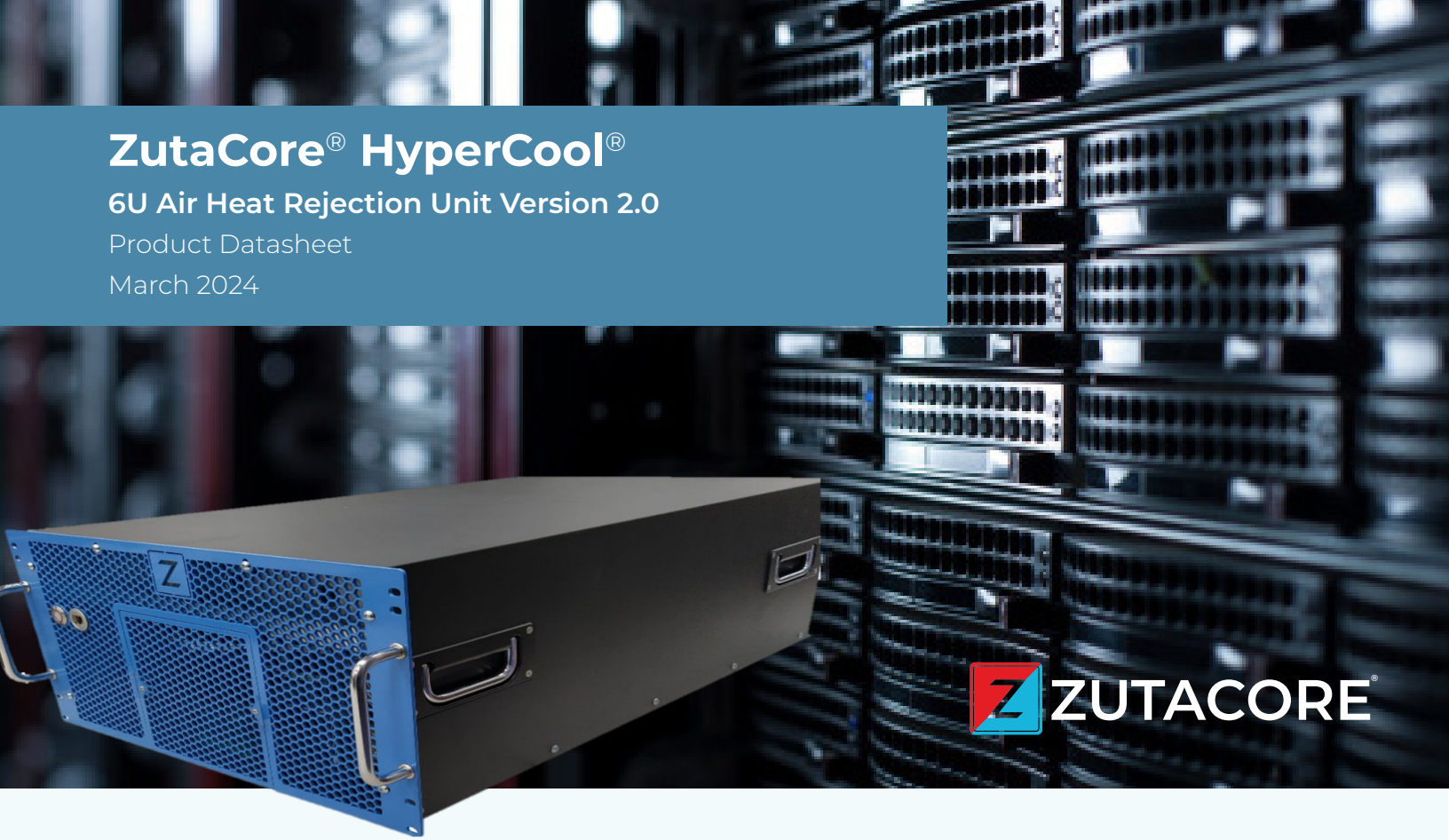
ZutaCore® HyperCool®

6U Air Heat Rejection Unit Version 2.0

Product Datasheet

March 2024



FEATURES

- 19” rack mountable unit with a 6U by 875 mm depth form factor.
- Supports up to 20 kW rack power at 27°C air inlet temperature.
- Use of a non-conductive refrigerant.
- Low pressure (< 3 bar)
- Monitor operations and control adjustments via a touch screen interface or over the network.
- N+1 redundancy of pumps and fans.
- Field replaceable option (in rack) of electronic and power components.

