

# **Dell VxRail™ E660, E660F, and E660N**

## Technical Specifications

## Notes, cautions, and warnings

 **NOTE:** A NOTE indicates important information that helps you make better use of your product.

 **CAUTION:** A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

 **WARNING:** A WARNING indicates a potential for property damage, personal injury, or death.

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# Revision history

Date	Revision	Description of change
October 2023	6	Updates to the minimum cores, networking and memory for E660N.
January 2023	5	Updated for VxRail software version 8.0.000.
February 2022	4	Updated for VxRail software version 7.0.320; added support for BOSS-S1.
November 2021	3	Updated for VxRail software version 7.0.300; added the support for 256 GB LRDIMM for VxRail E660 and E660F.
August 2021	2	Updated to include support for Intel Persistent Memory 200 series (BPS).
July 2021	1	Initial release

# Introduction

The VxRail E660, E660F, and E660N Technical Specifications provides the technical and environmental specifications of VxRail E660 series and its components.

The target audience for this document includes customers, field personnel, and partners who want to operate and maintain a VxRail E660, E660F or E660N. This document is designed for people familiar with:

- Dell systems and software
- VMware virtualization products
- Data center appliances and infrastructure

For the most up-to-date list of VxRail documentation, see the [VxRail Documentation Quick Reference List](#).

## Technical specifications

This section outlines the technical and environmental specifications of VxRail E660, E660F, and E660N.

