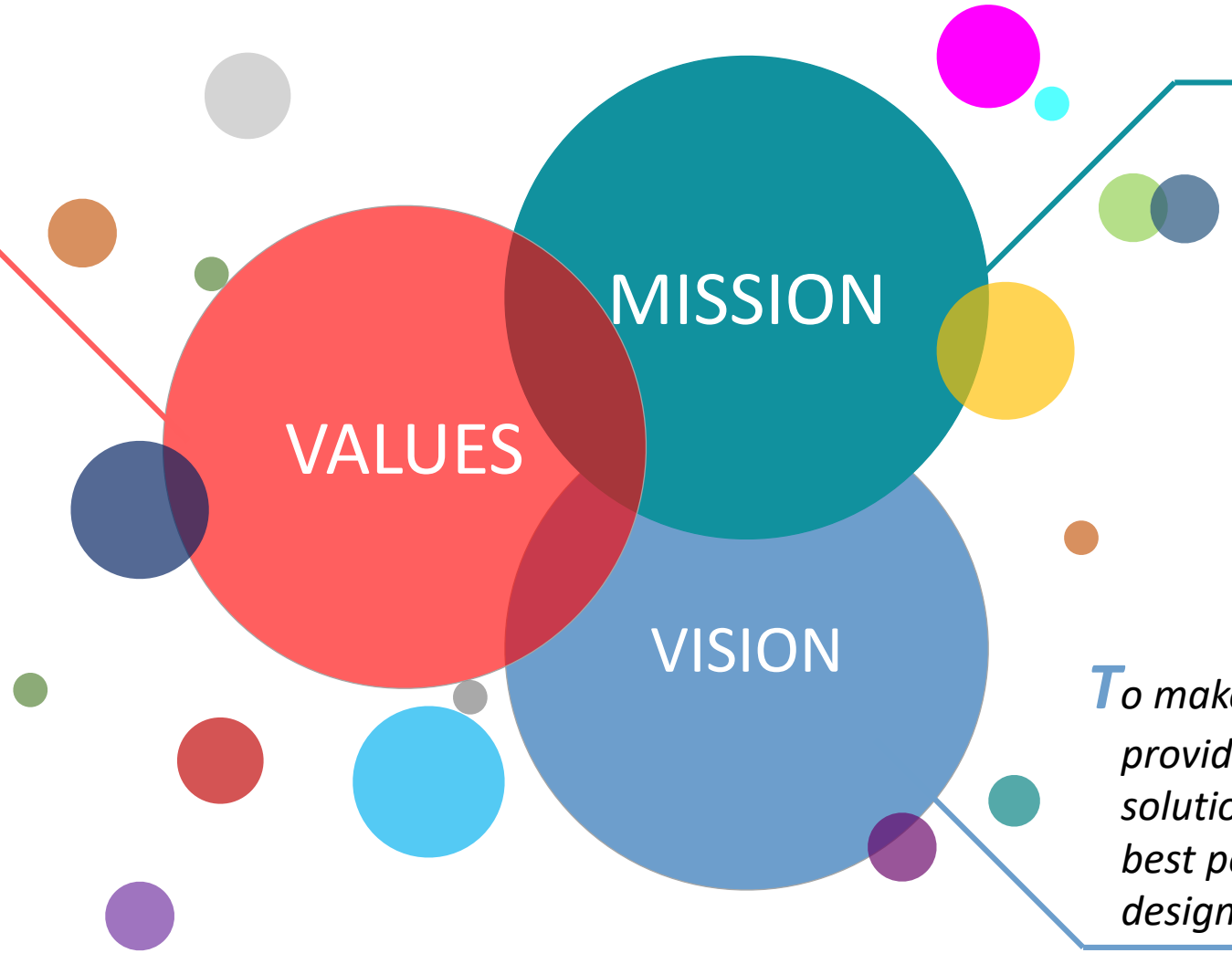
Innerve Power Solutions

About Us

- Innerve Power Solutions was founded with the intent of making world class designs and to be a preferred solution provider for Power electronics. With an average team experience of 7 years Innerve helps it clients accelerate the design cycles by offering critical design solutions for niche products which demand high technical and subject matter expertise
- The design team at Innerve is comprised of experienced and enthusiastic engineers from IITs with complementary skill sets and offer an entire product development gamut comprising of design, debug and development cycles, Root Cause Analysis (RCA) and End of line testing as service.
- Innerve is currently an Independent design House and Product design partner for renowned clients in the industry and various OEMs

