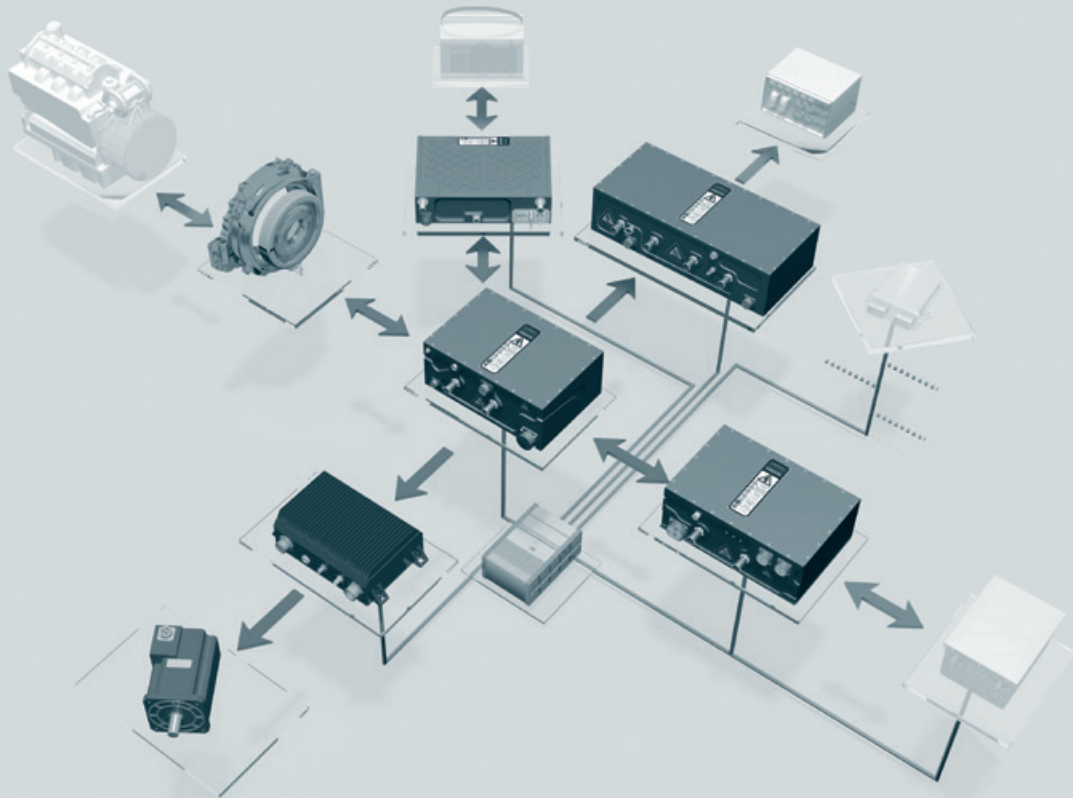




VINCORION



SOLUTIONS. TAILORED.

ELECTRICAL ENERGY SYSTEMS. POWER MEETS EFFICIENCY.

VINCORION ensures all your equipment remains powered up at all times.

Modern military vehicles have become extremely sophisticated and specialized. The fact that they are carrying more and more equipment goes without saying – and all of this gear needs power. Highly reliable power. And the increasing need to protect troops is just one of the factors driving up the energy requirements of military platforms. Enter VINCORION. At VINCORION, we plan, develop, and build electrical energy systems for a broad range of applications for both civilian and military vehicles, mobile platforms, and stationary systems. These systems ensure the crucial

supply of power, either independently or in combination with the main engine. And most importantly, even if the engine or main unit is switched off, electrical systems such as the onboard electronics, sensor systems, active protection systems, radio, ventilation, and air conditioning must continue to function to ensure the overall system remains available and ready for operation. At the same time, we ensure that factors such as fuel consumption, thermal signature, and engine noise are all reduced to a minimum. What's more, the additional installation of a high voltage energy storage increases the range of your vehicle, providing the potential to extend your mission.

RELIABLE AND DURABLE ELECTRICAL ENERGY SYSTEMS BY VINCORION. STATE-OF-THE-ART AND PROVEN SUCCESSFUL IN INTERNATIONAL APPLICATIONS.

All VINCORION energy systems supply platforms with steady electricity in precisely the form in which it is required. Power, capacity, voltage, current, and frequency are all optimally tuned to the particular customer's requirements in question – including innovative high-voltage consumers such as weapon stabilization or future electric armour and laser weapons. To achieve this, we offer tried and true state-of-the-art products – proven successful in both national and international applications. When used in the particular vehicle in question, our subsystems, such as generator sets, alternators, power electronics, or electrical components, are optimally tuned to one another and enable the energy for the platform to be managed intelligently and extremely efficiently.