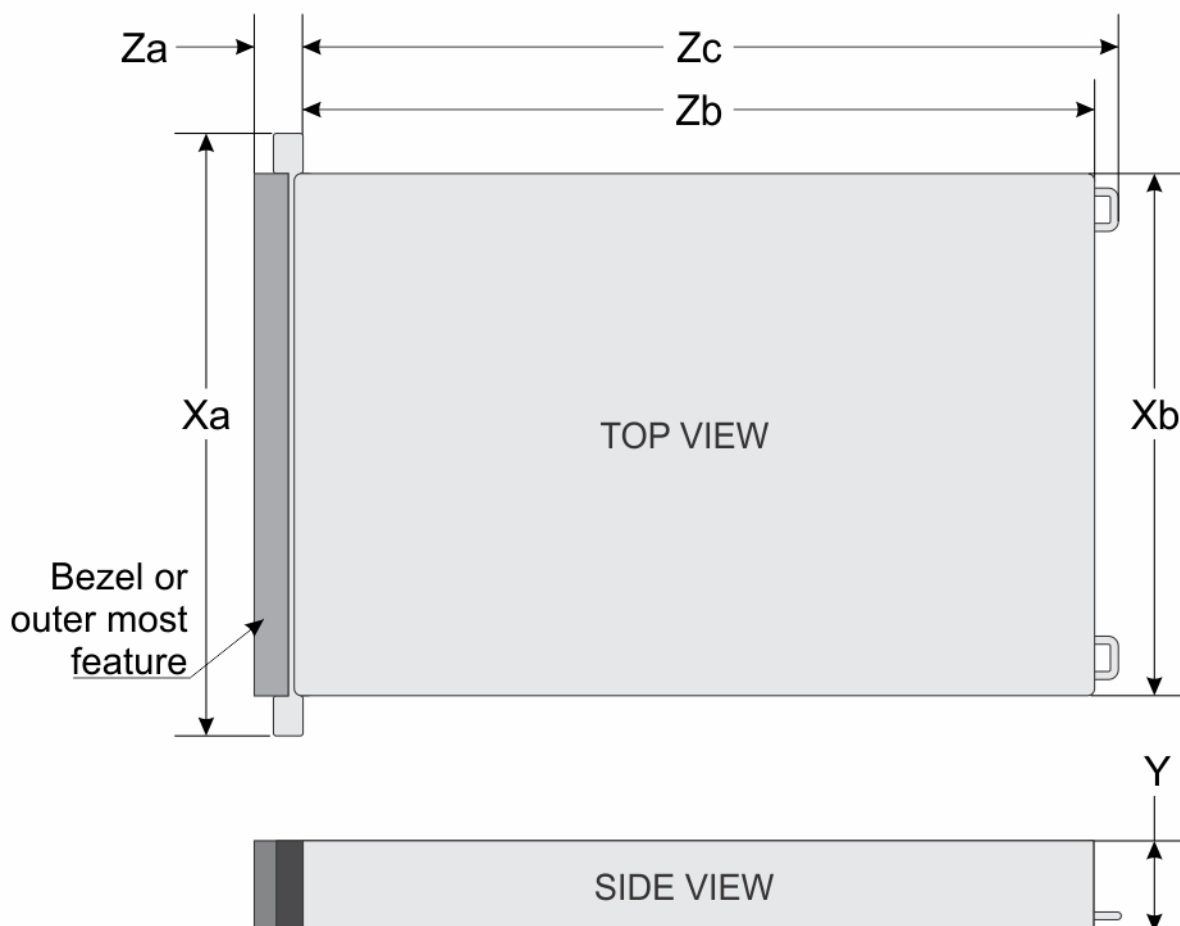
### Chassis configuration

The following table describes the chassis configuration of VxRail E660, E660F, and E660N:


VxRail model	Chassis configuration
VXRail E660, VxRail E660F	10 x 2.5-inch SAS/SATA including two universal drives
VXRail E660N	10 x 2.5-inch with all NVMe drives

### Chassis dimensions

The following figure and table provides the chassis dimensions of VxRail E660, E660F, and E660N:



Drives	Xa	Xb	Y	Za	Zb	Zc
10 drives	482 mm (18.97 inches)	434 mm (17 inches)	42.8 mm (1.68 inches)	With bezel: 35.84 mm (1.4 inches)  Without bezel: 22 mm (0.86 inches)	751.48 mm (29.5 inches) Ear to rear wall	787 mm (31 inches) Ear to PSU handle

 **NOTE:** Zb is the nominal rear wall external surface where the system board I/O connectors reside.

## Chassis weight

The following table shows the chassis weight of VxRail E660, E660F, and E660N:


System configuration	Maximum weight (with all drives/SSDs)
10 x 2.5-inch	21.0 kg (46.2 lb)

## Processor specifications


The VxRail E660, E660F, and E660N support up to two 3<sup>rd</sup> Generation Intel Xeon Scalable processors with up to 40 cores. One CPU support is also available.

## PSU specifications

The VxRail E660, E660F, and E660N support up to two AC power supply units (PSUs).

 **WARNING: Instructions for the qualified electricians only:**  
**Power supply cords/jumper cords and the associated plugs/inlets/connectors must have appropriate electrical ratings referencing the rating label on the system when used for connection.**

PSU	Class	Heat dissipation (maximum) BTU/hr	Frequency Hz	Voltage	Current
1100 W AC	Titanium	4299	50/60	100 - 240 V	12 - 6.3 A
1400 W AC	Platinum	5459	50/60	100 - 240 V	12 - 8 A

 **NOTE:** When selecting or upgrading the system configuration, to ensure optimum power utilization, verify the system power consumption with the Dell Energy Smart Solution Advisor available at [Dell.com/ESSA](https://www.dell.com/ESSA).

## Cooling specifications

The VxRail E660 series requires various cooling components based on CPU TDP, storage modules, GPU, persistent memory to maintain optimum thermal performance.

The VxRail E660 series offers air cooling.

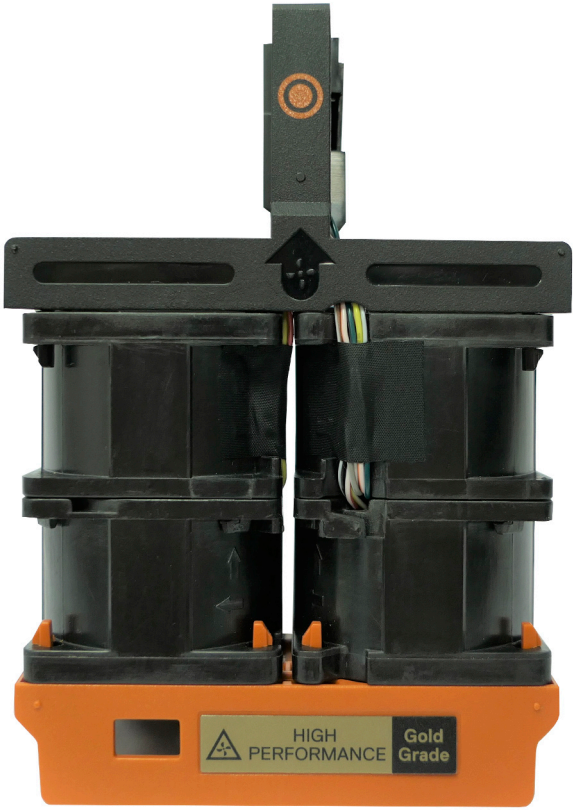
The VxRail E660 series supports up to four high performance silver grade (HPR SLVR) or high performance gold grade (HPR (Gold)) dual cooling fan modules based on certain CPU TDP, drive configurations, GPU and BPS memory.

