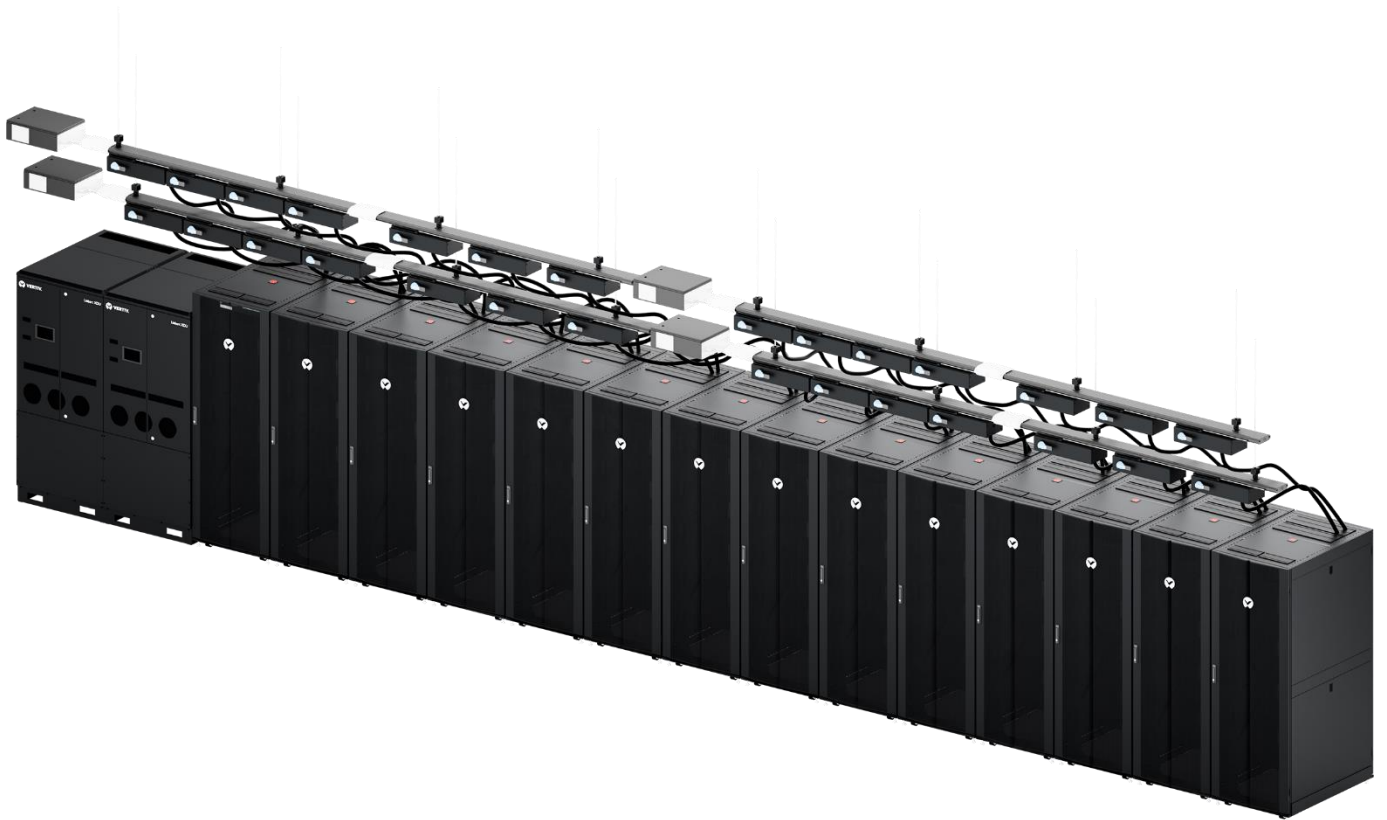




Solution Reference: 14L1400

AI Starter Kit 8: Liquid to Liquid Direct to Chip at Scale

Revision: Rev0

Reference Quotation no: CPQ-730830

Date: 12/16/2024

Table of Contents

1	Executive Summary.....	2
2	General Technical Description	2
2.1	System Capacity	3
2.2	Technologies Used	3
3	Material list.....	3
4	Solution Pictures	4
4.1	Front Quarter View.....	4
4.2	Back Quarter View	5
4.3	Top View	6
4.4	Front View.....	6
4.5	Rear View.....	7
4.6	Side View	7
4.7	VR Rack ISO View	8
5	Technical Description	9
5.1	Single Line Diagram.....	9
5.2	Monitoring Diagram.....	10
6	Technical Specifications	11
6.1	Product weight	11
6.2	Maximum Static load capacity of rack	11
6.3	Operation & Storage conditions	11
7	Product Specification.....	12
7.1	Liebert® XDU1350 Coolant Distribution Unit	12
7.2	Vertiv™ CoolChip Fluid Network.....	15
7.3	Liebert® LT460 Zone Leak Detection Sensors	16
7.4	Vertiv™ Powerbar iMPB	17
7.5	Vertiv™ Geist™ VP7UA002 rPDU	18
7.6	Liebert RDU501	19
8	Service Summary.....	20

1 Executive Summary

Vertiv™ 360AI Solutions uniquely combine deep domain expertise in power architectures, thermal management, remote management, and seamless service delivery to enable rapid deployment of infrastructure for AI applications and high-performance computing.

