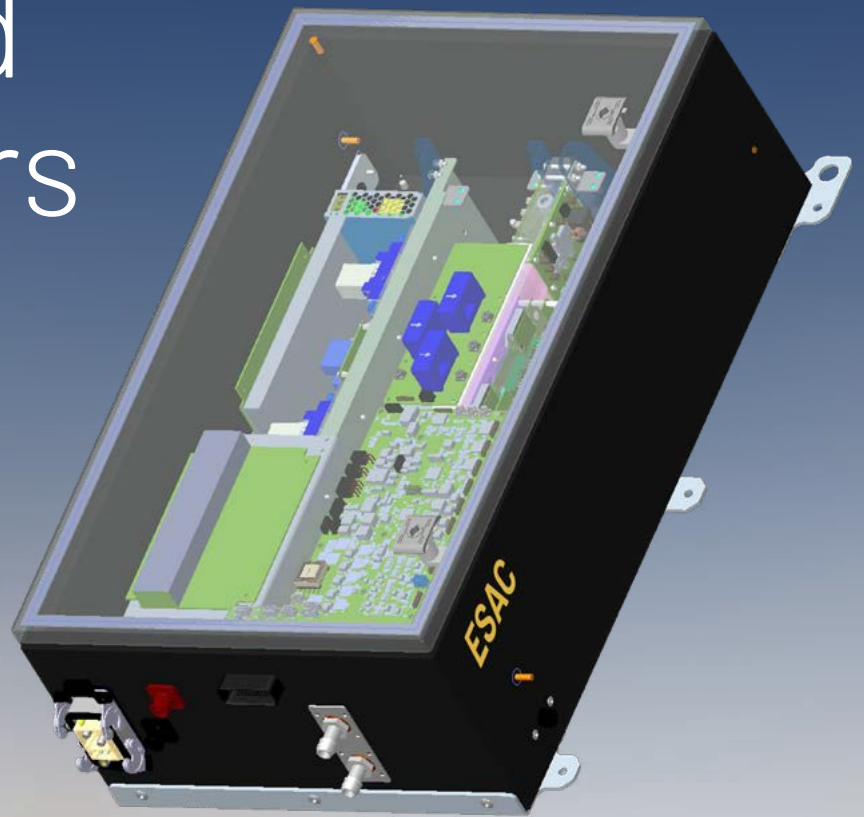


Energy Storage Advanced Converters

A New Series of Power
Converters, Designed for
Next-generation Energy
Storage Systems



Market Scenario

Over the course of the new century, a worldwide, gradual but unstoppable shift in mindset and the needs of electric energy users has been driven by climate change awareness, pollution concerns, and evolving urban regulations. Rules governing device emissions — both acoustic and greenhouse gases — are becoming increasingly stringent.

Today, most traditional generation systems are reaching the limits of allowable emissions. These systems can be replaced or supported by clean and efficient solid-state electronic converters, which enable energy storage systems to connect seamlessly to any type of grid or load. This is applicable across a wide range of domestic and industrial use cases.

The eco-friendly characteristics of these next-generation systems make them suitable for both outdoor and indoor applications, simplifying design and operation for OEMs and end-users alike.

The Energy Storage Advanced Converters by RGM

RGM introduces ESAC, a new series of power converters optimised to be part of Energy Storage Systems.

ESAC is a brand new series of RGM converters which meets the specifications of hybrid ICE generators and BESS systems.

By these 50 kW modular bricks and extensive hardware and software customization options, RGM provides comprehensive power conversion solutions.