Through our research and development at VINCORION, we have come up with both customized complete systems and system solutions, as well as standardized subsystems and components. The latter are designed to be flexible enough to enable us to adapt them in line with all of your requirements with the least effort possible. Our system meets high voltage safety requirements using a fault-tolerant IT-system. This allows you to modernize your fleet at lower cost and enhance the level of performance and availability offered by your vehicles. All newly developed

systems are subjected to a rigorous process of testing and optimization in a “hardware-in-the-loop” (HiL) simulation, in which we replicate the real-world environment. By taking this approach, you obtain a customized energy system that precisely meets your requirements within the shortest of time frames and offers you true added value. And you get fuel-saving solutions that support hybrid functionality, as well.

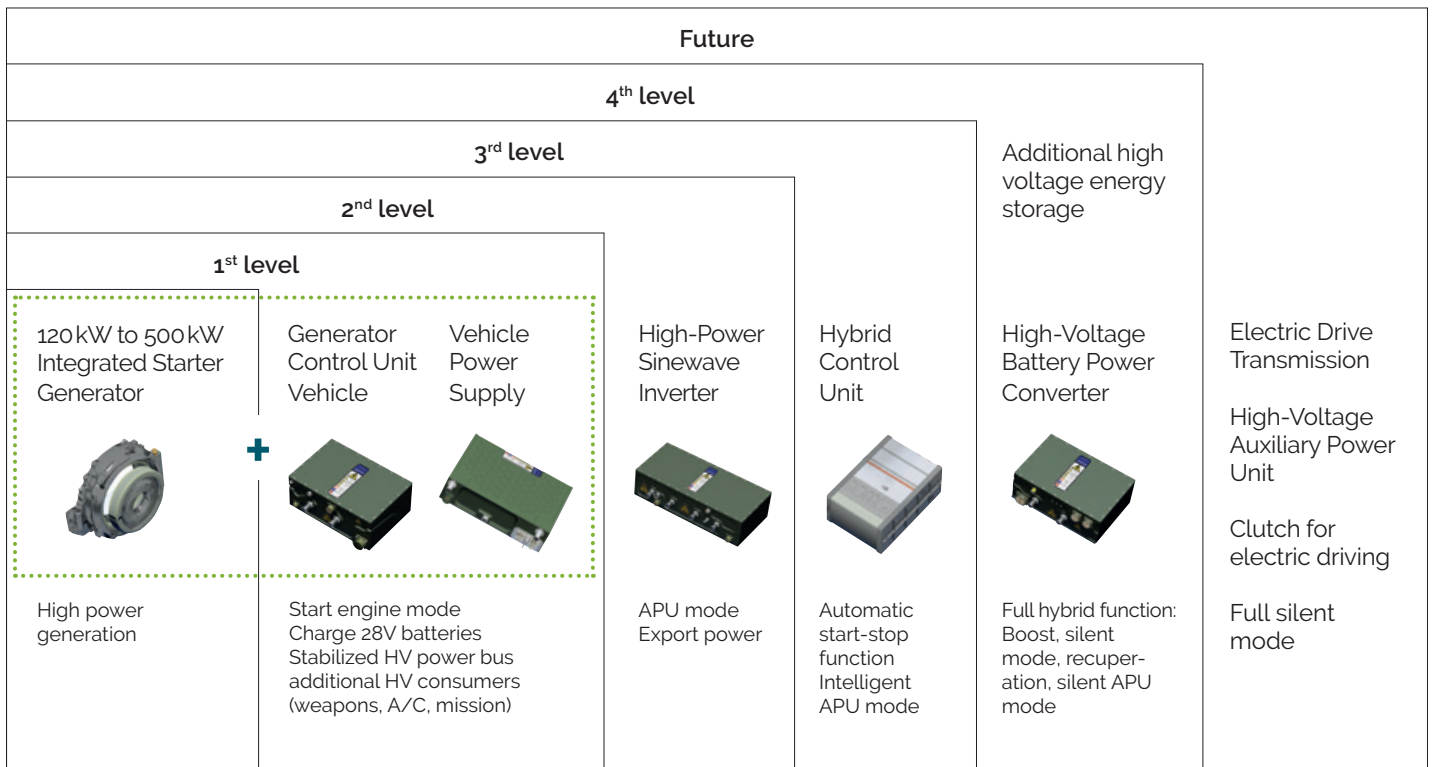
THE BENEFITS SPEAK FOR THEMSELVES:

- **Reduced life-cycle cost:** Maximum availability and operability
- **Fuel-saving, yet high power density:** Supports hybrid functionality
- **Easily adaptable to customer needs and flexible updates to existing systems:** Modular construction
- **Reliable:** Maximum availability and operability
- **Flexible:** Updating is a quick and simple process

FIELDS OF APPLICATION:

- Power supply for military vehicles with high power requirements
- Export power
- KERS and hybrid power

BASIS SYSTEM WITH OPTIONAL ADD-ONS DEPENDING ON MISSION REQUIREMENTS.