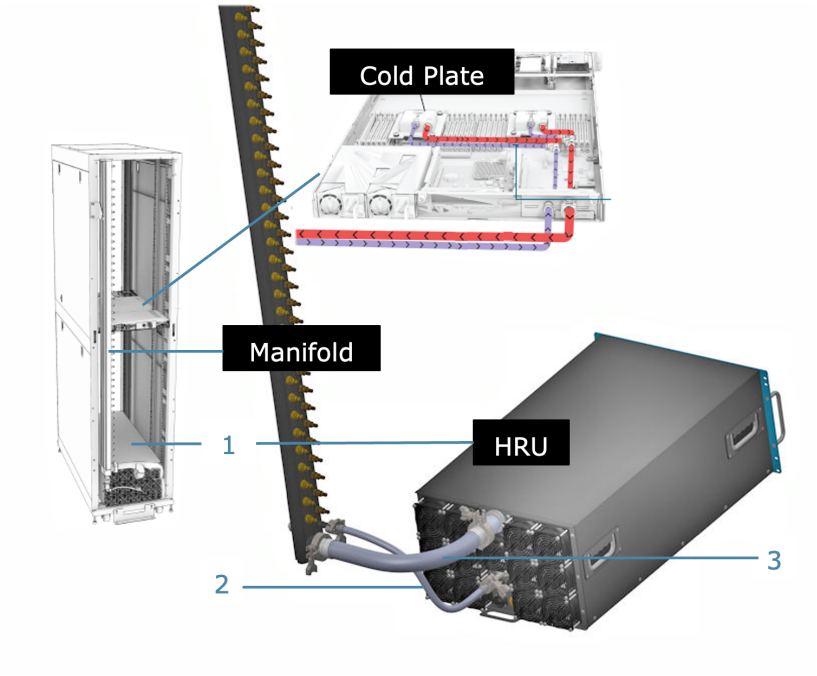
ADVANTAGES

- Compact, fully contained modular build.
- Fully automatic operation, analysis, and adjustments.
- Quick and easy installation with minimal setup.
- Safe, non-conductive refrigerant.

ZutaCore® HyperCool® is a direct-to-chip (waterless) dielectric liquid cooling solution for cooling a server’s heat emitting components such as CPU, GPU, and FPGA.

ZutaCore HyperCool consists of the following sub-systems:

- **ZutaCore HyperCool Heat Rejection Unit (HRU)**: a self-contained system placed inside a standard 19" server rack which can handle up to 20 kW rack power in total.
- **ZutaCore HyperCool Manifold:** a self-contained manifold that fits into standard and custom racks.
- **ZutaCore HyperCool Dielectric Cold Plate:** assembled onto heat emitting components such as CPUs and GPUs.
- **ZutaCore HyperCool Service Unit:** (not shown) a self contained system used to pump liquid refrigerant into the HRU and to purge non-condensable gases out of the system.
- **ZutaCore HyperCool Software Defined Cooling (SDC):** (not shown) user to monitor and control the operation of racks, servers, and HRUs.



Heat Rejection Unit (HRU) Installation Requirements

1. The HRU is placed inside the server rack, at the bottom of the rack.
2. A ½" tri clamp tube connects from the HRU's liquid fitting to the Manifold.
3. A 1½" tri clamp tube connects from the HRU's vapor fitting to the Manifold.