Vision & Mission



Integrity
Commitment
Results Oriented
Customer Focus
Team Work

To be pioneers in Power Electronics Design and to become preferable design partners to major power industries

To make a difference by providing innovative solutions and to build best power and control designs

Core Team

KASHYAP GUNDLAPALLI
Head R&D
M. Tech IITB
Comes with an Experience of 10 years in the field of Power Electronics focused on Motion Control
Ex. Crompton Greaves
Core strengths: Control Techniques focused on Industrial drives and Traction applications

RAJESH SURA
Architect
M. Tech IITB
Comes with an Experience of 8 years in the field of Power Electronics Focused on Converter Control
Ex. General Motors
Core strengths: Digital Control, System Modeling & Closed Loop Control, Magnetics design Expert

B TEJA KUMAR
Head-Product Design
M. Tech IITB
Comes with an Experience of 8 years in the field of Power Electronics focused on Hardware & Systems Design
Ex. Crompton Greaves
Core strengths: Systems Design, Electro- Mechanical Interfacing and Power PCB design Expert

Technical Expertise

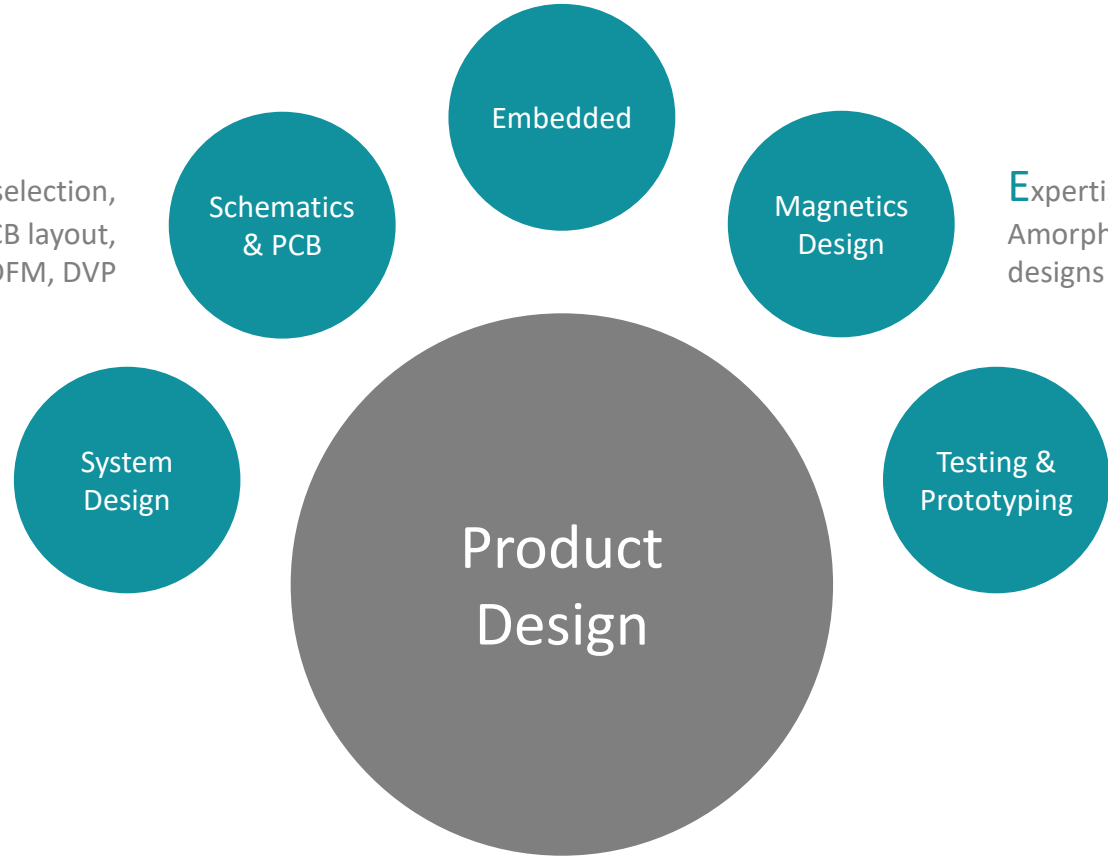
Digital control of Power converters. Expertise in Microchip, STM & TI MCUs. State Logic implementation HMI, SPI, UART, I2C communication protocols