Your goals for high-density, floorspace optimization, sustainability and efficiency became our teams' key design criteria, focusing their efforts on designing the solution that exceeds your goals and expectations with seamlessly integration into your environment. Our world class solutions and engineering team delivered on this promise, and our services team fully supports it with their unmatched expertise and global footprint.

2 General Technical Description

This high-density solution is sized for IT load of 1.4 MW across 14 racks, assuming 1.12 MW of direct to chip liquid cooling capacity and 280 kW traditional air-cooling (i.e., 80:20 liquid and air split).

The cooling solution is two liquid-to-liquid standalone cooling distribution units, assuming the facility chilled water supply is 65°F (18.3°C) with a specified 14°F (7.9°C) delta T with 100% water. The technical water side is specified at 86°F (30°C) supply at 1.5 lpm/kW or 0.3962 GPM/kW with 25% propylene glycol, equating to a technical side return water temperature of 103.8°F (39.9°C) or 17.8°F (10°C) delta T.

Included products are heavy-duty racks that house rack PDUs, manifolds, and top-of-rack management appliance, as well as other accessories necessary for integration and normal data center operation. Above the racks are busway power distribution. Note: overhead manifold for secondary fluid network is not included by default.

Also included are comprehensive deployment services for installation, fluid-fill, recurring a warranty service such as warranty inspection, start-up, and acceptance testing. Optional services include workforce training on thermal management operation and servicing.

2.1 System Capacity

Rack (s)	Total Solution Capacity	Load Per Rack
14	1400 kW	100 kW

2.2 Technologies Used

Cooling Method	Heat Rejection type
Direct-to-chip (liquid)	Water/Glycol

3 Material list

Qty.	SKU	Description
2	XDU1350	Liquid-to-Liquid CDU: Liebert XDU1350 Coolant Distribution Unit
14	RM124	Rack Manifold: Manifold assembly in-rack 36U medium flow
14	LT460-Z20	Zone Leak Detection Sensors: Leak Detection Kit, 20' cable
4	Powerbar iMPB	Busway system: 600 A iMPB Busway, tap-off units, and endcap
28	VP7UA002	Rack PDU: Switched Outlet Level Monitoring, 80 A, 240/415 V WYE, 57.6 kW, Vertical, (36) Combi C13/C19, Hardwired
14	VR9357	Heavy Duty Rack: VR-HD 48U 800 mm x 1200 mm
1	RDU501	1U Liebert RDU501 Intelligent Infrastructure Management Appliance
1	POESwitch24Port	1U POE Switch for Solutions

Material list only includes major components, other supporting peripheral components such as the hoses, valves, cable, adapter kits, etc. would be part of final quote document.

4 Solution Pictures

4.1 Front Quarter View



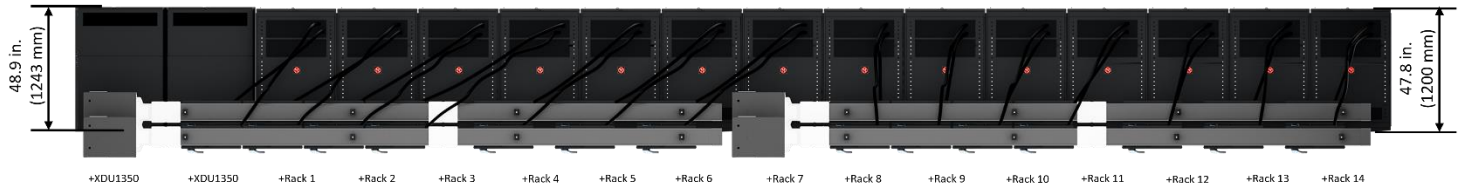
The images shown are for illustration purposes only and may not be an exact representation of the product.