INTEGRATED STARTER GENERATOR (ISG)



The Integrated Starter Generator is a permanent magnet-excited flywheel generator with a capacity of 20 kW to 500 kW. It is mounted on the crankshaft between the combustion engine and the transmission without any additional bearings.

FEATURES:

- High power density
- High efficiency (95%)
- Starter and booster functionality
- Water-cooled
- Can be operated as either an alternator or a motor
- SAE1 flange

Technical Specifications

Nominal DC power @ 2,200 rpm	120 kW
Nominal DC power @ 660 rpm	33 kW
Overload power	132 kW for 5 min / 144 kW for 1 min
Nominal torque	520 Nm
Max. starter torque	650 Nm (at -46°C to 0°C for less than 10 s)
Nominal speed	2,200 rpm
Max. speed	3,150 rpm
Coolant temperature	≤ 75°C
Ambient operating temperature	from -40°C to +110°C
Ingress protection classification	IP67
Dimensions	Diameter: 490 mm Length: from 155 mm to 320 mm
Total weight	100 kg ±5
Integration	SAE 1 (with standard adapters SAE 2/3)

GENERATOR CONTROL UNIT



The General Control Unit (GCU) is a bidirectional power converter for generator and motor functionality.

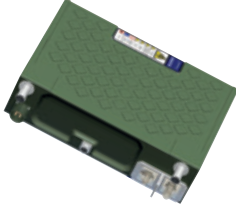
FEATURES:

- Stabilized 600 V DC / 750 V DC
- Integrated bus power management
- Cascading 120 kW modules
- Isolated power grid with high-voltage DC breaker
- Water-cooled
- CAN bus interface

Technical Specifications

Nominal electrical power	120 kW @ 750 V @ high-voltage DC interface
DC input voltage range	from 375 V to 750 V @ high-voltage DC interface (transients up to 850 V)
Nominal DC output voltage	750 V (standard)
Max. DC current	160 A @ high-voltage DC interface
Max. AC input voltage (line to line)	650 Vrms @ generator AC interface (GCU not active)
Max. AC output voltage (line to line)	3 × 480 Vrms @ generator AC interface generated by GCU @ nominal DC voltage
Max. AC phase current	3 × 170 Arms @ generator AC interface
Coolant temperature	≤ 75°C (≤ 80°C for less than 5 min)
Ambient operating temperature	from -40°C to +110°C (+120°C for less than 5 min)
Ingress protection classification	IP67
Dimensions (L × W × H)	535 mm × 356 mm × 216 mm
Weight	53 kg

VEHICLE POWER SUPPLY



The vehicle power supply (VPS) is a bidirectional and isolated DC/DC converter. It is the link between the high-voltage DC bus (600 V / 750 V) and the 28 V network of the vehicle.

FEATURES:

- Enables the ISG to be used via the generator control unit as the engine starter
- Supplies 28 V onboard system
- Galvanically isolated
- High efficiency
- CAN bus interface

Technical Specifications

Nominal DC power	18 kW
Nominal DC output voltage	28 V @ low-voltage DC interface
Nominal current @ low-voltage DC interface	640 A
Nominal DC input voltage	750 V @ high-voltage DC interface
DC input voltage range	540 V to 800 V @ high-voltage DC interface
DC input voltage range with reduced power	450 V to 540 V @ high-voltage DC interface
Coolant temperature	≤ 75°C (≤ 80°C for less than 5 min)
Coolant flow rate	≤ 75 L/min
Ambient operating temperature range	from -40°C to +110°C (+120°C for less than 5 min)
Ingress protection classification	IP67
Dimensions (L × W × H)	547 mm × 377 mm × 132 mm
Weight	40 kg

HIGH-POWER SINEWAVE INVERTER



The High-Power Sinewave Inverter provides a stable three-phase power system for standard 50 Hz / 60 Hz AC equipment or facilities such as field hospitals or camps. The inverter is capable to drive full asymmetrical loads up to 20 kW.

