

Server-in-a-Box: All-in-One Indoor/Outdoor Data Center Solution

Turnkey 13 kW edge infrastructure with integrated power and Direct Expansion (DX) cooling

Description

The Pii Server-in-a-Box is a self-contained micro data center engineered for outdoor environments (indoor versions also available). Purpose-built for distributed AI, it consolidates high-density IT/High Performance Compute (HPC) infrastructure, integrated Direct Expansion (DX) cooling, and configurable power distribution into a single, standardized footprint. Unlike conventional indoor edge room racks, this unit supports enterprise-grade computing and 13 kW of IT capacity directly to the point of data generation.

Application & Edge Inferencing

As data demands increase, telecommunications providers and enterprise networks require solutions to expand compute capacity at existing telecom sites without overhauling legacy grid infrastructure. Unlike centralized hyperscale facilities, the Server-in-a-Box provides the physical hardware foundation necessary for distributed AI in an easy-to-deploy, all-in-one solution. This makes it an ideal edge node for deploying GPU-as-a-Service (GPUaaS), allowing telecom providers to offer low-latency, on-demand AI processing power directly to local users. By locating high-density compute geographically closer to the point of use, the system supports local inferencing by directly reducing latency. Furthermore, this distributed approach enables faster deployment speeds at any site with available access to power.

Multi-Input Power Architecture

Powering this localized computing is Pii's [Tower of Power™](#) architecture. Housed within the enclosure are dedicated power shelves utilizing Pii's power electronics to establish a radically scalable, "any-input" topology. This DC-coupled microgrid allows the platform to natively accept diverse AC grid configurations alongside -48 Vdc and 200–440 Vdc variable energy sources, including fuel cells, solar PV, and battery energy storage systems (BESS).



Key Features and Advantages

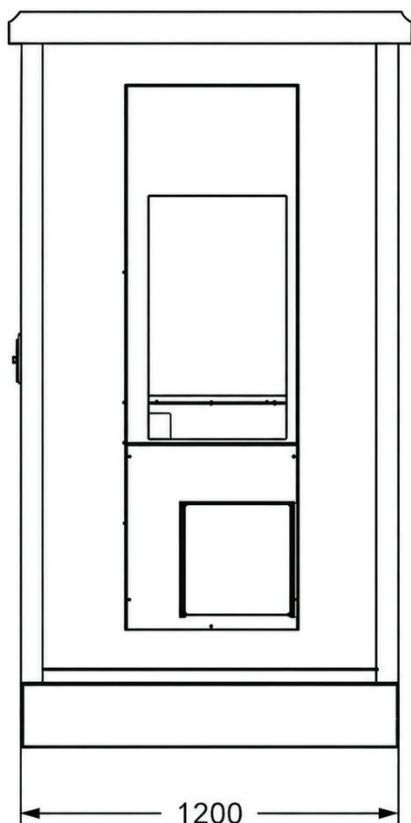
- **High-Density Compute:** Supports up to 13 kW of continuous IT capacity and provides 34 RU of available space within a standard 19" EIA rack, delivering the ideal physical foundation for power-intensive GPU-as-a-Service (GPUaaS) deployments.
- **Ruggedized Enclosure:** Built for demanding outdoor applications with an IP55 / NEMA 3S protection rating and a compact 1200 x 1400 x 2300 mm physical footprint.
- **Integrated DX Thermal Management:** Utilizes two enclosure-mounted Direct Expansion (DX) units, delivering a combined 20,400 W of cooling and 6,000 W of heating to maintain proper internal temperatures in ambient/external temperatures ranging from -30 °C to +55 °C.
- **Universal Input Compatibility:** Integrates Tower of Power™ capabilities to accept broad AC inputs (240 Vac single or 3-phase, 208Y/120 Vac, 415Y/240 Vac, or 480Y/277 Vac), as well as -48 Vdc and 200–440 Vdc variable inputs.
- **Security & Environmental Monitoring:** Equipped with standard mechanical locks and built-in temperature sensors, with optional upgrades for electronic cabinet access, door contacts, and smoke & fire detection systems.

Specifications

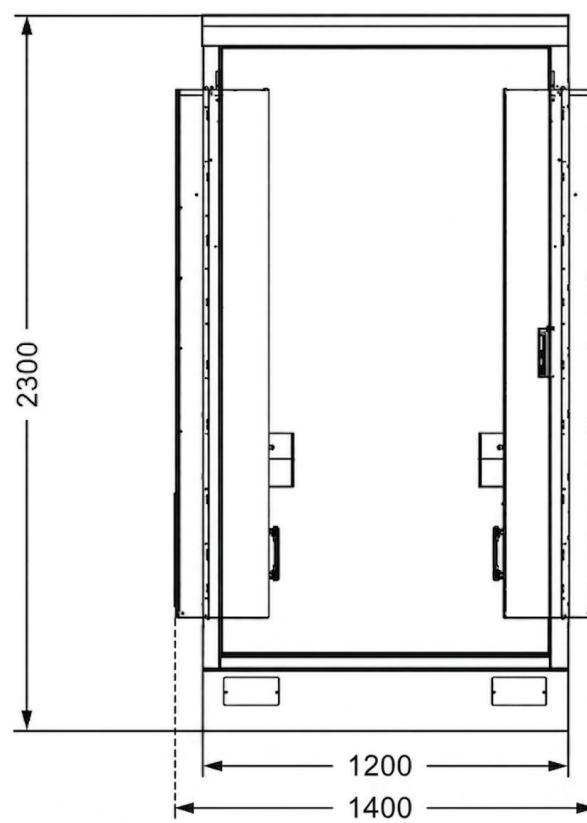
Server-in-a-Box	
IT Capacity	13 kW
Input Power	Tower of Power Capability Vac: 240 Vac single or 3-phase, 208Y/120 Vac, 415Y/240 Vac or 480Y/277 Vac Vdc: 200 - 440 Vdc (Fuel Cell, PV/Solar, BESS), -48 Vdc
Available Rack Units	34 RU in 19" EIA Rack
Cooling	Integrated Direct Expansion (DX) system
Security	Standard mechanical lock Electronic cabinet access (optional), web camera (optional)
Sensors	Built-in temperature Door contact (optional), smoke & fire detection (optional)
Enclosure Rating	IP55 / NEMA 3S
Dimensions	1200 x 1400 x 2300
Cooling Units	
Mounting Method	Enclosure Mounted
Ambient Temperature Range	-30 °C to +55 °C
Cooling Capacity (each) L35/L35 @ 50 Hz	20,400 W for two units (10,200 W for each unit)
Heating Capacity	6000 W for two units (3000 W for each unit)