4.2 Back Quarter View

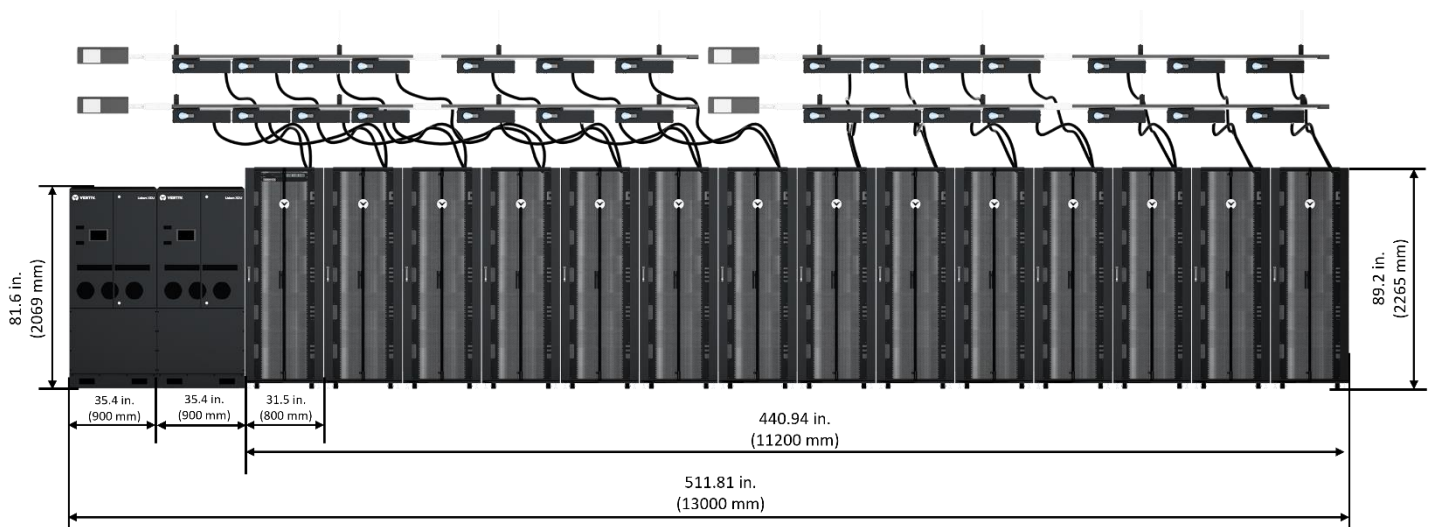


The images shown are for illustration purposes only and may not be an exact representation of the product.

4.3 Top View

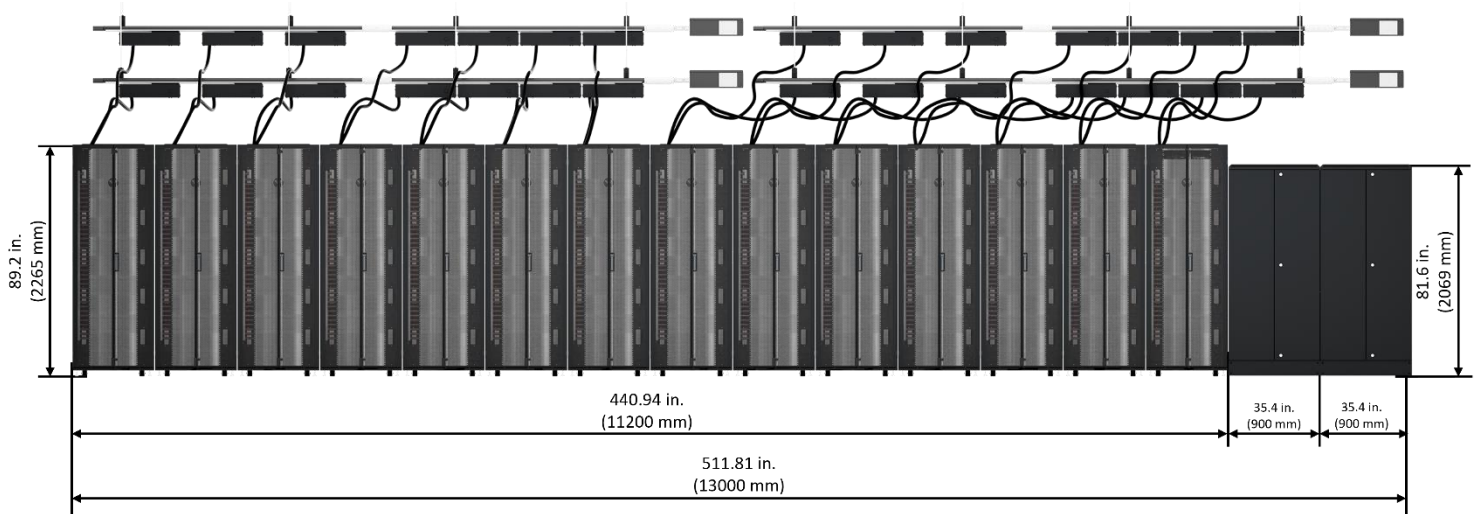


4.4 Front View



*The images shown are for illustration purposes only and may not be an exact representation of the product.
Nominal dimensions, reference submittal drawings for exact dimensions*