HPR SLVR and GOLD fans provide higher air flow rate through the system. For certain single CPU configurations only 3 set of fan modules are required and in such configurations a fan blank is required to block fan bay 1.

The VxRail E660 series is adapting to dual fans module form factor. One set of fan module includes two fan body with one fan connector.

Fan type	Abbreviation	Also known as	Label color	Label image
High performance (Silver grade) fan	HPR (SLVR)	HPR		



Fan type	Abbreviation	Also known as	Label color	Label image
High performance (Gold grade) fan	HPR (Gold)	VHP - Very High Performance		

The STD and HPR fans installation depends on the system configuration. For more information about the fan support configuration or matrix, see [Thermal restrictions matrix for air cooling](#).

## Battery specifications

The VxRail E660 Series supports CR 2032 3.0-V lithium coin cell battery.

## Expansion card riser specifications

The VxRail E660 Series supports up to three slots and all PCI express (PCIe) Gen 4 expansion cards.

The following lists the expansion card slots supported on the system board:

PCIe slot	Riser	PCIe slot height	PCIe slot length	Slot width	Processor connection
Slot 1	Riser 2A	Low profile	Half length	x16	Processor 1
Slot 1	Riser 1A	Full height	3/4 length	x16	Processor 1
Slot 2	Riser 2A	Low profile	Half length	x16	Processor 2
Slot 2	Riser 4C, riser 4D	Full height	3/4 length	x16	Processor 2
Slot 3	Riser 3A	Low profile	Half length	x16	Processor 2

# Memory specifications

The VxRail E660 Series supports the following memory specifications for optimized operation:

DIMM type	DIMM rank	DIMM capacity	Single processor		Dual processor	
			Minimum RAM	Maximum RAM	Minimum RAM	Maximum RAM
RDIMM	Dual rank	16 GB	16 GB	256 GB	32 GB	512 GB
		32 GB	32 GB	512 GB	64 GB	1 TB
		64 GB	64 GB	1 TB	128 GB	2 TB
LRDIMM	Quad rank	128 GB	128 GB	2 TB	256 GB	4 TB
	Octa rank	256 GB	256 GB	4 TB	512 GB	8 TB
Intel Persistent Memory 200 series (BPS)	Dual rank	128 GB	128 GB	1 TB	256 GB	2 TB
		256 GB	256 GB	2 TB	512 GB	4 TB
		512 GB	512 GB	4 TB	1 TB	8 TB

The VxRail E660 Series supports 32, 288-pin memory module sockets at a speed of 3200 MT/s.

The VxRail E660N vSAN ESA supports the following memory specifications for optimized operation:

DIMM type	DIMM rank	DIMM capacity	Single processor		Dual processor	
			Minimum RAM	Maximum RAM	Minimum RAM	Maximum RAM
RDIMM	Dual rank	16 GB	128 GB	256 GB	128 GB	512 GB
		32 GB	128 GB	512 GB	128 GB	1 TB
		64 GB	128 GB	1 TB	128 GB	2 TB
LRDIMM	Quad rank	128 GB	128 GB	2 TB	256 GB	4 TB
	Octa rank	256 GB	256 GB	4 TB	512 GB	8 TB
Intel Persistent Memory 200 series (BPS)	Dual rank	128 GB	128 GB	1 TB	256 GB	2 TB
		256 GB	256 GB	2 TB	512 GB	4 TB
		512 GB	512 GB	4 TB	1 TB	8 TB

# Storage controller specifications

The VxRail E660 and E660F supports the following internal controller cards:

- HBA355i
- PERC H755 storage controller (for satellite nodes only)
- BOSS-S2:
  - New rear-serviceable form factor
  - 2x 480 GB M.2 SSDs with RAID 1
  - LEDs for M.2 SSD status
- BOSS-S1:
  - Internal BOSS-S1 controller
  - 2x 480 GB M.2 SSDs with RAID 1

The VxRail E660N supports the following internal controller cards:

- BOSS-S2:
  - New rear-serviceable form factor
  - 2x 480 GB M.2 SSDs with RAID 1

- LEDs for M.2 SSD status
- BOSS-S1:
  - Internal BOSS-S1 controller
  - 2x 480 GB M.2 SSDs with RAID 1

**NOTE:** No internal storage controller is required for VxRail E660N.

## Drives

The VxRail E660 and E660F supports the following configurations:

- One disk group with 1 cache (NVMe/SAS mix-use, write-intensive) drive and up to 7 capacity (SAS/SATA read intensive) drives.
- Two disk groups with 1 cache (NVMe/SAS mix-use, write-intensive) drive and up to 4 capacity (SAS/SATA read intensive) drives per group.

The VxRail E660N supports the following configurations:

- vSAN configuration:
  - One disk group with 1 cache (NVMe, mix-use/write-intensive) drive and up to 7 capacity (NVMe read intensive) drives.
  - Two disk groups with 1 cache (NVMe, mix-use/write-intensive) drive and up to 4 capacity (NVMe read intensive) drives per group.
- vSAN ESA (Express Storage Architecture) configuration:
  - No disk group configuration is required.
  - Supports only capacity drives (NVMe, mix-use).
  - Supports a minimum of 4 drives and a maximum of 10 drives.
  - Does not support mixing drives of different capacity in the same system.

## Ports and connectors specifications

### USB ports specifications

The following table describes the USB port specifications of VxRail E660, E660F, and E660N:

Front		Rear	
USB port type	No. of ports	USB port type	No. of ports
USB 2.0-compliant port	One	USB 2.0-compliant port	One
Micro-USB, iDRAC Direct	One	USB 3.0-compliant port	One

**NOTE:** The micro USB 2.0 compliant port can only be used as an iDRAC Direct or a management port.

The USB 2.0 specifications provide a 5 V supply on a single wire to power connected USB devices. A unit load is defined as 100 mA in USB 2.0, and 150 mA in USB 3.0. A device may draw a maximum of 5 unit loads (500 mA) from a port in USB 2.0; 6 (900 mA) in USB 3.0.

The USB 2.0 interface can provide power to low-power peripherals but must adhere to USB specification. An external power source is required for higher-power peripherals to function, such as external CD/DVD Drives.

### NIC port specifications

The VxRail E660 series supports:

- Up to two 1 Gbps Network Interface Controller (NIC) ports embedded on the LAN on Motherboard (LOM).
- One 10/25 Gbps OCP 3.0 card.

Feature	Specifications
LOM card	1 Gbps x dual port
OCP card (OCP 3.0)	10 GbE x dual port, 10 GbE x quad port, 25 GbE x dual port, 25 GbE x quad port

**NOTE:** E660N vSAN ESA configuration supports 10/25/100 Gbps Network Interface Controller (NIC) ports embedded on the LAN on Motherboard (LOM) and integrated on the Open Compute Project (OCP) cards.

## Serial connector specifications

The VxRail E660 series supports one optional card type serial connector, which is a 9-pin connector, Data Terminal Equipment (DTE), 16550-compliant.

The optional serial connector card is installed similar to an expansion card filler bracket.

## Video specifications

The VxRail E660 series supports integrated Matrox G200 graphics controller with 16 MB of video frame buffer.