Circuits design, BOM selection, Schematics drawing, PCB layout, DFM, DVP

Expertise in core selection from materials like Ferrites, Amorphous, Powdered iron & Laminated cores. Customised designs for High efficiency & Form-factor constraints

System level block diagram creation, Project management, Understanding client's systems

Complete design testing cycle for making production ready design, RCA, Reference designs, Test jigs for production, Component level testing



Expertise

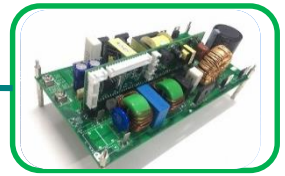
Applications

Electric Vehicles:

Chargers, Battery Management Systems, Motor Controllers – BLDC, PMSM and Induction Motor

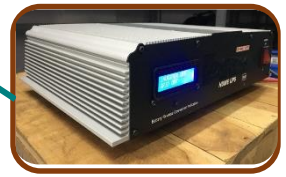
Renewable Technologies:

MPPT Charger, Power Optimizers. Solar Grid-Tied Inverters, Standalone PV Inverters, Solar PCUs, Micro Inverters, Solar Pumps



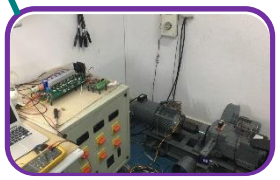
SMPS:

Isolated and Non-Isolated Converters, System Plant Modelling and Stability Analysis of Converters. Analog and Digital Control, Aux Power Supplies



UPS:

High frequency Home and Industrial Inverters up to 3kW, Design for Efficiency and Form factor SMPS based CC CV Battery Chargers



Industrial Motor Drives

Vector Control or Field Oriented Control for Induction, BLDC and PMSM motor drives, Machine Modelling and Parameter Estimation of Motors for Auto Commissioning

Products Delivered

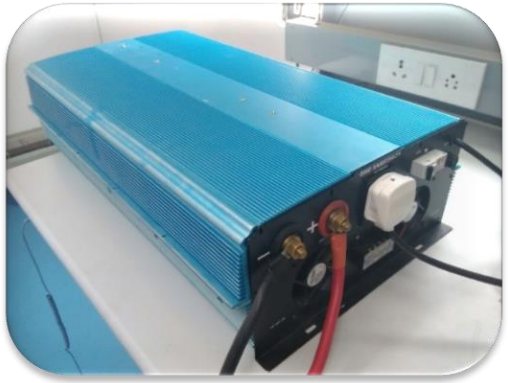
1450VA High Frequency UPS

500W Solar MPPT Charger

See Appendix for Detailed Specs

3kVA Online UPS for Defense Applications

1kW Lithium Ion Charger

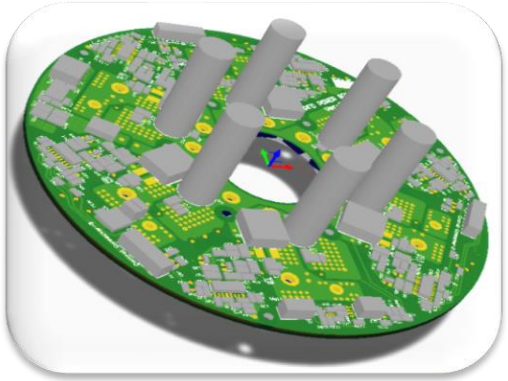


5000VA High Frequency UPS for Air Conditioner Loads

Interface Boards & Reference Designs Delivered

Charger Interface Board for Yulu Charging Stations

Controller Reference Design for Mitsubishi Board for Solar Pump Applications



SRM Motor Controller Hardware Design for 2-Wheeler Hub Motor Applications

Products Under Development

1kW BLDC Motor Controller for Electric Rickshaws

Battery Management System for BHEL Submarine Applications

See Appendix for Detailed Specs

Induction Motor Controller for Pump Applications

Matrix Converter for NUS

1.2kW Multi Output Charger for Yulu Charging Stations

Clientele

Key Clients

IFB

yulu

NUS
National University
of Singapore

BHEL

Design Partners for

MICROCHIP

wpg

Where Can We Come?