4.5 Rear View

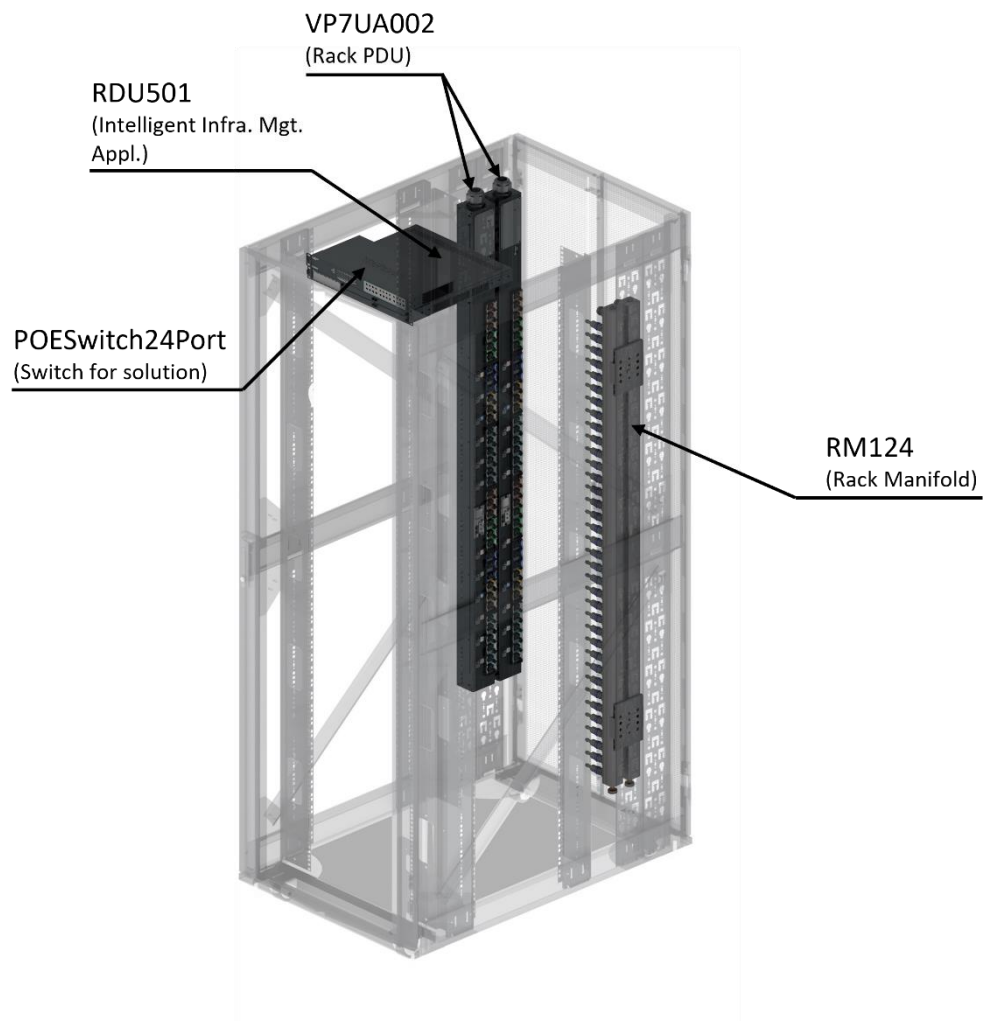


4.6 Side View



The images shown are for illustration purposes only and may not be an exact representation of the product.
Nominal dimensions, reference submittal drawings for exact dimensions