Resolution	Refresh rate (Hz)	Color depth (bits)
1024 x 768	60	8, 16, 32
1280 x 800	60	8, 16, 32
1280 x 1024	60	8, 16, 32
1360 x 768	60	8, 16, 32
1440 x 900	60	8, 16, 32
1600 x 900	60	8, 16, 32
1600 x 1200	60	8, 16, 32
1680 x 1050	60	8, 16, 32
1920 x 1080	60	8, 16, 32
1920 x 1200	60	8, 16, 32

## Environmental specifications

The following table describes the operational climatic range for category A2:

Temperature	Specifications
Allowable continuous operations	
Temperature ranges for altitudes <= 900 m (<= 2953 ft)	10–35°C (50–95°F) with no direct sunlight on the equipment
Humidity percent ranges (non-condensing at all times)	8% RH with -12°C minimum dew point to 80% RH with 21°C (69.8°F) maximum dew point
Operational altitude de-rating	Maximum temperature is reduced by 1°C/300 m (33.8°F/984 Ft) above 900 m (2953 Ft)

The following table describes the shared requirements across all categories:

Temperature	Specifications
Allowable continuous operations	

Temperature	Specifications
Maximum temperature gradient (applies to both operation and non-operation)	20°C in an hour* (36°F in an hour) and 5°C in 15 minutes (41°F in 15 minutes), 5°C in an hour* (41°F in an hour) for tape <i>i</i> <b>NOTE:</b> * - Per ASHRAE thermal guidelines for tape hardware, these are not instantaneous rates of temperature change.
Non-operational temperature limits	-40 to 65°C (-104 to 149°F)
Non-operational humidity limits	5% to 95% RH with 27°C (80.6°F) maximum dew point
Maximum non-operational altitude	12,000 meters (39,370 feet)
Maximum operational altitude	3,048 meters (10,000 feet)

The following table describes the maximum vibration specifications:

Maximum vibration	Specifications
Operating	0.26 G <sub>rms</sub> at 5 Hz to 350 Hz (all operation orientations)
Storage (nonoperational)	1.88 G <sub>rms</sub> at 10 Hz to 500 Hz for 15 minutes (all six sides tested)

The following table describes the maximum shock pulse specifications:

Maximum shock pulse	Specifications
Operating	Six consecutively executed shock pulses in the positive and negative x, y, and z axis of 6 G for up to 11 ms.
Storage (nonoperational)	Six consecutively executed shock pulses in the positive and negative x, y, and z axis (one pulse on each side of the system) of 71 G for up to 2 ms.

## Thermal restrictions matrix for air cooling

The following table describes the label references that are used in the thermal restriction tables:

Label references	
STD	Standard
HPR	High Performance
HSK	Heat sink
LP	Low Profile (Riser)
FH	Full Height (Riser)
DW	Double Wide (Xilinx FPGA accelerator)
BPS	Intel Persistent Memory 200 series (BPS)

The following table describes the system details of VxRail E660 and E660F:

Configuration		CPU (TDP)	DIMM (RDIMM/ LRDIMM/ BPS)	Fan/ Quantity	Heatsinks	Air shroud	DIMM blank
Front storage							
10 x 2.5" HDD	Any PPCM config	<=165W	All types of DIMM (Except BPS)	HPR Silver fan with qty 4(2S)/3 (1S)	Standard Heatsink	Yes	Yes
		>165W to <220W			Extended Heatsink	No	No

Configuration		CPU (TDP)	DIMM (RDIMM/LRDIMM/BPS)	Fan/Quantity	Heatsinks	Air shroud	DIMM blank
Front storage							
		>=220W		HPR Gold fan with qty 4 (2S)/3(1S)	Extended Heatsink	No	No
	GPU	Depends on CPU TDP	All types of DIMM	HPR Gold fan with qty 4(2S)/3(1S)	Extended Heatsink	No	No

The following table describes the ASHRAE A2/35°C thermal restrictions for CPU and 128 GB LRDIMM of VxRail E660 and E660F:

Ambient Support Matrix for ICX CPU and 128 GB LRDIMM		
Configuration		10 x 2.5-inch 3 LP/ 2 FH
CPU TDP	105 W/120 W	HPR Silver fan Supports at 35°C.
	125 W/135 W	
	150 W	
	165 W	
	185 W	
	205 W	
	220 W	HPR Gold fan Supports at 35°C.
	250 W	
	270 W	
Memory	64 GB RDIMM	Supports at 35°C.
	128 GB LRDIMM	Supports at 35°C.