Mechanical Dimensions (mm)

Side View



Front View



Building the Tower of Power™ Architecture

1. Component Integration

The individual power electronics listed below are installed into a 3-slot chassis alongside a dedicated shelf controller, creating a fully populated power shelf.

2. Capacity Scaling and/or Redundancy

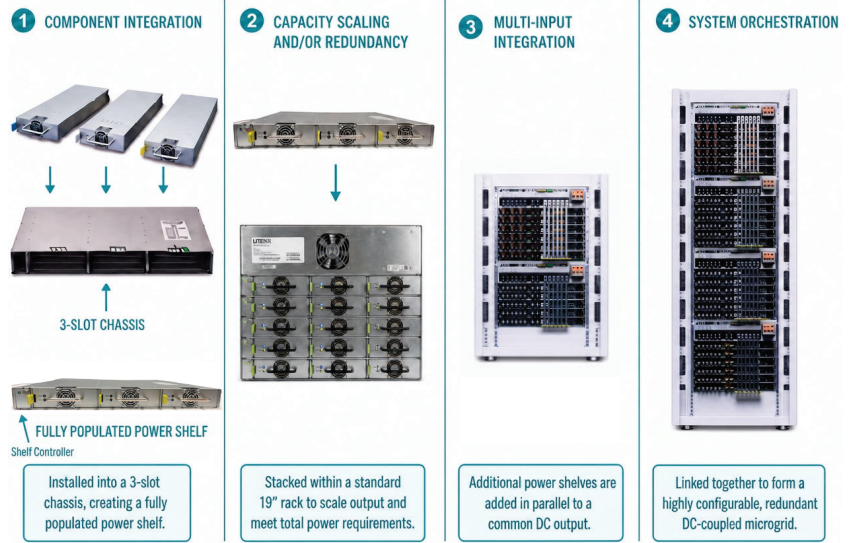
Multiple populated power shelves are stacked within a standard 19" rack to scale output and meet the total power requirements of the application.

3. Multi-Input Integration

To support diverse energy generation (e.g., AC grid, solar, fuel cells), additional power shelves are added in parallel, to a common DC output, enabling the "multi-input" capability.

4. System Orchestration

Linked together and managed by a Microgrid Controller or Industrial PC (IPC) via Modbus or CANbus, the power shelves form a highly configurable, DC-coupled microgrid.



	Description	Input Voltage	Input Current	Output Power	Output Voltage	Output Current
AC to DC	PS-2332-01Px-LF Industrial Rectifier	AC: 190 Vac to 305 Vac DC: 200 V to 440 V	16.5 A max	3.3 kW	250 Vdc to 920 Vdc 400 V range: 250 Vdc to 450 Vdc 800 V range: 450 Vdc to 920 Vdc	400 V range: 8.7 A max 800 V range: 4.3 A max
	PS-2332-02Px-LF 60 V Rectifier	AC: 120 V to 305 V DC: 300 V to 450 V			42 Vdc to 64 Vdc	58 A max
	PS-2332-03Px-LF Industrial Rectifier	AC: 190 Vac to 305 Vac DC: 200 V to 440 V			250 Vdc to 770 Vdc 350 V range: 250 Vdc to 385 Vdc 700 V range: 385 Vdc to 770 Vdc	350 Vdc range: 10.5 A max 700 Vdc range: 5.25 A max
DC to AC	IM-2332-01Px-XX 400 V Inverter	290 Vdc to 450 Vdc	12.2 A max	120 Vac / 3 kVA	120 Vac - 277 Vac single phase	120 V single-phase: 25 A max 120 V / 240 V split-phase: 13.75 A max
	IM-2332-01Py-XX 800 V Inverter	560 Vdc to 900 Vdc	6.5 A max	240 - 277 Vac / 3.3 kVA	120/240 Vac split phase	
DC to DC	DD-1202-TR0x-ROHS 12 V Converter	DC: 300 V to 440 V	7 A max	2 kW	10.8 Vdc to 14 Vdc	167 A max
	DD-1302-01Px-ROHS 24 V Converter		12 A max	3 kW	21.6 Vdc to 28 Vdc	110 A max
	DD-2352-02Px-LF 48 V to 400 V Converter	43 Vdc to 60 Vdc	85 A max	3.5 kW	350 Vdc to 400 Vdc	10 A max
	PS-2332-01Py-LF Solar Converter	120 Vdc to 450 Vdc	16.5 A max	3.3 kW	250 Vdc to 920 Vdc Fully Adjustable 400 & 800 Vdc nominal	400 Vdc range: 8.7 A max 800 Vdc range: 4.3 A max
	PS-2332-02Py-LF Solar Converter	120 Vdc to 450 Vdc			42 Vdc to 64 Vdc	58 A max