Reference design support on futuristic technologies

Co- Developing proprietary technology

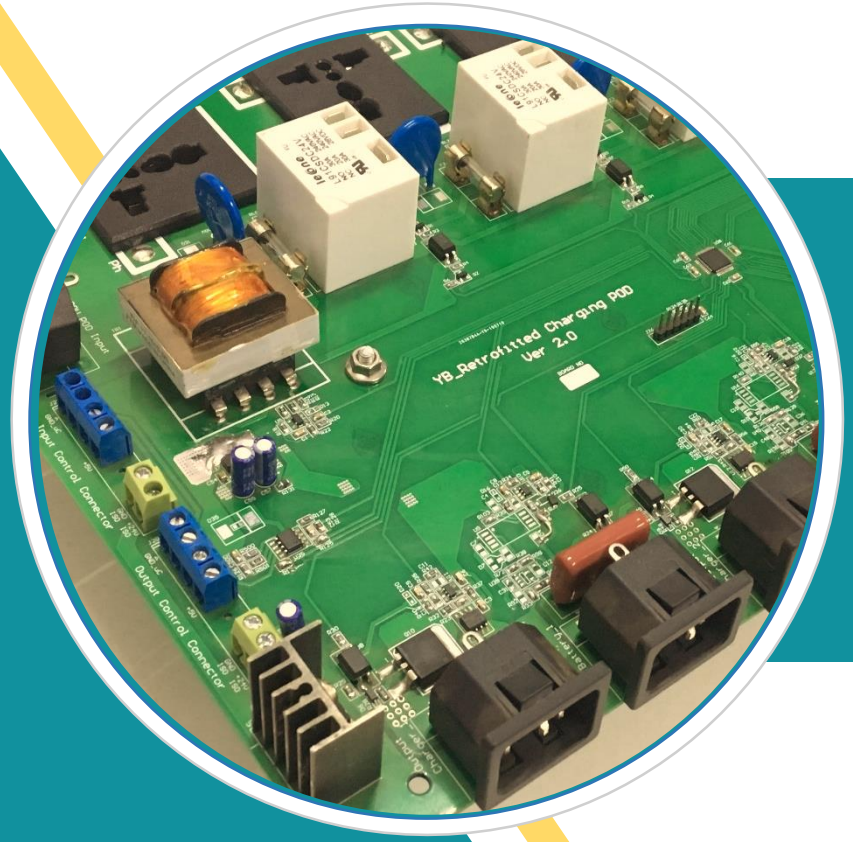
Providing more horse power. Dedicated team for power conversion

