



BOSCH

Invented for life

electric

New energy for off-highway applications

Bosch Engineering

The future of electrified drive systems

Electrical operation – versatile application



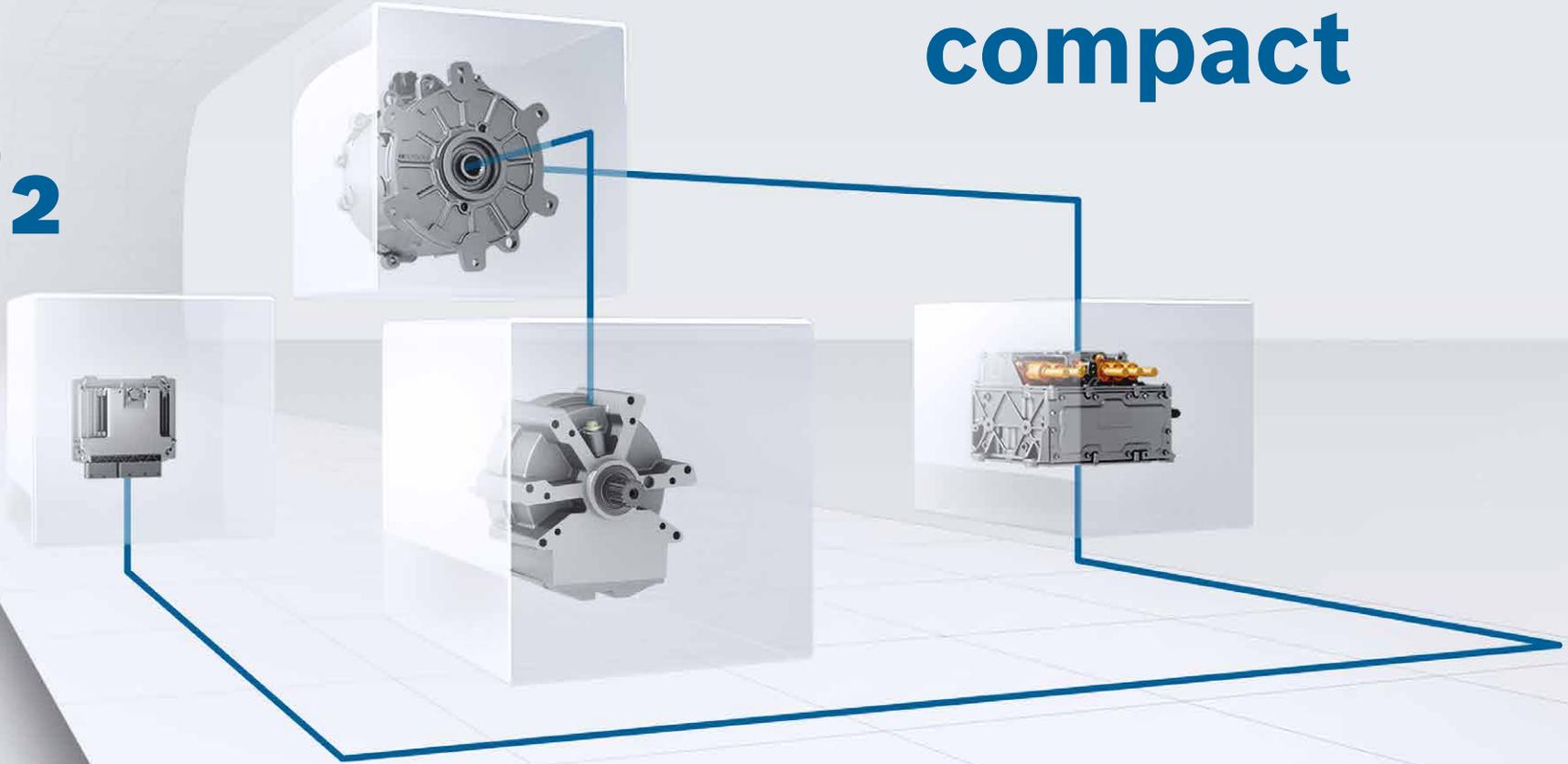
The electrified drive system from Bosch Engineering can be used in numerous sectors of the off-highway segment. As a fully electric or hybrid solution, it allows for emission-free or significantly low emission travel.

STRONG PERFORMANCE

Compact design and low weight, but high power: the electrified drive for off-highway applications from Bosch Engineering. At voltage levels of up to 425V, under typical cooling conditions, the drive reaches a continuous power of 60 kW. During acceleration or boost phases, it can even reach a maximum power of up to 105 kW and a maximum torque of 615 Nm.

-CO₂

compact



**100 %
maintenance-free**

Facts and figures that speak for themselves

OPERATING PRINCIPLE

The electric drive from Bosch Engineering consists of three compatible components: e-machine SMG180, inverter INVCON 3.3 and reduction gear EDT180. Developed for automobile large-scale production, the inverter and electric motor are not based on an industrial design, but rather designed and tested for mobile operation under increased environmental influences. In addition to the advantages of a compact design and a low weight, the components are optimized with regard to a high power density. The high level of product maturity allows for instant and uncomplicated system operation. The reduction gear is developed specifically for the e-machine SMG180.