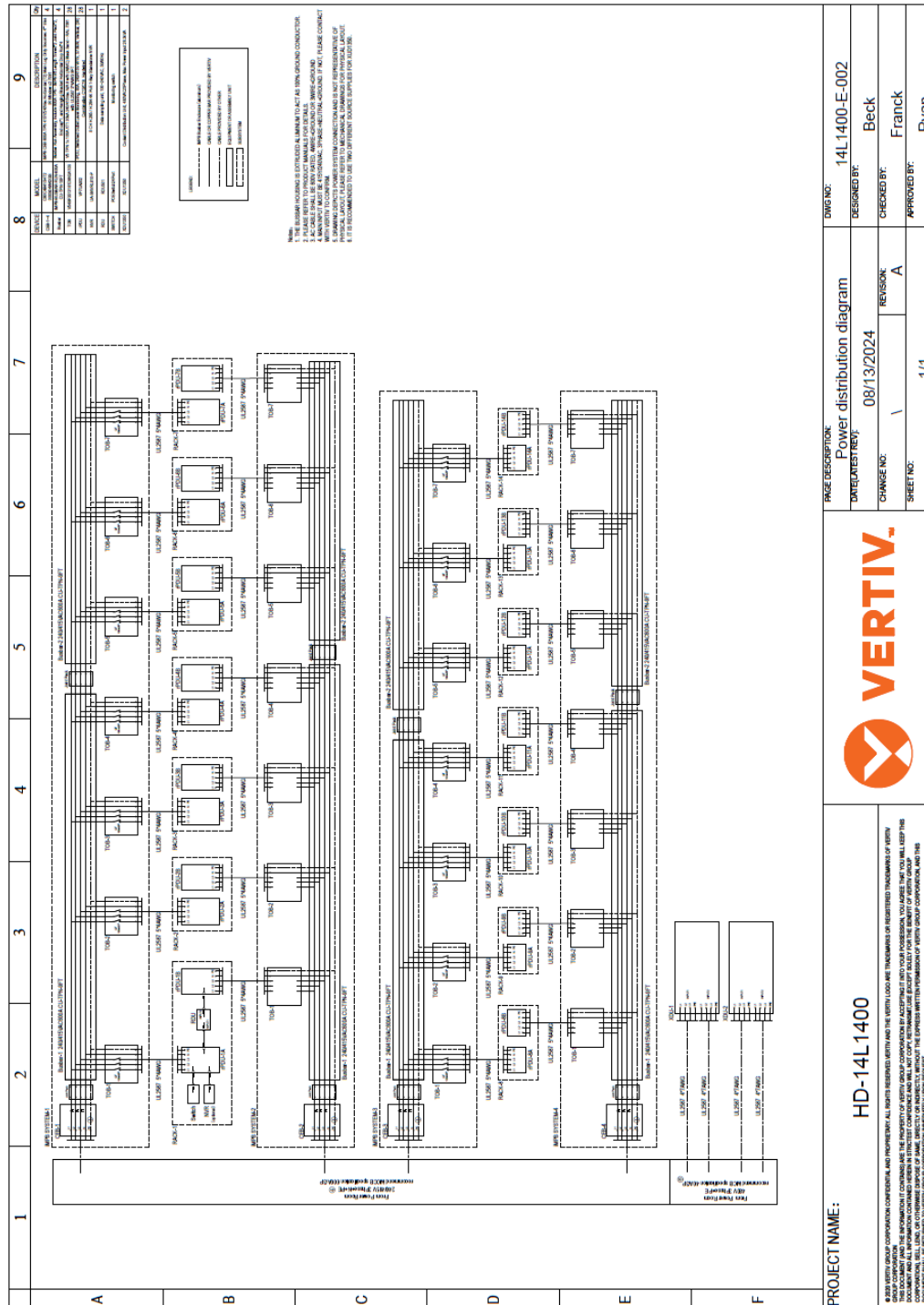
4.7 VR Rack ISO View



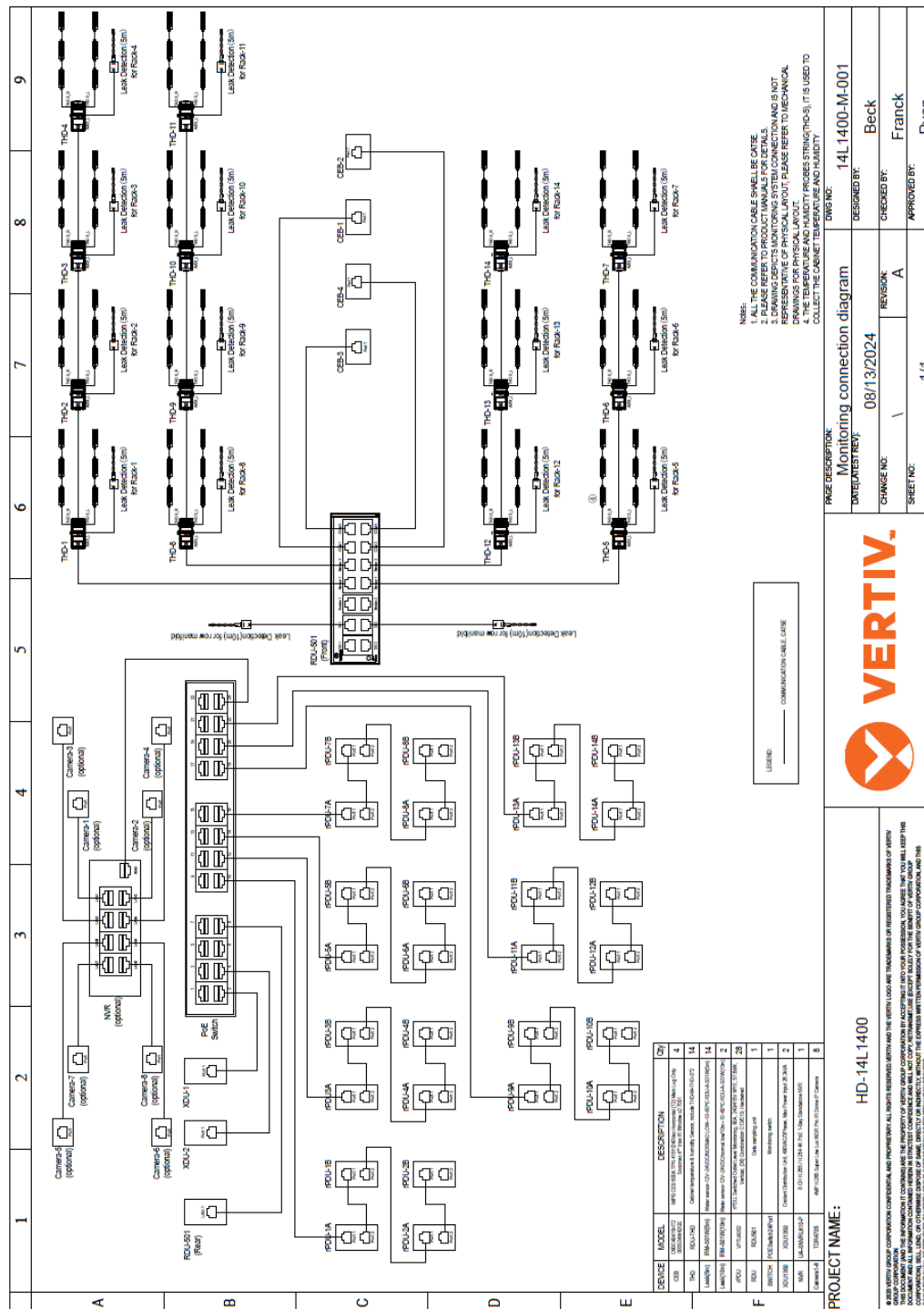
The images shown are for illustration purposes only and may not be an exact representation of the product.

5 Technical Description

5.1 Single Line Diagram



5.2 Monitoring Diagram



6 Technical Specifications

6.1 Product weight

SKU	Quantity	Weight (per SKU)	Total weight
XDU1350 (CDU)	2	1544 lbs (700 kg)	3088 lbs (1400 kg)
RM124 (Rack manifold)	14	83 lbs (38 kg)	1162 lbs (532 kg)
VP7UA002 (Rack PDU)	24	22 lbs (10 kg)	528 lbs (240 kg)
VR9357 (Heavy Duty Rack)	14	560 lbs (254 kg)	7840 lbs (3556 kg)

6.2 Maximum Static load capacity of rack

SKU	Maximum Static load capacity
VR9357 (Heavy Duty Rack)	4248 lbs (1927 kg)

6.3 Operation & Storage conditions

Operation conditions	Operation temperature range: 41°F to 104°F (5°C to 40°C)
	Operation relative humidity range: 10% to 80% RH (non-condensing)
Storage conditions	Storage temperature range: -4°F to 149°F (-20°C to 65°C)
	Storage relative humidity range: 5% to 95% RH (non-condensing)

7 Product Specification

7.1 Liebert® XDU1350 Coolant Distribution Unit

Designed to support liquid cooling within high density environments, the Liebert® XDU1350 Coolant Distribution Unit is suitable for chip & rear door cooling applications to offer easy, cost-effective deployment in any data center.