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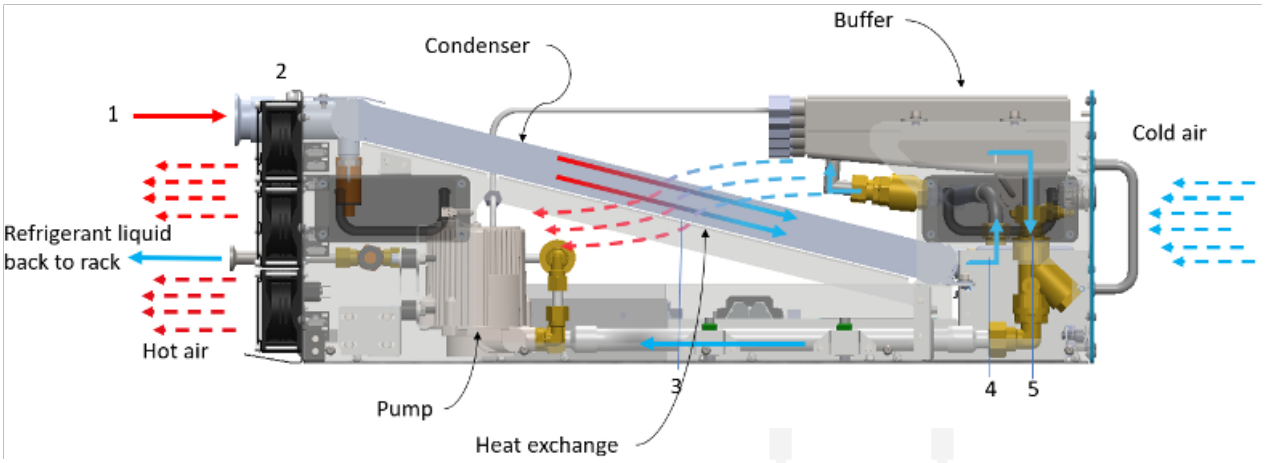
6U Heat Rejection Unit (HRU) Air Overview

The 6U HRU air can support up to 20 kW rack power. The HRU consists of the following subsystems:

- **Condensing subsystem:** responsible for condensing the vapor that flows from the servers (through the Manifold) back into liquid refrigerant.
- **Liquid collection and delivery subsystem:** responsible for collecting liquid refrigerant from the condenser and pumping it back to the servers.
- **Internal control system:** monitors system parameters and controls the system performance. Connects to the central system software via API and network.

1. Heated **vapor refrigerant** flows towards the **condenser.**
2. Fans force air through the **condenser** coils to condense the vapor into liquid.
3. Refrigerant flows down the **condenser.**
4. The **liquid refrigerant** flows from the **condenser** into a buffer tank.
5. Refrigerant is pumped out of the **buffer tank** and back into the servers.



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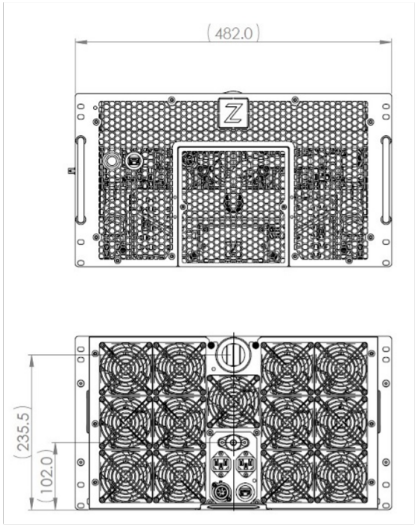
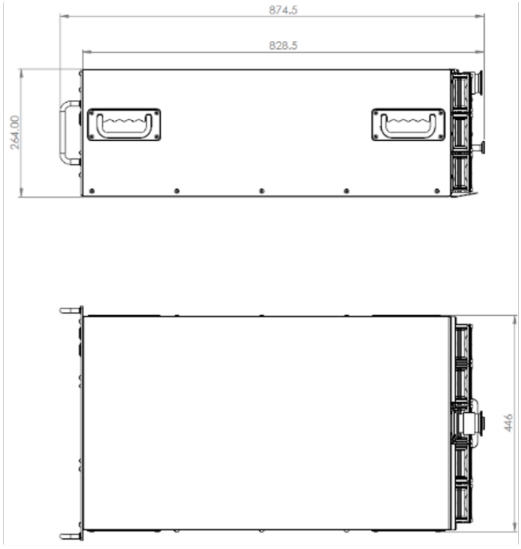
6U HRU Air Specifications	
▪ Standalone system, no facility infrastructure needed ▪ All weted materials are dielectric refrigerant compatible	▪ Cooling capacity supports up to 20 kW rack power

Environmental			
Overall System		**Refrigerant**	
Operating temperature:	5°C - 45°C (41°F - 113°F)	**Type:**	Dielectric Refrigerant
Max working pressure:	3.2 bar	**Temperature working range:**	-76°C - 65°C (-106°F - 149°F)
Humidity:	20% - 70%	**Buffer tank capacity:**	6 Litre
Waterproof rating:	NEMA Type 1	**Safety:**	Non-conductive, non-corrosive, non-flammable, non-toxic
		Environmental properties:	Zero ozone depletion potential, low global warming potential