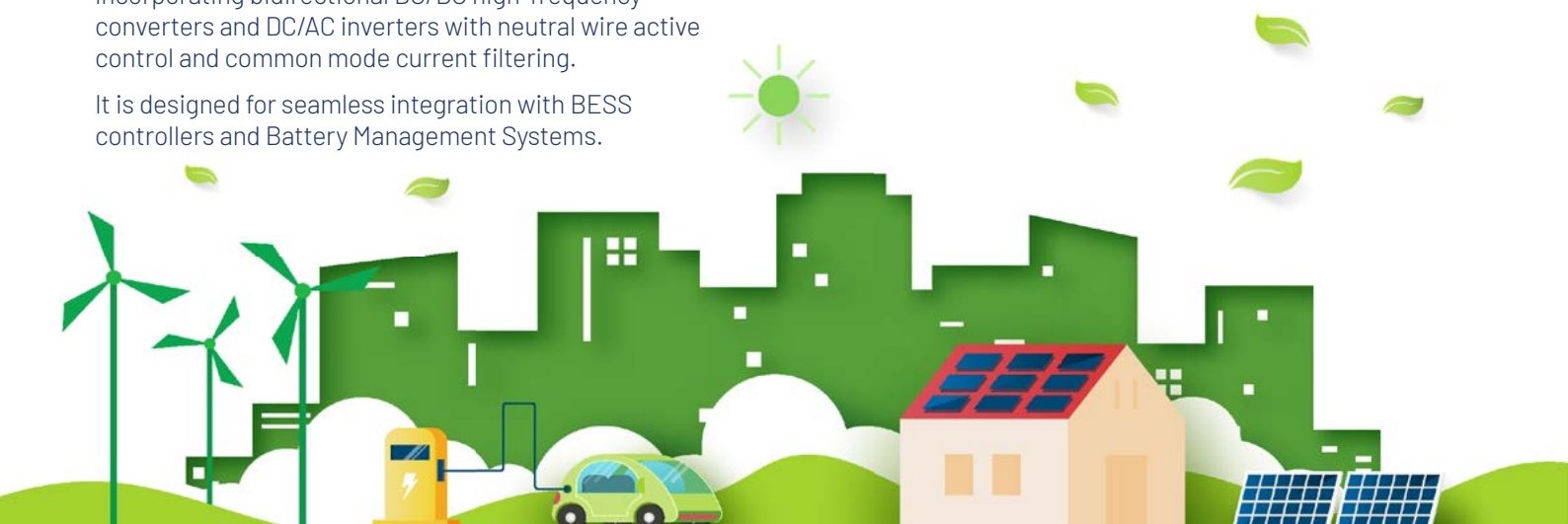
ESAC series is optimised for Energy Storage Systems, incorporating bidirectional DC/DC high-frequency converters and DC/AC inverters with neutral wire active control and common mode current filtering.

It is designed for seamless integration with BESS controllers and Battery Management Systems.

The digital vector control inverter supports micro-grids, operating both as a grid former and a grid follower. Moreover, it makes possible senseless parallel connections by effective droop control; this makes simpler grid wiring, especially in retrofit scenarios, and reduces assembly time and costs for BESS and hybrid genset systems.

The series reliability is enhanced by the compact and solid execution, based upon IP55 grade metal boxes and liquid cooling, making it suitable for industrial, mobile, and marine applications.

Several RGM DC/DC galvanically insulated high-end converters can be used together with ESAC in order to fit any BESS designer needs.