- Achieve incredible efficiency in high-density environments.
- Protects secondary liquid network with strict conformance to wetted material compatibility.
- Intuitively designed for ease of deployment
- Accommodates any facility design and with multiple cooling configurations.
- Robust design with confidence inspiring redundancy options including teaming for the most demanding applications.
- Integrated controller designed from the ground up to be easy to deploy and supports leak detection.
- Flexible support services available for installation and

maintenance with same day options

Product Summary:

Main Unit Quantity	2
Model Number	XDU1350BA1A17A30T0HT13NS0005F
Nominal Cooling Capacity	XDU1350: XDU 1350 Chilled water
Unit Revision	B: Model Revision B
Unit Voltage	A: 480 V - 3ph – 60 Hz
Automatic Transfer switch (ATS)	1: Power Termination Enclosure with Automatic Transfer Switch (ATS) 400 V or 480 V
Controller	A: Standard Controller
Communication/Monitoring	1: Protocol: Modbus, BACnet, SNMPV2 / V3, HTTP(s) Webserver, NTP, SSH-CLI, SFTP
HMI	7: 7-inch Touchscreen Display
Secondary Circuit Fluid Monitoring	A: Turbidity Sensor, pH sensor, Conductivity Sensor
Pump Configuration	3: Three Pumps
EMC Filter	0: Standard EMC Filter
Primary Connections from Facility	T: Top Connection
Primary Filtration	0: None
Primary Control Valve -Chilled Water	H: Standard Valve
Secondary Connection	T: Top Connection
Secondary Filtration	1: Factory Fitted (50 µ)
Pressure Relief Device for Secondary Circuit	3: 3 Bar Pressure Relief Valve
Reservoir	N: SS Reservoir w/ 3-Stage Fluid Level Detection
Packaging	S: Seaworthy
SCCR	0: 65 kA
Enclosure	1: Standard Color " Black"

Shiploose:

Water Detection Rope	Water Detection Rope 66 ft (20 m)
Primary Hoses Sets	None
Secondary Hoses Set	HOSE SET 3.3 ft (1.00 m) 4" 150 FLNG

CLICK HERE OR SCAN THE QR CODE
TO GET MORE INFORMATION

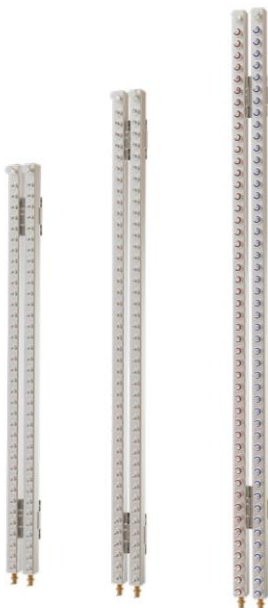


7.2 Vertiv™ CoolChip Fluid Network

The Vertiv™ CoolChip Fluid Network is an in-rack manifold that provides a reliable, clean, and effective route between server and coolant distribution unit. Mounting in the zero-U space of any industry-standard rack, the stainless-steel rack manifolds were designed with dripless quick disconnects and multiple coupling sizes for easy install and highly tailored to any deployment size.

Key Benefits:

- Meet various deployment needs with multiple configurations.
 - Ensure high cooling availability and efficiency with several coupling options for proper sizing.
 - Universal mounting bracket speeds installation
 - Assured cleanliness with vacuum brazed stainless-steel construction and factory validated precleaning process.



Main Features:

- Stainless Steel Construction provides a durable and robust product.
- Multiple Sizes and Flow Rates allow for customization of your liquid cooling deployment.
- Universal Mounting Bracket enable mounting on any industry-standard rack.
- Dripless Quick Disconnects ensure quick and safe installation and service operation.
- Air Bleeder Valve eases installation complexity and increases system efficiency, maximizing the amount of cooling fluid in the circuit.
- Integrated Drain Valve allows for easy installation and maintenance.
- Top or Bottom Connections enable configuration in the field, adding flexibility to the install and application.

CLICK HERE OR SCAN THE QR CODE
TO GET MORE INFORMATION



7.3 Liebert® LT460 Zone Leak Detection Sensors

The zone leak detection sensor modules install quickly and work simply for reliable warning of potentially hazardous moisture conditions. The supervised zone leak detector uses up to 100 feet of flexible Liebert® moisture sensing cable, offering protection from unwanted leaks. Designed for use with Liebert LT500Y leak detection cable, the Liquitect 460 is the ideal solution for perimeter sensing or serpentine coverage of small areas. Selectable modes of operation provide flexible alarming options and protection for the cable. Selectable alarm delays minimize false-positive conditions.

Key Benefits:

- Dual output relays can signal to a local alarm panel, a remote building management system, or to Liebert® SiteScan™ Web.
 - Selectable alarm delays allow reporting customization.
 - Perimeter sensing or serpentine coverage of small area.



Main Features:

- Zone leak detection sensor.
- Monitors up to 100 feet of leak detection cable.
- Reports to local or centralized monitor panels.
- Installs easily.

