by the Vertiv Liebert iCOM control and shall be in either DX, EconoPhase or Idle Mode by each refrigerant circuit. Dual circuit condensers shall operate fans to meet airflow needs and mode of each circuit independent of the other. Fan(s) on common refrigerant circuit shall operate in synchronous speed when that circuit is active.

5.8 Skid Locking Disconnect

A locking type disconnect switch shall be factory-mounted and wired to the electrical panel. The switch shall be accessible from the outside of the unit with the door closed and shall prevent access to the high voltage electrical components until switched to the Off position. The locking disconnect shall be lockable in support of lockout/tag-out safety programs.

5.8.1 Short Circuit Current Rating

The electrical panel shall provide at least 65,000A SCCR.

5.8.2 575V Option

The secondary electrical enclosure shall contain a factory wired transformer and fusing to support 575V input power. All internal wiring shall be provided to connect main and secondary electrical enclosures. High voltage supply and low voltage indoor unit communication/interlock connections shall be made in the main electrical enclosure.

5.9 Cabinet

The condenser cabinet shall be divided into fan and coil sections by full width baffles per corresponding DX circuits. Internal structural support members, including coil support frame, shall be painted or galvanized steel for strength and corrosion resistance. Panel doors are provided on the outside of each coil/fan section to provide for coil cleaning. An electrical panel shall be contained inside a factory mounted, NEMA 3R weatherproof electrical enclosure. Galvanized steel base is available and required to support the condenser mounting, rigging, and airflow.

5.10 Vertiv™ CoolPhase Perimeter Receiver (Not included with DA265)

Vertiv CoolPhase Perimeter receiver shall be a painted, uninsulated receiver with integral fusible plug, formed copper pipe for ease of connecting the condenser liquid line to the receiver and the mounting bracket. These receivers are factory installed and piped to the Vertiv CoolPhase Condenser Skid assembly

5.11 Vertiv™ EconoPhase

The Vertiv EconoPhase has two variable speed refrigerant pumps controlled by individual VFDs, factory wired electrical panel, factory piped and tested refrigerant piping all housed within a bright aluminum NEMA 3R enclosure. The Vertiv EconoPhase is mounted, wired, and piped into the Vertiv CoolPhase Condenser Skid to provide significant jobsite installation savings. The Vertiv EconoPhase refrigerant pumps are individually activated and speed controlled during cooler outdoor ambient, coordinated with Vertiv CoolPhase Perimeter compressors idled and refrigerant bypassed around them. Cool temperatures, such as mild weather and at night, partial economization and power savings is provided with one pump activated and one compressor idled. Colder temperatures, such as winter weather, allow both Vertiv CoolPhase Perimeter compressors to be idled and Vertiv EconoPhase pumps to be controlled independently to provide full economization

Proprietary and Confidential © 2025 Vertiv Group Corp.

5.12 Condenser Housing

The condenser housing is constructed of galvanized steel and divided into individual fan sections by full width baffles. Internal structural support members, including coil support frame, are galvanized steel for strength and corrosion resistance. Panel doors are provided on the outside of each coil/fan section to provide for coil cleaning. Galvanized steel base is available and required to support the condenser mounting, rigging and airflow.

Condenser shall be shipped pre-installed on a base structure that includes the Vertiv EconoPhase pumped refrigerant economizer, refrigerant receivers, and all associated piping.

Proprietary and Confidential © 2025 Vertiv Group Corp.

6.0 EXECUTION

6.1 Installation of Vertiv Thermal Management Units

The customer or the customer's representative shall be responsible for the following:

6.1.1 General

Install Vertiv Thermal Management units in accordance with the manufacturer's installation instructions. Install units plumb and level, firmly anchored in locations indicated and maintain the manufacturer's recommended clearances.

6.1.2 Electrical Wiring

Install and connect electrical devices furnished by the manufacturer but not specified to be factory mounted. Furnish a copy of the manufacturer's electrical connection diagram submittal to the electrical contractor.

6.2 Piping Connections

Install and connect the devices furnished by the manufacturer but not specified to be factory mounted. Furnish a copy of the manufacturer's piping connection diagram submittal to the piping contractor.

6.2.1 Drain Water Piping

Connect the water drain to the air-conditioning unit. Provide pitch and trap as manufacturer's instructions and local codes require.

6.3 Field Quality Control

Start cooling units in accordance with the manufacturer's startup instructions. Test controls and demonstrate compliance with requirements. These specifications describe requirements for a computer room environmental control system. The system shall be designed to maintain temperature and humidity conditions in the rooms containing electronic equipment.

The manufacturer shall design and furnish all equipment to be fully compatible with heat dissipation requirements.

6.4 Warranty Start-up and Control Programming

Install the indoor unit in accordance with manufacturer's installation instructions provided with seismic option. Firmly anchor maintaining manufacturer's recommended clearances. Mounting requirement details such as anchor brand, type, embedment depth, edge spacing, anchor-to-anchor spacing, concrete strength, special inspection and attachment to non-building structures must be outlined and approved by the Engineer of Record for the projection or building. Electrical, pipe and duct connections must permit movement in three dimensions and isolate the unit from field connections. Electrical conduit shall be flexible, having at least one bend between the rigid connection at the unit cabinet and the connection to rigid conduit or foundation. The piping flexible connection or loop must be suitable for the operation pressure and temperature of the system. Furnish a copy of manufacturer's piping connection diagram submittal to the piping contractor.

Engage manufacturer's field service technician to provide warranty start-up supervision and assist in programming of unit(s) controls and ancillary panels supplied by them.

Proprietary and Confidential © 2025 Vertiv Group Corp.

Connect with Vertiv on Social Media

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

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

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

 https://www.x.com/Vertiv/



Vertiv.com | Vertiv Headquarters, 505 N Cleveland Ave, Westerville, OH 43082 USA

©2026 Vertiv Group Corp. All rights reserved. Vertiv™ and the Vertiv logo are trademarks or registered trademarks of Vertiv Group Corp. All other names and logos referred to are trade names, trademarks or registered trademarks of their respective owners. While every precaution has been taken to ensure accuracy and completeness here, Vertiv Group Corp. assumes no responsibility, and disclaims all liability, for damages resulting from use of this information or for any errors or omissions.

SL-71322_RevD_11-26