With a transmission ratio of $i = 3.086$, it provides a speed range and torque as known from mechanical and hydraulic systems. Consistently high rotational speeds are possible without any problems thanks to integrated active oil lubrication. In addition, a flexible flange plate provides high compatibility with existing vehicle configurations. This emission-free type of drive train is controlled by the Electric Drive Control Unit (EDCU). Its modular software platform allows it to be flexibly adapted to customer-specific needs and used in various mobile and stationary applications. Customer-owned software may also be integrated. This makes the electric drive system open to numerous system configurations.

Technical data

ELECTRIC DRIVE CONTROL UNIT

Clock frequency	180 MHz
Topologies	Battery-powered, diesel-electric drive, range extender
Motor software modules	expandable for up to 4 drives
Drive software modules	Driver request detection, auxiliary drives, range extender, charger

ELECTRIC DRIVE

Power (max/continuous)*	105/60 kW
Torque (max/continuous)	200/90 Nm (without gearbox), 615/275 Nm (with gearbox)**
Maximum speed	12,800 rpm (without gearbox), 4,147 rpm (with gearbox)**
DC/DC converter	12 V/3 kW
Type of protection (mounted)	IP67, IP6K9K
Dimensions (l × w × h)	192 × 327 × 194 mm (inverter) 239 × 245 mm (e-machine [l × hole circle-Ø]) 139 × 260 × 275 mm (gearbox)
Weight	10 kg (inverter), 31 kg (e-machine), 17 kg (gearbox)
Interface	CAN 2.0 A
Gearbox spline	W35 (according to DIN 5480)
E-machine spline	W25 (according to DIN 5480)
Service life	8,000 h
Voltage	12 V, HV to 425 V
Coolant	Water glycol mixture
Typical cooling water feed temperature	≤ 60 °C

*Depending on cooling and voltage **($i = 3.086$)

100 % maintenance-free

Time and cost savings through the omission of maintenance costs, such as oil changes.

more comfort

in daily use, work noise is significantly reduced.

no emissions

The purely electric drive solutions travel locally emission-free and even with hybrid drive systems, emissions and CO₂ output are reduced.

compact

The space-saving design can be easily integrated into existing mechanical and hydraulic systems.

series quality

The electric drive system is based on large-scale production components from the automobile industry and is extensively tried and tested.

PRODUCT BENEFITS

- ▶ Simple and quick implementation of electrification strategies
- ▶ Easy integration in existing drive train concepts thanks to high interface compatibility and compact design
- ▶ Reduction of maintenance costs due to maintenance-free components
- ▶ Increased efficiency and longer service life using the permanent excitation synchronous machine
- ▶ Implementation of various system topologies through a modular software platform
- ▶ Configurable software allows customer-specific adjustments

Driven by quality



ENGINEERS FOR INTERNATIONAL REQUIREMENTS

Global presence Headquartered at the Bosch development center in Abstatt, we are represented by regional subsidiaries all over the world. As a result, we know the requirements and characteristics of the different markets. In close collaboration with the Bosch Group and together with our competent employees, we are always able to realize challenging development tasks for international customers.



INDIVIDUAL SOLUTIONS AS NEEDED

Comprehensive range of services and know-how Through tested and innovative large-scale production technology, we are able to develop electric drive concepts for various off-highway applications and optimally adapt them to the respective areas of application. Thanks to the modular software platform, we can manage various system configurations, according to the customer's needs.



COMPREHENSIVE SOLUTIONS THROUGH INTELLIGENT INTEGRATION

System and networking competence As a system provider we keep the whole machine in mind and ensure easy integration of the electric drive in existing drive systems as well. The small design of the system is the prerequisite for this. Likewise, versatile connections are essential in order to configure the system compatible with the interfaces of existing hydraulic components. In this way, we create the best foundation for maximum system use and efficiency.



DEVELOPMENT COMPETENCE AND PROVEN TECHNOLOGY

Quality and reliability The electric drive for the off-highway segment from Bosch Engineering is based on automotive series components from Bosch. In contrast to industrial design, they were designed and tested for mobile operation under increased environmental influences. At the same time, using components from the automobile sector results in economies of scale with beneficial effects on the system costs.



COMPREHENSIVE SUPPORT THROUGH THE WHOLE PROCESS

Seamless partnership For individual solutions, our expert teams work intensively on innovative developments of electrified drive systems for various requirements in the off-highway segment. Together with our customers, we identify particular requirements. After this, we create a custom-made system design and accompany the project with our expertise until system commissioning.



FORWARD-THINKING CONCEPTS FOR INDIVIDUAL CHALLENGES

Innovation driver and technology leader As a company with the most patent applications, the Bosch Group is the optimal background for us. The whole know-how of the Bosch Group will naturally flow into the new development of innovative drive systems for off-highway applications and will offer a technological advantage.