Pipe and Electrical Connections			
Vapor and Liquid Tube Connections - Type and Diameter		**Electrical Connections - Electrical and Communications**	
Vapor Inlet:	Tri-clamp 1½” flange	**Power connections:**	N+1 phase redundancy; 200-240 VAC at 50/60
Liquid Outlet:	Tri-clamp ½” flange	**Power consumption:**	< 650W
		Communication protocol:	RJ45 based TCP/IP communication 1GB

Physical Dimensions - HRU Dimensions and Weight
Width: 482 mm (18.98”)
Length: 874.5 mm (34.4”)
Height: 264 mm (10.4”)
Weight: 55kg (132 lbs.) dry





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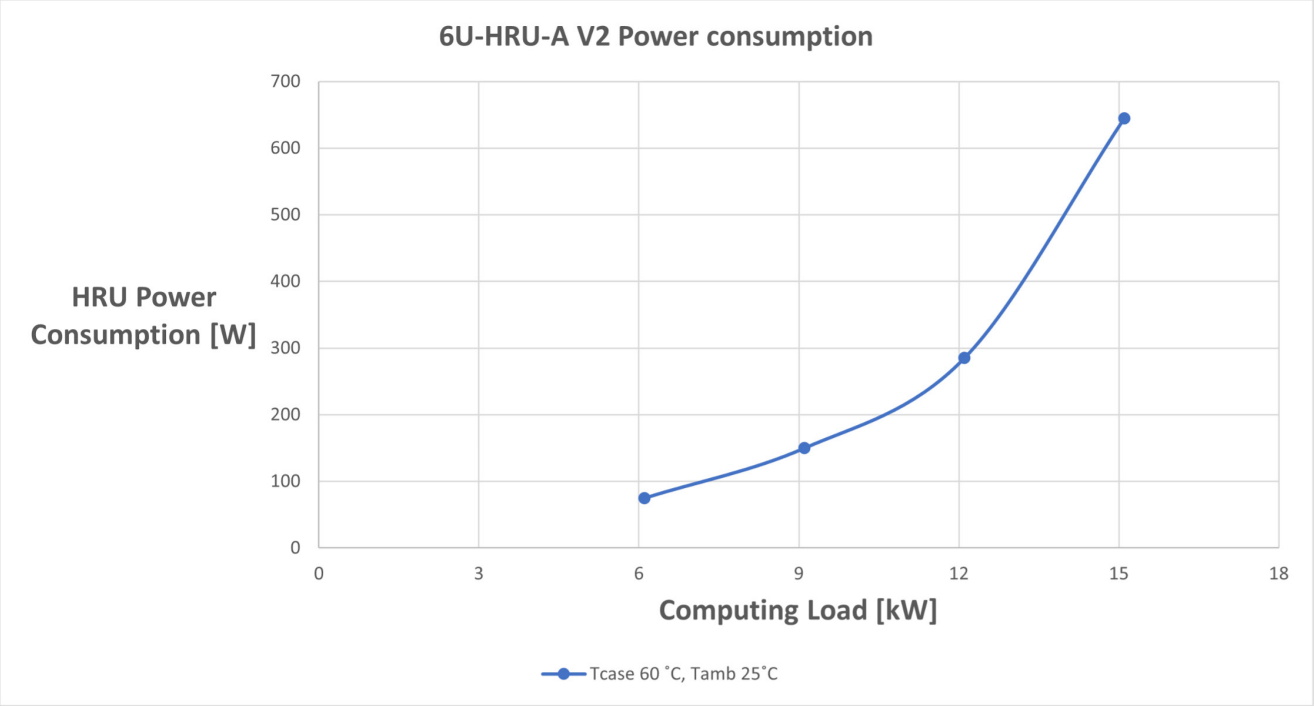
Power Consumption as a Function of Computing Load	
The following table and graph show the Heat Rejection Unit power comsumption (W) at different compute loads (kW), for air inlet temperatures of 25°C	
Computing load	**Heat Rejection Unit Power Consumption (W)**
0 kW	80
6.1 kW	75
9.1 kW	150
12.1 kW	285
15.1 kW	645