The following table describes the ASHRAE A2/35°C thermal restrictions for T4 GPU and 128 GB LRDIMM of VxRail E660 and E660F:

Ambient Support Matrix for ICX CPU and 128 GB LRDIMM		
Configuration		10 x 2.5-inch 3 LP/ 2 FH
CPU TDP	105 W / 120 W	HPR Gold fan Supports at 35°C.
	125 W / 135 W	
	150 W	
	165 W	
	185 W	
	205 W	
	220 W	
	250 W	
	270 W	
Memory	64 GB RDIMM	Supports at 35°C.
	128 GB LRDIMM	Not supported at 35°C environment if CPU TDP > 205 W (See <a href="#">30°C</a> )

Ambient Support Matrix for ICX CPU and 128 GB LRDIMM		
Configuration		10 x 2.5-inch 3 LP/ 2 FH
		thermal restriction for 10 x 2.5-inch configuration table)

The following table describes the ASHRAE A2/35°C thermal restrictions for BPS memory of VxRail E660 and E660F:

Ambient Support Matrix for ICX CPU and 128 GB LRDIMM		
Configuration		10 x 2.5-inch 3 LP/ 2 FH
CPU TDP	105 W/120 W	HPR Gold fan Supports at 35°C.
	125 W/135 W	
	150 W	
	165 W	
	185 W	
	205 W	
	220 W	
	250 W	
	270 W	
Memory	BPS + 64 GB RDIMM	Not supported if CPU TDP > 165 W Supports at 35°C.
	BPS + 128 GB LRDIMM	
T4 GPU	165 W	HPR Gold fan Supports at 35°C.
	220 W	
	250 W	
	270 W	

The following table describes the 30°C thermal restrictions of 10 x 2.5-inch configuration:

Ambient Support Matrix for ICX CPU and 128 GB LRDIMM		
Configuration		10 x 2.5-inch 3 LP/ 2 FH
64 GB RDIMM / 128 GB LRDIMM, BPS, and T4 GPU	64 GB RDIMM	Supported at 35°C: All CPU TDP up to 270 W
	128 GB LRDIMM	
	T4 + 64 GB RDIMM	
	T4 + 128 GB LRDIMM	Supported at 30°C: CPU TDP 220 W-270 W
	BPS + 64 GB RDIMM	Supported at 30°C: CPU TDP 270 W
	BPS + 128 GB LRDIMM	Supported at 30°C: CPU TDP 185 W-270 W
	T4 + BPS + 64 GB RDIMM	Supported at 30°C: CPU TDP 270 W
	T4 + BPS + 128 GB LRDIMM	Supported at 30°C: CPU TDP 185 W-270 W

The following table describes the system details of VxRail E660N:

Configuration		CPU (TDP)	DIMM (RDIMM/ LRDIMM/ BPS)	Fan	Heatsinks	Air shroud	DIMM blank
Front storage							
10 x 2.5" NVMe	Any PPCM config	<=165W	All types of DIMM	HPR Gold fan (VHP)	Standard Heatsink	Yes	Yes
		>165W to <220W			Extended Heatsink	No	No
		>=220W			Extended Heatsink	No	No
	GPU	Depends on CPU TDP	All types of DIMM		Extended Heatsink	No	No

The following table describes the ASHRAE A2/35°C thermal restrictions for CPU and 128 GB LRDIMM of VxRail E660N:

Ambient Support Matrix for ICX CPU and 128 GB LRDIMM		
Configuration		10 x 2.5-inch 3 LP/ 2 FH
CPU TDP	105 W/120 W	HPR Gold fan Supports at 35°C.
	125 W/135 W	
	150 W	
	165 W	
	185 W	
	205 W	
	220 W	
	250 W	
	270 W	
Memory	64 GB RDIMM	HPR Gold fan Supports at 35°C.
	128 GB LRDIMM	HPR Gold fan Supports at 35°C.

The following table describes the ASHRAE A2/35°C thermal restrictions for CPU and 256 GB LRDIMM of VxRail E660N:

Ambient Support Matrix for ICX CPU and 256 GB LRDIMM		
Configuration		10 x 2.5-inch HDD front storage
CPU TDP	105 W/120 W	HPR Gold fan Supports at 35°C.
	125 W/135 W	
	150 W	
	165 W	
	185 W	
	205 W	Not supported Supports at 35°C.
	220 W	
	250 W	
	270 W	
Memory	256 GB LRDIMM	Not supported if CPU TDP > 165 W



Ambient Support Matrix for ICX CPU and 256 GB LRDIMM		
Configuration		10 x 2.5-inch HDD front storage
		Supports at 35°C.