CLICK HERE OR SCAN THE QR CODE
TO GET MORE INFORMATION



7.4 Vertiv™ Powerbar iMPB

Our data center customers benefit from unparalleled flexibility to adapt as their needs evolve, thanks to the innovative overhead power distribution system of the Vertiv™ PowerBar iMPB, offering seamless integration and scalable design. Supported by our robust global manufacturing network and efficient inter-regional product transfers, we effectively mitigate supply chain disruptions. This streamlined approach accelerates deployment, minimizing delays and ensuring smooth operations. With Vertiv's expertise, we simplify the design and integration of your entire power chain, delivering a tailored solution that sets us apart in offering unmatched, customized power solutions in the market.

Key Benefits:

- Solution is ideal for data centers of any size, having slab or raised floors, that have frequent or planned power configuration changes.
- Variety of capacity and connection configurations support optimization and adaptation over time with minimal outside support needed.
- Continuous power delivery is enabled with hot-swappable tap-off boxes having breaker protection that isolates active IT loads as well as close proximity branch breakers that support proper administration.



Ideally Suited For:

- Data centers of any size.
- Data centers with frequent or planned configuration changes.
- Single or dual-bus configurations.
- Raised and non-raised floors.

**CLICK HERE OR SCAN THE QR CODE
TO GET MORE INFORMATION**



7.5 Vertiv™ Geist™ VP7UA002 rPDU

Upgradeable Switched Outlet Level Monitored rPDUs provide reliable power distribution to critical IT equipment while delivering individual outlet level control and a comprehensive view of outlet level power usage via remote network access. Includes environmental monitoring capabilities to obtain real-time environmental metrics.

Product Summary:

- rPDU, Switched Outlet Level Monitoring, 80 A, 240/415 V WYE, 57.6 kW, Vertical, (36) Combination C13/C19, Hardwired, Black Powder Coat.

Key Benefits:

- Remotely reboot outlets to power cycle unresponsive IT equipment or increase runtime of critical equipment upon power failure with outlet-level control.



- Reliable power distribution with local and remote outlet-level power monitoring options offers quick access to critical power usage information down to the device level to evaluate energy usage trends and maximize uptime.
- Environmental monitoring capabilities with the addition of optional environmental sensors ensure users have critical infrastructure data at their fingertips to prevent climate-related equipment failure and system downtime.
- Fault-Tolerant Daisy Chaining with RSTP simplifies intelligent rPDU connectivity and ensures data is reported even when a break in the network chain occurs. Supports up to 40 rPDUs.
- Daisy-chain up to 50 devices on a single IP address and reduce deployment time with self-configuration of downstream devices.

CLICK HERE OR SCAN THE QR CODE
TO GET MORE INFORMATION



7.6 Liebert RDU501

The Liebert® RDU501 is an intelligent infrastructure management solution from Vertiv that allows data center administrators to monitor environmental conditions and infrastructure appliances such as UPS, precision cooling units, generator sets, etc.

The RDU501 is a premium infrastructure gateway appliance equipped with out-of-band access to service processors as well as serial console management capabilities.

Fast Deployment:

- R 2.5D SmartSolutions Modelling with drag-and-drop interface.



Environmental Monitoring:

- Heat, Power and Assets Monitoring Dashboard.
- Thermal Management (including CRAC teamwork).
- Power Management.
- Security Management.
- Alarm and Data Reports.

IT Management Monitoring

- Remote and local server management via IPMI 2.0 protocol
- Serial Console Management (Out-of-band access)
- Automated Startup and Shutdown of IT servers.

CLICK HERE OR SCAN THE QR CODE
TO GET MORE INFORMATION



8 Service Summary

SKU name	Description
VRTLC-14L1400-SITE-ASSESS	LIQUID COOLING ENGINEERING SERVICES 14L1400
VRTLC-ENG-14L1400	LIQUID COOLING ENGINEERING SERVICES 14L1400
VRTLC-INSTMATL-14L1400	LIQUID COOLING INSTALLATION MATERIAL 14L1400
VRTLC-INSTLAB-14L1400	LIQUID COOLING INSTALLATION LABOR 14L1400
VRTLC-MVS-14L1400	LIQUID COOLING MOVING AND STORAGE 14L1400
VRTLC-PROJMGT-14L1400	LIQUID COOLING PROJECT MANAGEMENT 14L1400
VRTLC-CUSTDEM-14L1400	14L1400 OPERATIONAL DEMONSTATION/CUSTOMER ORIENTATION
WI-10HR4	Warranty Inspection
DAPRPDU-GE1	Dist Assur Pkg Geist R-PDU or RTS Single
1WL THERMLAB-K-EBS	WarrantyLaborLWCoverageK
XDU1350YC	2PM ONLY 8X5 XDU1350
VRTLC-L2	L2 - Delivery, QA/QC, Installation Assembly
VRTLC-L3	L3 - Start-up and Site Acceptance Testing