FEATURES:

- Grid-forming inverter in the form of a DC / AC converter
- Makes it possible to supply consumers outside the vehicle with power by means of a 230 V / 400 V, 50 Hz or 120 V / 210 V, 60 Hz three-phase voltage grid
- A setup enabling the vehicle to be used as a mobile auxiliary power unit (APU)
- Water-cooled
- CAN bus interface

Technical Specifications

Nominal output	100 kVA (total power @ 400 V AC) at cos = 0.8
Nominal output current	145 A @ 50 Hz
Nominal voltage	230/400 V AC; (optional 120/210 V AC)
Output	3-phase, neutral IT (isolated power grid); sinusoidal
Frequency	50 Hz ± 1%; optional 60 Hz at reduced output power
DC input voltage	600 V DC – 800 V DC (isolated grid required)
Coolant temperature	≤ 75°C (≤ 80°C for less than 5 min)
Coolant flow rate (nominal)	75 L/min
Ambient operating temperature range	from -40°C to +110°C (+120 °C for less than 5 min)
Ingress protection classification	IP67
Dimensions (L × W × H)	812 mm × 356 mm × 216 mm
Weight	Approx. 100 kg (incl. EMC filter acc. to MIL-STD-461F)

HIGH-VOLTAGE BATTERY POWER CONVERTER



The High-Voltage Battery Power Converter is the link between the high-voltage DC bus (e.g. 750 V) and a high-voltage battery (e.g. 350 V) for optimized battery control in combination with the Battery Management System.

FEATURES:

- Bidirectional connection to traction battery
- CAN bus interface
- Water-cooled
- Implemented charging characteristics

Technical Specifications

Nominal power	100 kW
Voltage level 1 (constant)	500–800 V 750 V @ nominal power
Nominal DC current 1	133 A @ 750 V DC
Voltage level 2 (variable)	250–450 V (375 V @ nominal power)
Nominal DC current 2	266 A @ 375 V DC
Coolant temperature	≤ 75°C (≤ 80°C for less than 5 min)
Coolant flow rate (nominal)	75 L/min
Ambient operating temperature range	from -40°C to +110°C (+120°C for less than 5 min)
Ingress protection classification	IP67
Dimensions (L × W × H)	535 mm × 356 mm × 216 mm
Weight	75 kg

HYBRID CONTROL UNIT



The Hybrid Control Unit is the interface between the vehicle and energy system. It enables power management for hybrid functionalities in combination with high-voltage energy storage.

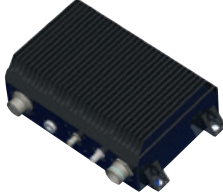
FEATURES:

- Links all high-voltage components with the vehicle's main engine and transmission to facilitate communication
- Intelligent interaction between all components
- Implements a full range of functions, like the start-stop function and intelligent APU mode
- Air-cooled

Technical Specifications

DC supply voltage range	8V to 32V
Nominal DC supply voltage	24V
Data interfaces	4 CAN bus interfaces 2 RS-232 interfaces 1 Ethernet interface 1 USB interface
Ambient operating temperature range	from -40°C to +80°C
Ingress protection classification	IP66
Dimensions (L × W × H)	185 mm × 158 mm × 70 mm
Weight	1.2 kg

MOTOR CONTROL UNIT



The motor control unit is used to control the compressor motor for onboard air conditioning systems in vehicles. It is specifically designed for the VINCORION compressor motor SP250-2A.

FEATURES:

- Small size through high DC input voltage
- CAN bus interface
- Integrated test system
- Air-cooled

Technical Specifications

Nominal power at max. external airflow	8,7 kW @ 2 m/s
DC input voltage range	from 570 V to 630 V
Nominal DC input voltage (line to line)	600 V
Nominal AC output voltage	400 V
DC cutoff voltage	500 V
Nominal output frequency	up to 350 Hz
Coolant surface cooling with externally forced airflow	0,5 m/s at small load, 2 m/s at full load
Cooling air temperature	≤ 50°C
Ambient operating temperature range	from -40°C to 50°C (at forced cooling)
Ingress protection classification	IP54
Dimensions (L × W × H)	393 mm × 246 mm × 140 mm
Weight	9 kg

AUXILIARY DRIVE MOTOR



The Auxiliary Drive Motor SP250-2A is used for onboard air conditioning systems in vehicles. Although specifically designed for the Air Conditioning Drive Inverter, this motor can be used for other applications as well. The motor is permanent-magnet synchronous.

FEATURES:

- High efficiency
- Surface-cooled
- Hall sensor position encoder

Technical Specifications

Nominal power	8 kW @ 3,500 rpm
Nominal voltage (line to line)	400 V
Nominal speed range	500 rpm to 3,500 rpm
Ambient operating temperature range	from -40°C to +63°C
Ingress protection classification	IP65
Dimensions (L × W × H)	290 mm × 190 mm × 190 mm
Weight	21 kg