**NOTE:**

- No support for 128G/256G LRDIMM along with BPS if CPU TDP > 165W.
- No support for 256G LRDIMM if CPU TDP >165W.

The following table describes the ASHRAE A2/35°C thermal restrictions for T4 GPU and 128 GB LRDIMM of VxRail E660N:

Ambient Support Matrix for ICX CPU and 128 GB LRDIMM		
Configuration		10 x 2.5-inch 3 LP/ 2 FH
CPU TDP	105 W / 120 W	HPR Gold fan Supports at 35°C.
	125 W / 135 W	
	150 W	
	165 W	
	185 W	
	205 W	
	220 W	
	250 W	
	270 W	
Memory	64 GB RDIMM	Supports at 35°C.
	128 GB LRDIMM	Not supported at 35°C environment if CPU TDP > 205 W (See <a href="#">30°C thermal restriction for 10 x 2.5-inch configuration table</a> )

The following table describes the ASHRAE A2/35°C thermal restrictions for BPS memory of VxRail E660N:

Ambient Support Matrix for ICX CPU and 128 GB LRDIMM		
Configuration		10 x 2.5-inch 3 LP/ 2 FH
CPU TDP	105 W / 120 W	HPR Gold fan Supports at 35°C.
	125 W / 135 W	
	150 W	
	165 W	
	185 W	
	205 W	
	220 W	
	250 W	
	270 W	
Memory	BPS + 64 GB RDIMM	Not supported if CPU TDP > 165 W Supports at 35°C.
	BPS + 128 GB/256 GB LRDIMM	
T4 GPU	165 W	HPR Gold fan

Ambient Support Matrix for ICX CPU and 128 GB LRDIMM		
Configuration		10 x 2.5-inch 3 LP/ 2 FH
	220 W	Supports at 35°C.
	250 W	
	265 W / 270 W	Not supported


The following table describes the 30°C thermal restrictions of 10 x 2.5-inch configuration:

Ambient Support Matrix for ICX CPU and 128 GB LRDIMM		
Configuration		10 x 2.5-inch 3 LP/ 2 FH
64 GB RDIMM / 128 GB LRDIMM, BPS, and T4 GPU	64 GB RDIMM	Supported at 35°C: All CPU TDP up to 270 W
	128 GB LRDIMM	
	T4 + 64 GB RDIMM	
	T4 + 128 GB LRDIMM	Supported at 30°C: CPU TDP 210 W-270 W
	BPS + 64 GB RDIMM	Supported at 30°C: CPU TDP 260 W-270 W
	BPS + 128 GB LRDIMM	Supported at 30°C: CPU TDP 185 W-270 W
	T4 + BPS + 64 GB RDIMM	Supported at 30°C: CPU TDP 260 W-270 W
	T4 + BPS + 128 GB LRDIMM	Supported at 30°C: CPU TDP 185 W-270 W

## Particulate and gaseous contamination specifications

The following table defines the limitations that help avoid any damages to the IT equipment and/or, or both failure from particulate and gaseous contamination. If the levels of particulate or gaseous pollution exceed the specified limitations and results in equipment damage or failure, you must rectify the environmental conditions. Remediation of environmental conditions is the responsibility of the customer.


The following table describes the particulate contamination specifications:

Particulate contamination	Specifications
Air filtration	<p>Data center air filtration as defined by ISO Class 8 per ISO 14644-1 with a 95% upper confidence limit.</p> <p>This condition applies to data center environments only. Air filtration requirements do not apply to IT equipment designed to be used outside a data center, in environments such as an office or factory floor.</p> <p>Air filtering can also be accomplished by filtering room air with MERV8 filter per ANSI/ASHRAE Standard 127.</p> <p> <b>NOTE:</b> Air entering the data center must have MERV11 or MERV13 filtration.</p>

The following table describes the gaseous contamination specifications:

Gaseous contamination	Specifications
Copper Coupon Corrosion rate	<300 Å/month per Class G1 as defined by ANSI/ISA71.04-2013

Gaseous contamination	Specifications
Silver Coupon Corrosion rate	<200 Å/month as defined by ANSI/ISA71.04-2013

 **NOTE:** Maximum corrosive contaminant levels measured at ≤50% relative humidity.