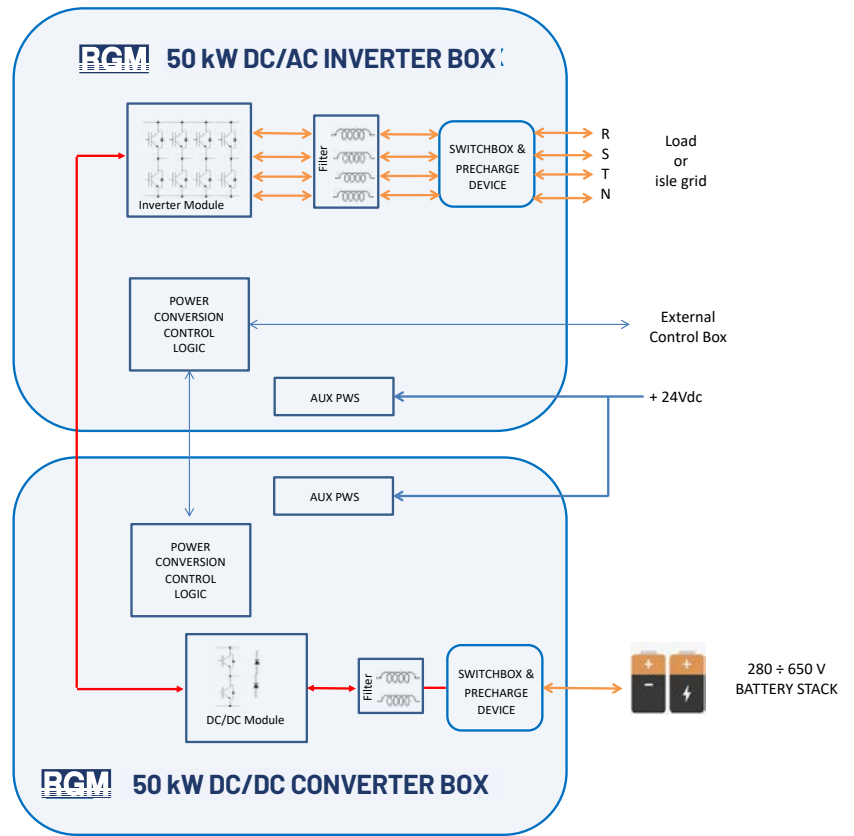


50 kW BESS Dedicated Conversion System

This very flexible combination of the RGM DC/DC and DC/AC converters allows the system designer to select within a wide range of battery configurations, as the battery voltage range can be within 280 and 650 VDC. Moreover, the combination of converters includes all of the precharge and contactors stage needed to easily include the system as is into a BESS equipment.

The water cooling system is simply integrated by connecting the cold plate in a series by a single pipe, and the electric connection between the devices is intended made by two (power/signals) short cables which can be supplied by RGM.

All of the mechanical / environment characteristics of the DC/DC and the DC/AC converters are fitted by this combination elements.



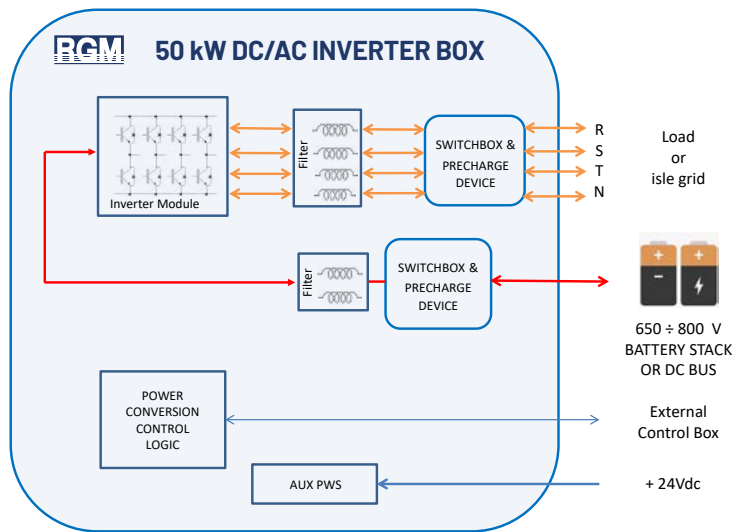
BESS DEDICATED CONVERTER SYSTEM MAIN DATA

AC SIDE	3ph.+ Active Neutral, 400 V _{AC} , 50 Hz, Max 90 A, 62,5 kVA
DC BUFFER	280 ÷ 650 V _{DC} , Continuous current 150 A, Max current 180 A, Max power 50 kW
ENVIRONMENT	IP55, cooling fluid (water+glycole) max 50°C, 10 l/min flow
COMMUNICATIONS	CAN BUS - (Option: MODBUS TCP)

ESAC based systems can be expanded by RGM galvanically isolated DC/DC converters in order to integrate sources as photovoltaic and Fuel Cell and to exploit SELV batteries

