New energy for marine applications

The future of electrified drive systems

Bosch Engineering

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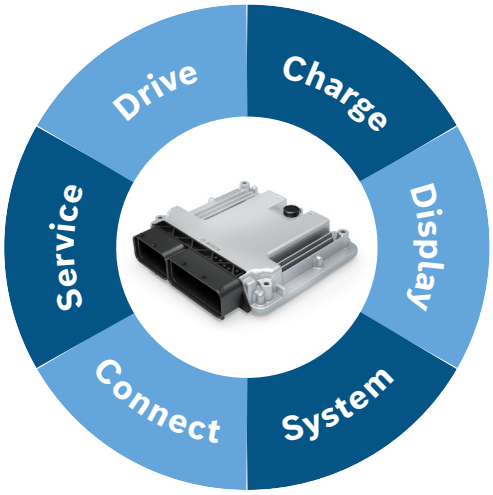
The trend towards electrification

Bosch Engineering offers electric propulsion systems for recreational boats and yachts which shipyards and system integrators can use to implement electrification quickly and easily.

In many regions of the world, new environmental laws for inland and recreational boats will come into force in the coming years. This is a trend not only among shipyards and many boat manufacturers. The increasing customer demand for a more environmentally friendly and low-noise motorization is also driving the industry. With its electrification solutions, Bosch Engineering wants to play a decisive role in driving the change in shipping, giving boat manufacturers exactly the drive components and system solutions they need.

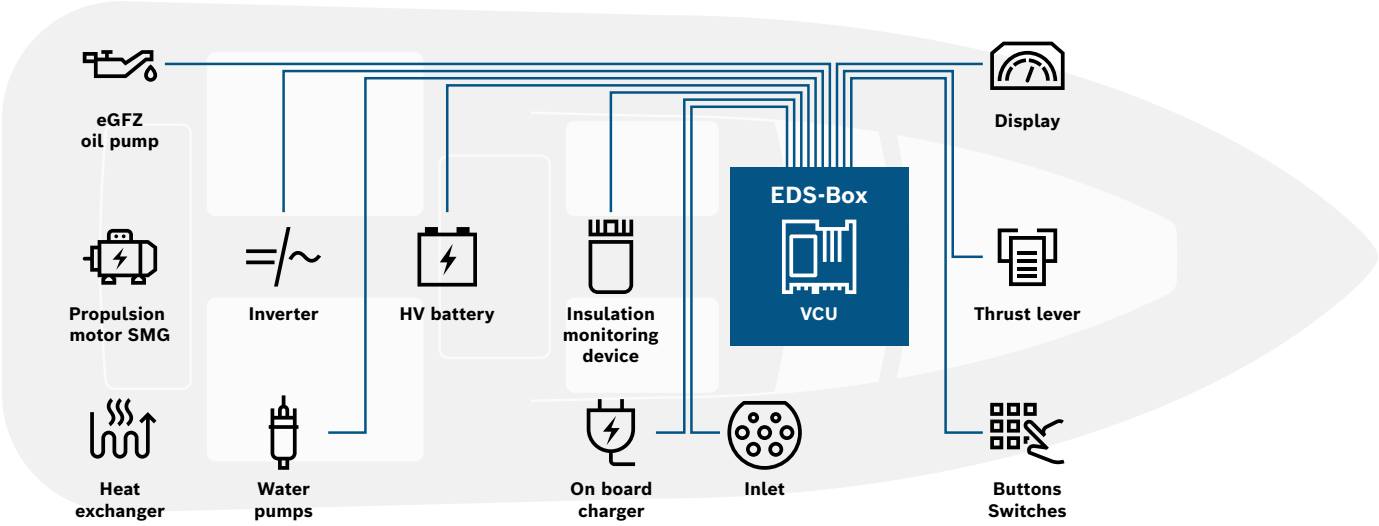
Electric drive system platform: Easy integration thanks to platform approach

With the electric drive system platform (EDSP), Bosch Engineering offers boat manufacturers a high-quality solution for electric boat drives. This includes Bosch's own drive components, such as electric motors, inverters and transmissions, as well as solutions for all other relevant components like high-voltage batteries, chargers, and cable harnesses. Together with the EDSP, users also receive a description of all the core information required for integration into the boat. This includes a system manual, component specification, ECU software, as well as a commissioning package. In addition, the EDSP approach significantly shortens the time to market for production use.



