POWER INNOVATIONS INTERNATIONAL

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Tower of Power (<300 kW)
Multi-input, low voltage solid state transformer

Description

Pii's Tower of Power architecture is an all-in-one solid state transformer (SST) that enables up to 300 kW of multi-directional power management. This product offers both grid-tied and islanded applications for residential, commercial, data center, and industrial markets. With its modular multi-port inputs and outputs, the low voltage (LV) SST can provide power within a micro-grid utilizing **any** AC input voltage (from 120 V single-phase up to 480 V three-phase) or **any** DC and AC source (including solar arrays or lithium/lead acid batteries up to 800 V).

The outputs can be any combination of grid-tied and islanded AC voltages along with DC outputs of +/- 400 V, 800 V, +/- 12, 24, or 48. Adding the PLC charge board gives users the capability for EV fast charging, either uni-directionally or bi-directionally.

Features and Benefits

- All power management fits in 19" EIA rack
- Scalable and modular power, by energy source and load
- Multi-port capability
- Integrated, grid-tied, and islanded capability
- Priority input power selection
- Enables load shedding, grid support, and off-grid power
- Remote upgrades via over-the-air

Applications

- Nano-grids and micro-grids
- On- and off-grid EV fast charging
- V2x bi-directional EV charging
- Distributed renewable energy
- Direct-to-stack hydrogen PEM control
- Telecom and cellular infrastructure power
- Direct to DC data center energy source

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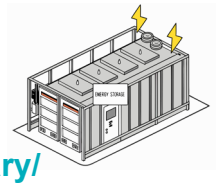
KEY

AC

DC

"The Tower of Power:"
A seamless integration of sources to loads

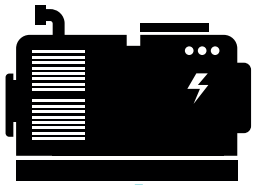
BESS



Grid Support

Edge Data Centers

Stationary/
Mobile
Generator



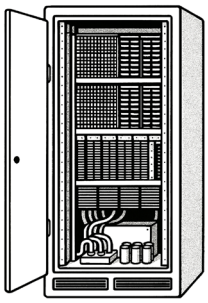
Grid

Commercial/
Industrial

AC Input
EV Charger

AC
Inputs

AC
Outputs



Tower of Power

DC
Inputs

DC
Outputs

EVs

Lithium & Lead Acid

EV Fast Charging

Telecom Power

Fuel Cells

Solar Array

± 400 V & 800 V
Edge Data Centers

Theory of Operations

The Pii SST, or "**Tower of Power**" architecture, consists of multiple rectifier and inverter modules in power shelves connected on a common DC bus (DC coupled). All power modules are galvanically isolated and can be configured and stacked to meet customers' requirements of voltage and power. The "Tower of Power" is installed in an EIA 19" rack within Pii power shelves. Additionally, options are available to have the EIA rack be outdoor rated with integrated thermal management. "Towers" can be paralleled to scale the system. **Any** input energy source, AC or DC, is used to maintain a constant voltage on the DC bus. **Any** output, single or three phase AC, or DC, can be configured based on the modules inserted into the shelf. Output voltage and current can be controlled remotely or locally. The EV charging PLC PCBA is OCPP compliant.

	Description	Input Voltage	Input Current	Output Power	Output Voltage	Output Current	Safety Standards
AC to DC Conversion	PS-2332-01Px-LF "Industrial" 3.3 kW Rectifier	**AC:** 190 Vac to 305 Vac **DC:** 200 V to 440 V range	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	UL 62368-1 (IEC 62368-1) Vac input only
	PS-2332-EVCx-LF EV 3.3 kW Rectifier	**AC:** 120 Vac to 305 Vac **DC:** 250 V to 420 V					UL 2202 (AC & DC input)
	PS-2332-02Px-LF 60 V 3.3 kW Rectifier	**AC**: 120 V to 305 V **DC**: 300 V to 450 V	16.5 A max		**42 Vdc to 64 Vdc**	58 A max	Conforms to IEC 62368-1
DC to AC Conversion	IM-2332-01Px-XX 400 V 3.3 kVA Inverter	290 Vdc to 450 Vdc	12.2 A max	120 Vac / 3.0 kVA and 240 Vac / 3.3 kVA	120 Vac - 277 Vac single phase 120/240 Vac split phase	**120 V single-phase:** 25 A max **120 V / 240 V split-phase:** 13.75 A max	UL 1741
	IM-2332-01Py-XX 800 V 3.3 kVA Inverter	560 Vdc to 900 Vdc	6.5 A max				
DC to DC Conversion	DD-1202-TR0x-ROHS 12 V DC-DC Converter	**DC:** 300 V to 440 V	7 A max	2 kW	13.8 Vdc nominal Adjustable: 10.8 Vdc to 14 Vdc	167 A max	Conforms to IEC 62368-1
	DD-1302-01Px-ROHS 24 V DC-DC Converter		12 A max	3 kW	27.6 Vdc nominal Adjustable: 21.6 Vdc to 28 Vdc	110 A max	
	DD-2352-02Px-LF 48 V to 400 V DC-DC Converter	48 Vdc nominal range: 43 Vdc to 60 Vdc	85 A max	3.5 kW	350 Vdc nominal Adjustable: 350 Vdc to 400 Vdc	10 A max	
	PS-2332-01Py-LF 3.3 kW Solar Converter	120 Vdc minimum for MPPT: 450 Vdc OCV max	16.5 A max	3.3 kW	400 & 800 Vdc nominal Adjustable: 250 Vdc to 920 Vdc	**400 Vdc range:** 8.7 A max **800 Vdc range:** 4.3 A max	Conforms to UL62109-1 (IEC 62109-1)