	SOURCE	STANDARD	OPTION
	Grid 400VAC 50Hz	✓	
	Galvanically insulated PV source		●
	Galvanically insulated FC source		●
	Lithium Battery > 300VDC	✓	
	Galvanically insulated battery		●
	Galvanically insulated SELV battery (< 60VDC)		●

DC/AC Inverter



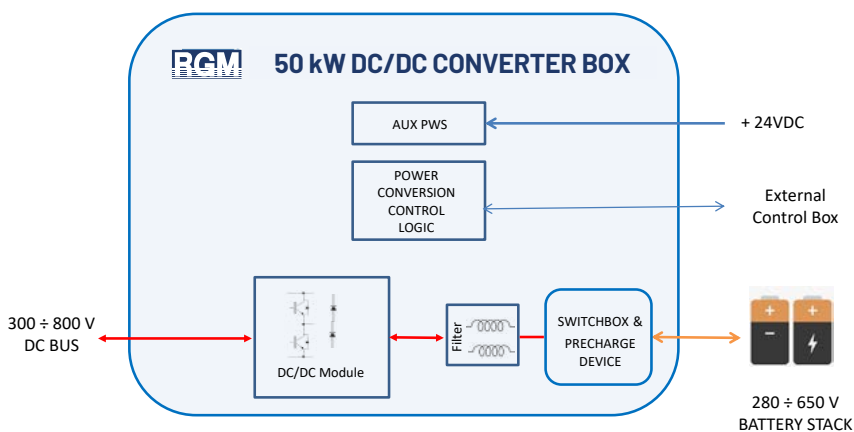
Designed to be connected to a 3ph. isle grid this 50 kW, 62,5 kVA bidirectional inverter features an active Neutral wire current management and a sophisticated digital control, in order to allow a 100% current unbalance and an effective active common mode current filter. This allows enhanced parallel capability, low EMI, drastically reduced common mode currents and easy load wiring with reduced power balance requirements.

The water cooling and the robust execution make this device the best fit for mobile applications, i.e. Energy Store Containers, electric vehicles, yachting hotel applications.

DC/AC BIDIRECTIONAL INVERTER MAIN DATA

AC SIDE	3ph.+ Active Neutral, 400 V _{AC} , 50 Hz, Max 90 A, 62,5 kVA
DC SIDE	650 ÷ 800 V _{DC} , Continuous current 80 A, Max current 90 A, Max power 50 kW
ENVIRONMENT	IP55, cooling fluid (water+glycole) max 50°C, 10 l/min flow
COMMUNICATIONS	CAN BUS - (Option: MODBUS TCP)
DIMENSIONS	750 x 650 x 250 mm (connectors and brackets excluded), 80 kg

DC/DC Converter



Designed to be combined with the DC/AC inverter in order to make it compliant with battery voltage 280÷650 VDC, this device can also act as a stand-alone, bidirectional battery and/or Fuel Cell compliant DC/DC converter.

It is distinguished by the high carrier frequency and the remarkably low current ripple due to its interleaved stages architecture.

As in the AC/DC inverter, the water cooling and the robust execution make this device optimum for mobile applications, i.e. Energy Store Containers, electric vehicles, yachting hotel applications.