End to end commercially viable product development if need be

THANK YOU

INNERVE
POWER SOLUTIONS

www.innervepower.com

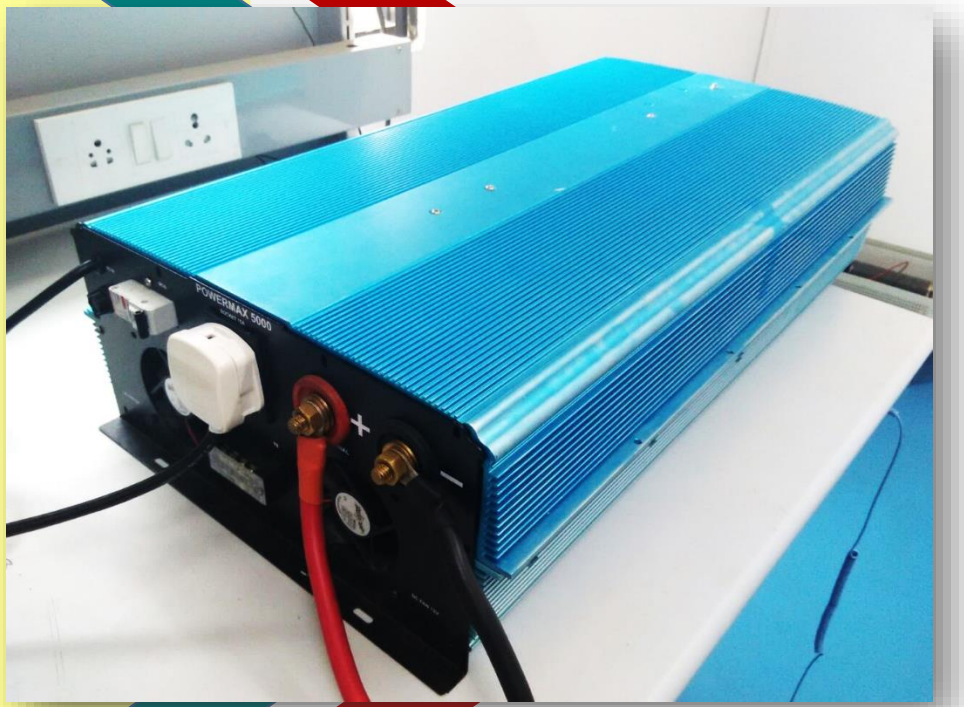

YB_Retrofitted Charging POD
Ver 2.0
Input Control Connector
Output Control Connector

Appendix

1450VA 1 Phase UPS for Domestic Applications

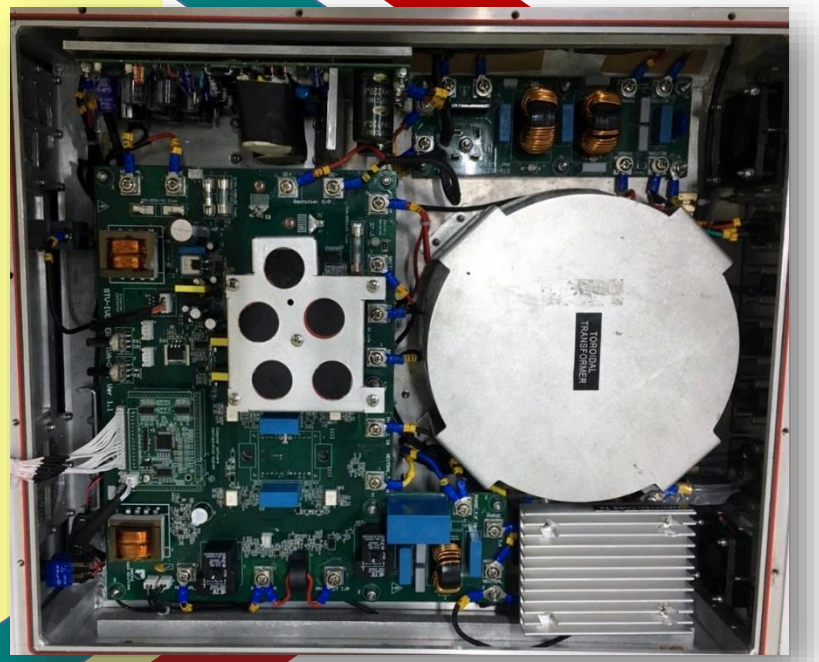
Continuous Power rating	**1450VA, 230VAC, 50Hz, THD < 3%**
Surge Power rating	3000VA
Input AC under voltage lockout	100VAC +/- 5V
Input AC over voltage	265VAC +/-10V
LCD Display	Displays all I/O Parameters and Alarms
Transfer time	<20ms
Charging	Smooth DC current @ 10Amp, CC-CV and Trickle stages
Protection	Reverse Polarity Protection, Short circuit Protection, Over Load, Under Voltage protection
Inverter Form Factor	6kgs @ 273mm x 380mm x 80mm

5000VA Single Phase UPS for Air Conditioner Loads



Continuous Power rating	**5000VA & 3000W 230VAC, 50Hz, THD < 3%**
Surge Power rating	10000VA
Input AC under voltage lockout	100VAC +/- 5V
Input AC over voltage	265VAC +/-10V
Battery	12Vx3 (150AH/200AH)
LCD Display	Displays all I/O Parameters and Alarms
Transfer time	<20ms
Charging	Smooth DC current @ 16Amp, CC-CV and Trickle
Protection	Reverse Polarity , Short circuit, Over Load, Under Voltage Protections
Loads	1.5 ton Air-Conditioner & 3HP motor