With the EDSP, boat manufacturers benefit from a predefined complete solution that can be installed in sports boats or yachts easily, quickly, and cost-effectively. Moreover, the drive components can also be supplied individually for independent integration by the customer. The motors are available in two peak power levels of 90 kW and 140 kW in the EDSP. In particular, the design of the 400 V permanent magnet synchronous motor has a high power density and is extremely efficient. The inverter is equipped with a powerful DC/DC converter to supply the 12 V consumers, while the reduction gear boasts an impressively high efficiency, runs very quietly, and requiresery little maintenance.

The compact dimensions allow boat manufacturers to easily integrate the components even in confined spaces or to retrofit existing applications. What is more, the low total weight of the components increases the maximum range of the boat.

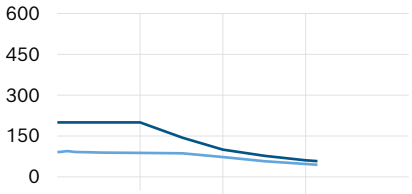


Electric motor

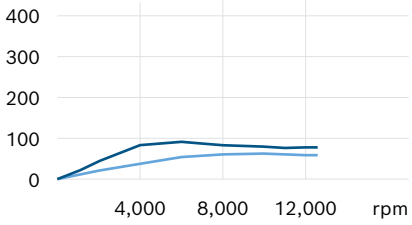
SMG180-OHW

Voltage range	< 425 V_{DC}
Power peak	90 kW
Power continuous	60 kW
Torque peak	200 Nm
Torque continuous	90 Nm
Efficiency$_{peak}$	94 %
Coolant flowrate	8 l/min
Weight	30 kg
Dimensions	~Ø 60 × 270 mm
Speed	12,000 rpm

Torque (400 V) [Nm]



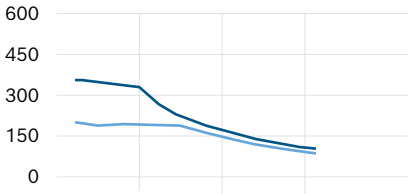
Power (400 V) [kW]



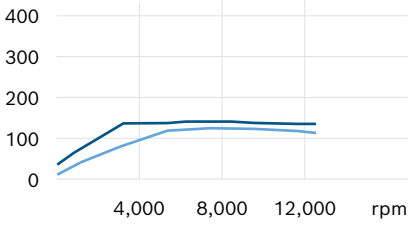
SMG220-OHW

Voltage range	< 425 V_{DC}
Power peak	140 kW
Power continuous	120 kW
Torque peak	350 Nm
Torque continuous	200 Nm
Efficiency$_{peak}$	96 %
Coolant flowrate	8 l/min
Weight	63 kg
Dimensions	~Ø 286 × 337 mm
Speed	15,000 rpm

Torque (400 V) [Nm]



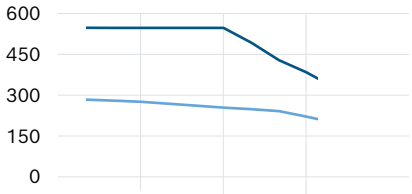
Power (400 V) [kW]



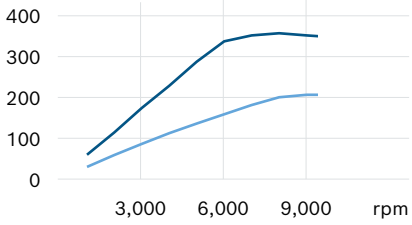
SMG230-OHW [1, 2]

Voltage range	< 850 V_{DC}
Power peak	360 kW
Power continuous	200 kW
Torque peak	550 Nm
Torque continuous	280 Nm
Efficiency$_{peak}$	97 %
Coolant flowrate	10 l/min
Weight	60 kg
Dimensions	~Ø 345 × 283 mm
Speed	12,000 rpm

Torque (800 V) [Nm]

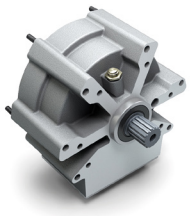


Power (800 V) [kW]