DC/DC BIDIRECTIONAL CONVERTER MAIN DATA

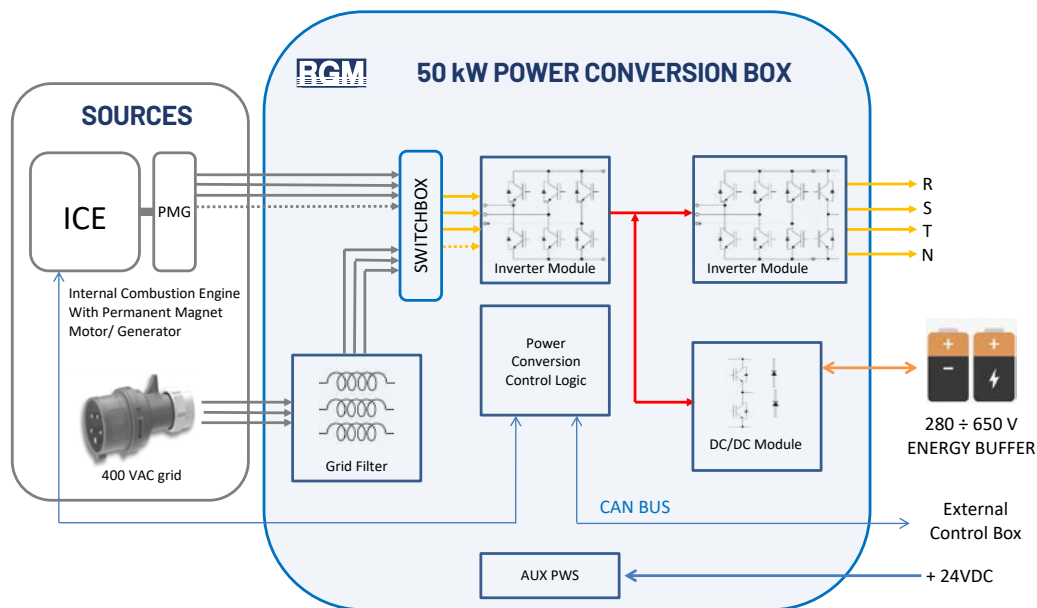
LOWER VOLTAGE SIDE	280 ÷ 650 V _{DC} , Continuous current 150 A, Max current 180 A, Max power 50 kW
HIGHER VOLTAGE SIDE	300 ÷ 800 V _{DC} , Nominal current 150 A, Max current 180 A, Max power 50 kW
ENVIRONMENT	IP55, cooling fluid (water+glycole) max 50°C, 10 l/min flow
COMMUNICATIONS	CAN BUS - (Option: MODBUS TCP)
DIMENSIONS	750 x 450 x 250 mm (connectors and brackets excluded), 50 kg

50 kW Hybrid GENSET Power Conversion System

Designed to be the integrated power converter controller for a buffered, hybrid generator set, this device can also act as a UPS device and a frequency converter.

The DC energy buffer can be a Li-based battery stack for energy oriented operations, as a UPS, or supercap based for instantaneous peak power oriented operations, as in a variable speed rotating hybrid genset.

As per the whole products family this device is provided by water cooling and robust, industrial grade execution, fitting any mobile and harsh applications.



HYBRID GENSET POWER CONVERSION SYSTEM MAIN DATA

AC SOURCES SIDE	Generator	3ph. sensorless Asynchronous, PM or switched reluctance generator, 320 ÷ 520 V _{AC} , Max 50 A
	Grid	3ph. 400 V _{AC} 50 Hz (Option: 200 V _{AC} 60 Hz), Max 50 A
AC LOAD SIDE	3ph.+ Active Neutral, 400 V _{AC} , 50 Hz, Max 90 A, 62,5 kVA	
DC BUFFER	280 ÷ 650 V _{DC} (>340 V _{DC} @ full power), Continuous current 120 A, Max current 150 A, Max power 50 kW	
ENVIRONMENT	IP55, cooling fluid (water+glycole) max 50°C, 10 l/min flow	
COMMUNICATIONS	CAN BUS - (Option: MODBUS TCP)	
DIMENSIONS	700 x 600 x 200 mm (connectors and brackets excluded), 80 kg	

Who are RGM systems dedicated to?

These devices are dedicated to all of the gen-set OEM who need to update their systems in order to fit the current and future international standards, allowing them to design full electric systems with the minimum amount of change of wiring and applications environment.

RGM devices are characterised by compactness and solid execution, allowing the designer to easily install them into existing volumes in mobile systems and/or canopy or containers.

For more information please contact our Sales Team: sales@rgm.it We will take care of your request and you'll be answered by our specialised staff.

Why RGM

Heritage

Providing solutions to international leading companies since 1986

Design Support

Turn-key solutions not available on the market with a high level of integration into the customer products: "have it work the way you want"

Value to Customers

Compact, efficient, highly integrated, reliable products, result in customer's lower costs of manufacturing

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