3000VA Online UPS for Defense Applications

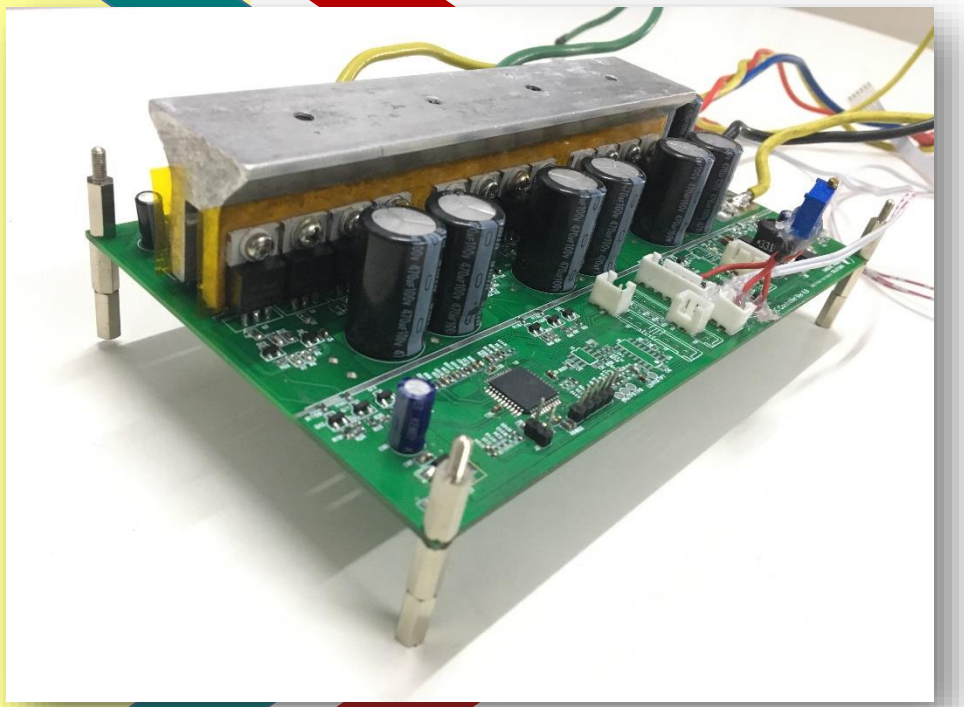


UPS Output Voltage	**230V AC ± 2%**
Capacity	**3 KVA**
Output Voltage Regulation	**± 2%**
Output Frequency	**50Hz ± 0.5%**
Load Power Factor	**0.7 lag**
Efficiency	**>96%**
Frequency Regulation	**±0.5%**
Frequency Stability	**±0.5%**
Voltage Regulation	**±2%**
Voltage Stability	**±2%**
Total Harmonic Distortion	**<3% for liner load**
Over Load Capacity	**110% for 10 min, 125% for 30 sec & 150 for 5 sec**
Protections	**Output Over Load /Short Circuit, Output Over Voltage, Output Under Voltage, IGBT Temperature, Cooling Fan Failure**

500W Solar MPPT Charger

Continuous Power rating	**500W**
MPPT Efficiency	99%
Peak efficiency	95%
Panel Configuration	4x12V panels in Parallel, 2*25 V panels in series
LCD Display	Displays all I/O Parameters and Alarms
Paralleling	Multiple Outputs can be paralleled w/o Communication
Charging	Smooth DC current @ 10Amp
Protection	Panel and Battery Reverse Polarity Protection, Short circuit Protection,
Scalability	Up to 5kW