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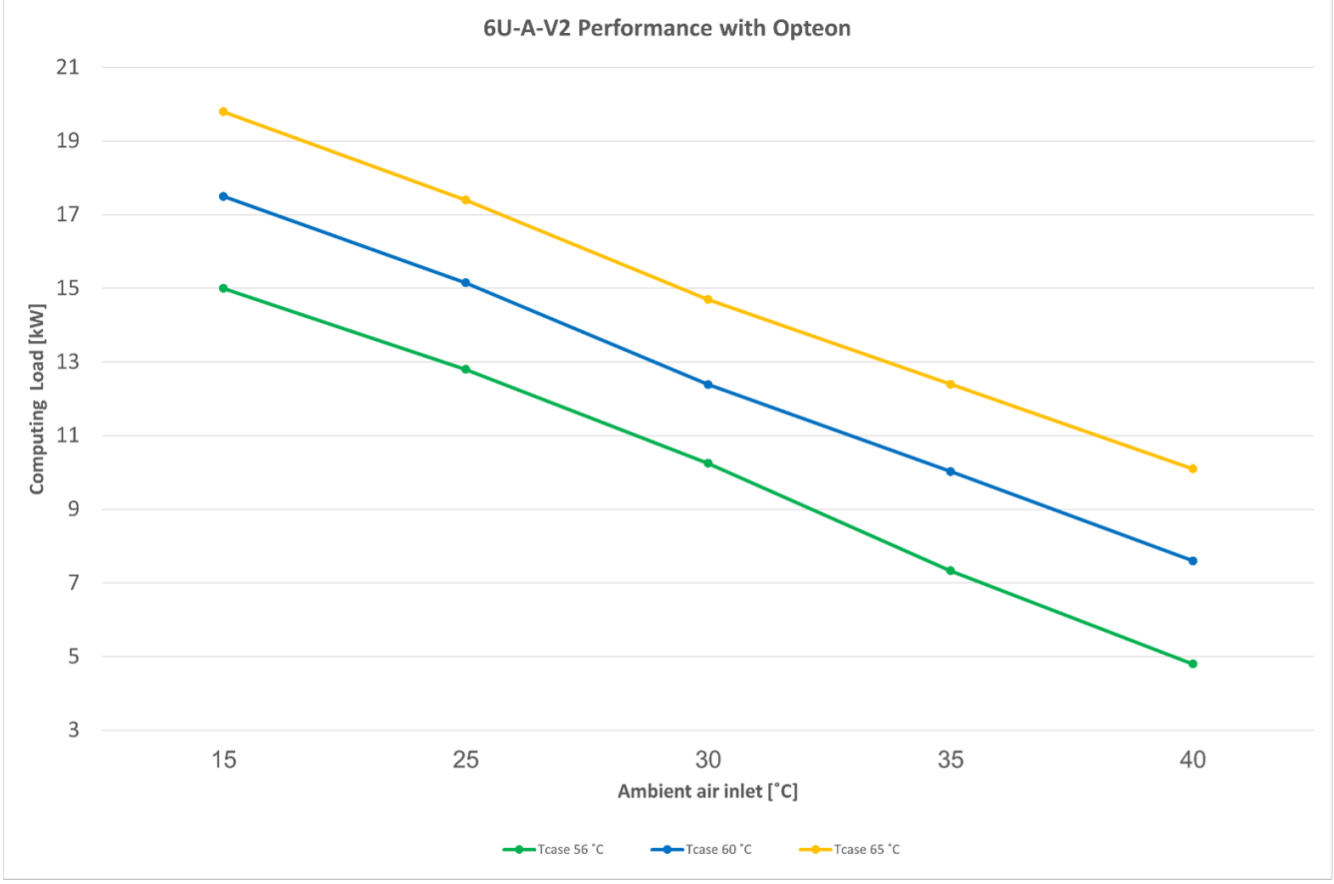
Maximum Computing Load as a Function of Ambient Air Temperature			
The following table and graph show maximum computing loads (kW) at different T-Case temperatures (°C) for air inlet temperatures of 25, 30, 35°C, and 40°C.			
Air Inlet	Maximum Computing Load (kW)		
	T Case: 56°C	T Case: 60°C	T Case: 65°C
15°C	15	17.5	19.8
25°C	12.8	15.2	17.4
30°C	10.3	12.4	14.7
35°C	7.3	10	12.4
40°C	4.8	7.6	10.1



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