Hi-Power Solutions
Haute Puissance

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HIPO xxxATx

Confidential

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HIPO™ Modules, AC boost version | **HIPO xxxATx** | **Patents: US12088213B2, CA3159480A1**

In an Ultrafast Level 3+ EVSE application, the HIPO™ modules are used to convert electrical power between the power source and the vehicle(s). This document provides a detailed description of the AC/DC current controlled, boost converter modules. For a DC/DC optimized version, please refer to the HIPO xxxDTx variant.

The modules integrate numerous protections such as voltage, current, temperature limits, fuses, and inlet contactors. Galvanic isolation in AC/DC conversion is achieved externally using a custom inlet transformer designed for the AC supply used. It can be anything between 400VAC to 25kVAC.

Various components should be added to complete the EVSE. A typical system comprises an inlet transformer, three HIPO modules with 2 DC inductors each, one cable interface board per active EV charging port, as well as various DC contactors, ground leak detection, control power supply, support components, and a main controller.

An optional switching array permits the implementation of battery-buffered EV chargers without supplementary power converters. These modules are designed to produce Level 3+ EVSE, battery backed if desired, with or without solar array. They can be used to add **V2X** functionality to your system. It features very low arc flash energy levels.

For more information and engineering details, please contact us at: **Info@hipowersolutions.ca**

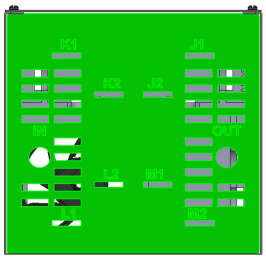
Features	HIPO400AT6 AC Boost converter Up to 400AAC,650VDC Typically used in 250kW to MW EVSE	HIPO80AT6 AC Boost converter Up to 80AAC,650VDC Typically used in 50kW to 300kW EVSE
Sustained Power output at 25C ambient	90kW per module at up to 650VDC	20kW per module at up to 650VDC
Topology	Interleaved boost converters (VDC out > VAC peak in)	
DC inductors	2 per module for reduced current ripple	
AC/DC mode (per module)		
Module AC input voltage	Up to 3 x 60V to 240V, 60Hz, per phase Optional 50Hz version available	Up to 3 x 60V to 240V, 60Hz, per phase Optional 50Hz version available
DC output current	400A at 0% boost, 200A at 100% boost	80A at 0% boost, 40A at = 100% boost
Power factor	Near unity	
Harmonics	Less than 5% THDI, 2% THDV typ.	Less than 5% THDI, 2% THDV typ.
Galvanic isolation	Control signals are galvanically isolated from the power circuits	
Protections	Fuses and inlet contactors included as well as electronic over current, over voltage, and temperature limits.	
DC bus precharge	Automatic precharge from AC inlet when run command asserted.	
DC bus stored energy	~80 Joules in capacitors, ~20 Joules in inductors	~20 Joules in capacitors, ~5 Joules in inductors
Control power	24VDC at 3.5A, 4A inrush	24VDC at 2.5A, 2.8A inrush
Control modes		
Interface	An external cable interface board provides monitoring and analog / digital signals to the main controller	
Control loops	Each module has independent current control loops following the main controller setpoint.	
Environment		
Cooling (internal)	Liquid cooling	Air cooling
Enclosure rating	NEMA 1 (Not finger safe)	Open chassis
Ambient temperature	-30C to 35C (Wider range available)	-30C to 35C (Wider range available)
Humidity	0-95% non-condensing	0-95% non-condensing
Storage temperature (liquid drained)	-40C to 50C (when cooling circuit drained)	-40C to 50C
Arrangement		
Modules Dimensions	Module = 260w x 520h x 260d, 20kg	Module = 200w x 420h x 260d, 15kg
Mounting	Side by side vertical mounting in cabinet. AC input from the bottom, DC output at the top.	Side by side vertical mounting in cabinet. AC input from the bottom, DC output at the side.
Standards followed		
Safety	CSA C22.2, UL v0	
Grid connection	IEEE-519 harmonics, anti-islanding	

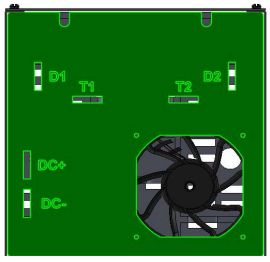
Typical Accessories		
Controls interface		
Cable Interface board	Typically, one per EV cable	
Control cable	One per module, 0.5m to 2m	
Control signals	24V digital IOs, 0-10V analog	
DC inductors		
Current rating	200A	40A
Dimensions	130w x 160h x 160d, 15kg	100w x 100h x 120d, 10kg
DC contactors (2 per cable)		
Current rating	500A @ 900VDC	100A @ 800VDC

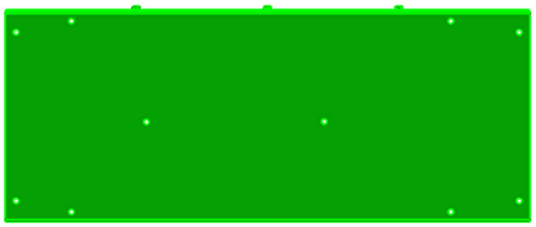
Hi-Power Solutions Inc. reserves the right to adjust this specification as technology advances.

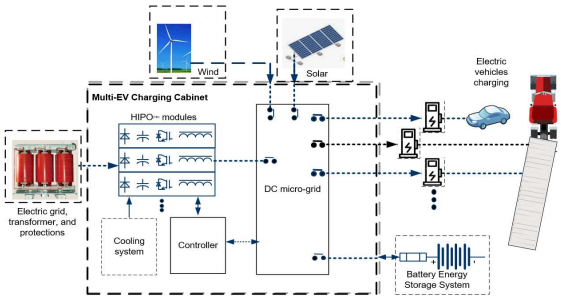
Level 3+ ultrafast EV charger example using 3 x HIPO400AT6

HIPO 400AT6









Typical application
V2X option available with expanded DC micro-grid