1 kW BLDC Controller for Electric Rickshaws

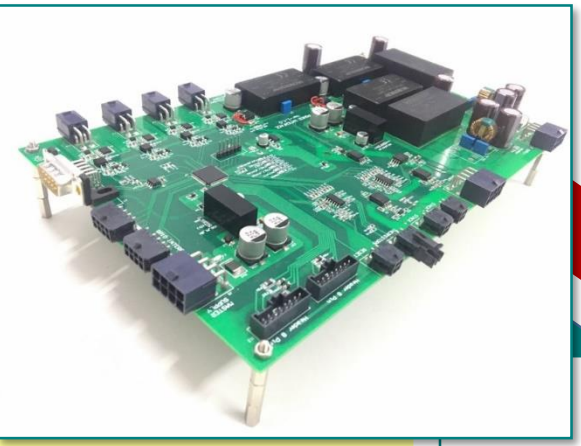


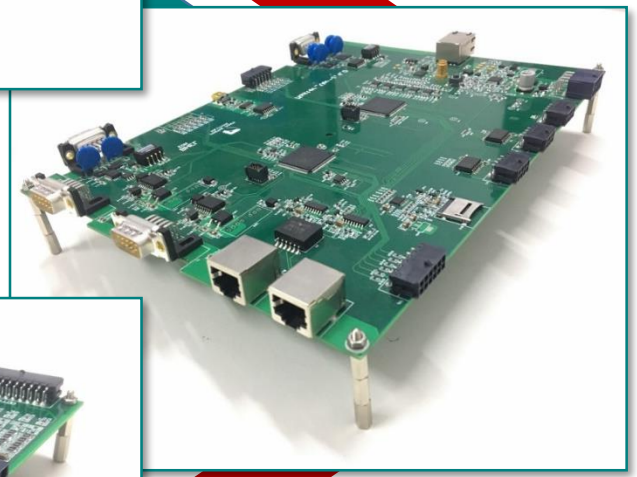
	Parameters	Values	Units
Input	Input voltage range	42 - 55	Volts
	Nominal	48	Volts
	Efficiency	92	%
Output	Output current	240	Amps
	Wattage peak	2000	Watts
	Wattage nominal	1000	Watts
Protection	Battery Over Voltage / Under Voltage Shutdown	Shuts down on fault, recovers when in-range	
	Load Short Circuit Protection	Shuts down on fault and auto retry 3 times	
	Over Temperature Protection	Shuts down on Over temp, recovers when temp goes down	
	Over load protection	Regulates load current, shuts down after pre-determined time	
Communication	UART	Available	
	CAN	Available	
Performance	Speed – 2W	Up to 35	kmph
	Speed – 3W	Up to 25	kmph

1 kW Lithium Ion Charger for Electric Vehicles

	Parameters	Values	Units
Input	Mains Voltage Range (RMS)	180 – 265	Volts
	Nominal	230	Volts
	Frequency	50	Hz
	Max Current(RMS)	6	Amp
	Power Factor	0.98	
	Efficiency	90	%
Output	Max Voltage	54	Volts
	Output Current	19	Amps
	Output Ports	1	
	Battery Type	Lithium Ion	
	Wattage	600	Watts
	Recommended Battery Capacity	12 to 40	Ampere Hour
Isolation	input and Output	2.5	Kilo Volt
Protection	Input OV & UV, Battery OV & UV, Load Short Circuit Over Temperature	Shuts down on fault, recovers when in-range	
Communication	UART	Enabled	
	CAN	Available	
	BMS interface	Available	

Battery Management System for Submarines





	Master Module	Slave Module
Configuration	Master + N – Slaves, Daisy chain	Master + N – Slaves, Daisy chain
Battery Pack Voltage	12 – 1080 volts	
Cell parameters	Volt: 0-5volts, Cur: 1.2 Ah or 1.5 Ah	0-5 V
No of cells per system	≥ 250 cells	6/8/12/16
Current capacity (Ah)	≤1000 Ah	1.2 Ah/1.5 Ah/Vendors choice
Balancing current per Cell	≤420 mA @4.2 Volts	
Input voltage	5 - 60 VDC	5 volts/12 volts
Communication Peripherals	SPI/UART/CAN 2.0/Modbus/RS 232/ RS 485, Wi-Fi as per the concurrence of BHEL	SPI/UART/CAN 2.0/Modbus/RS 232/ RS 485, Wi-Fi as per the concurrence of BHEL
General purpose I/O	Min: 8 and Max: 16 Pins	As per the number of cells/slave module
Current consumption	Less than 500 mA in any mode	Less than 500 mA in any mode
Data Storage	Micro SD	Vendors choice