Peak power Nominal power

Gearbox



EDT180

1 speed planetary gear box

Ratio	3.086:4.318
Torque peak (out)	615 Nm
Power peak	90 kW
Speed max (in)	12,800 rpm
Efficiency	up to 98
Cooling	Water glycol mixture
Oil pump	Internal active oil cooling/lubrication
Weight	15 kg
Dimensions	259 × 140 × 263 mm
Compatible motor	SMG180

eGFZ9125

1 speed spur gear box

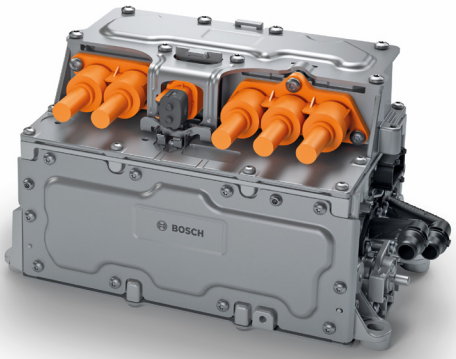
Ratio	4.6 (optional available: 4; 5; 6)
Torque peak (out)	3,800 Nm
Power peak	140 kW
Speed max (in)	16,000 rpm
Efficiency	up to 98
Cooling	Water glycol mixture
Oil pump	Integrated (CAN controlled)
Weight	49 kg
Dimensions	329 × 457 × 336 mm
Compatible motor	SMG220

eGFV9120 [2]

1 speed planetary gear box

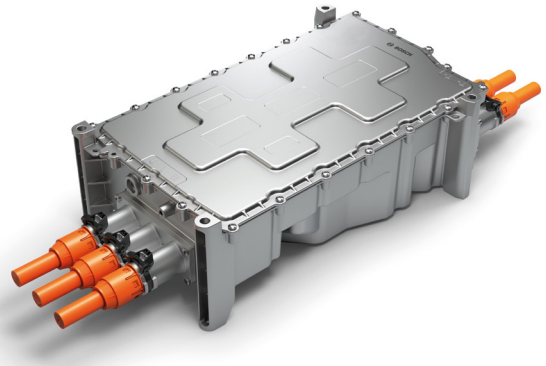
Ratio	3.77:4.34
Torque peak (out)	2,000 Nm
Power peak	360 kW
Speed max (in)	12,000 rpm
Efficiency	tbc.
Cooling	Water glycol mixture
Oil pump	Splash lubrication
Weight	25 kg
Dimensions	Ø 335 × 220 mm
Compatible motor	SMG230

Inverter



INVCON3.3

Typ. power	up to 140 kW peak
Voltage range	205 – 425 V_{DC}
Supply voltage	12 V
Current peak	480 A_{rms}
Current continuous	250 A_{rms}
DCDC power (12 V)	2.8 kW
Water cooled	8 l/min, 65 °C
Protection	IP6K6K, IP6K9K
Software	Control software with config. interface (UDS, BODAS Service) and CAN 2.0A (500 kbit/s); trq- & n-control
Weight	10 kg
Dimensions	352 × 192 × 194 mm
Compatible motor	SMG180, SMG220



Inverter Gen4 [2]

Typ. power	up to 360 kW peak
Voltage range	400 – 845 V_{DC}
Supply voltage	12/24 V
Current peak	550 A_{rms}
Current continuous	307 A_{rms}
DCDC power (12 V)	–
Water cooled	10 l/min, 65 °C
Protection	IP6K6K, IP6K9K
Software	Control software with config. interface (UDS, BODAS Service) and J1939; trq-, n- and U-control
Weight	18 kg
Dimensions	533 × 343 × 160 mm
Compatible motor	SMG230

[1] Technical specifications measured at 800 V, 40 °C

[2] Individually available, not supported by EDSP

At a glance:

- With the new electric drive system platform (EDSP), Bosch Engineering offers a sophisticated system solution for simple and fast integration in the boat
- The EDSP system guideline and software make it easier for users to create a high-voltage drive system that meets the requirements of the European Recreational Craft Directive, at the same time complying with the latest state of the art in functional safety and cybersecurity
- The platform solution is based on proven high-performance and particularly compact components from the automotive sector
- The drive components can also be purchased individually for independent integration by the customer

Find more information on our website!

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