

# Two-Wheeler & Powersports – Riding innovation

**Bosch Mobility Solutions**

Comprehensive system solutions and passion for two-wheeler and powersports



**BOSCH**  
Invented for life

Connectivity systems

Assistance systems

Powertrain systems and electrification

# System solutions for two-wheeler and powersports make riding safer, more efficient and fun

## PASSION MEETS EXPERTISE

Worldwide demand for powered two-wheelers is on the rise. Motorcycles and scooters are chosen for their fun riding experience and their affordable mobility. Studies indicate that by 2021, around 160 million two-wheelers will be produced annually – a third more than today. To better meet increasing demand and individual manufacturer requirements, Bosch is pooling its two-wheeler and powersports activities into one global organization – the Two-Wheeler & Powersports business unit. The unit brings together passionate two-wheeler and powersports experts from the areas of safety systems, powertrain technology, and connectivity, and offers components as well as complete system solutions that service the entire two-wheeler and powersports spectrum: from small two-wheelers, high-performance bikes to powersports vehicles such as quads, personal watercraft, and snowmobiles.

## Connectivity systems

### CONNECTING TWO-WHEELERS TO THE OUTSIDE WORLD

Bosch brings connectivity to two-wheelers – internally and externally. Intelligently connected on-board systems make life easier for the rider and increase safety. Furthermore, the ability to communicate with other vehicles and the wider infrastructure offers riders new possibilities. One such innovative system is Bosch's connectivity control unit (CCU), which uses sensor and cloud data to increase dynamics while also enhancing safety, convenience and riding pleasure.

### CONNECTING SERVICES AND INFORMATION

The secure transfer of vehicle data to external services and their providers is the basis for new, future-ready services and business models. What's more, connected mobility involves processing large volumes of data and presenting the results to riders in a clear way. Bosch's integrated connectivity cluster (ICC) is an innovative information display designed especially for two-wheelers. The ICC uses built-in Wi-Fi connectivity to provide access to additional features such as the smartphone integration solution mySPIN as well as access to and storage of a wealth of vehicle data.

## Assistance systems

### COMPREHENSIVE SAFETY SYSTEMS

Bosch is the market leader for two-wheeler safety systems. These systems reduce the risk of accidents, especially in hazardous riding conditions, by intervening in critical situations without compromising riding dynamics. The modular and scalable antilock braking system (ABS) was especially designed for the braking characteristics of two-wheelers and can be adapted to models ranging from the lower power segment to high-performance sports bikes. ABS constantly monitors the wheels, using wheel-speed sensors and regulates braking pressure accordingly, thereby maximizing riding stability and shortening stopping distances. The motorcycle stability control (MSC) forms the next step in safety and is used primarily in high-performance bikes. The MSC provides assistance by continuously monitoring all essential vehicle values – including torque, lean angle, and acceleration – to detect critical situations and intervene if necessary. This represents a marked improvement in both riding stability and braking performance, especially in bends – without reducing the fun of riding. Bosch's side view assist is the world's first assistance system for two-wheelers. This system uses four ultrasonic sensors that monitor their surroundings to help riders change lanes more safely.

## Powertrain systems and electrification

### POWERTRAIN SOLUTIONS FOR POWERFUL, ECONOMICAL AND RESOURCE-SAVING RIDING

Bosch brings new energy to the two-wheeler and powersports powertrain and offers comprehensive systems expertise for vehicles ranging from small two-wheelers and high-performance bikes to powersports vehicles. The combination of engine management systems (EMS) with sophisticated sensor systems is significantly more efficient than conventional carburetor systems. Bosch offers the full range of EMS technology with components customized especially for two-wheelers and powersports. This includes components for fuel injection and supply, air management, ignition, and exhaust-gas treatment as well as electronic control units. Integrated Bosch modular systems offer both a better cost/benefit ratio and a more enjoyable and dynamic two-wheeler and powersports experience.

The main benefits of Bosch two-wheeler and powersports technology

up to

**16 %**

reduction in CO<sub>2</sub> emissions and fuel consumption with engine management system (EMS) compared to carburetor engines.\*

at least

**26 %**

of all relevant accidents could be prevented if every powered two-wheelers were equipped with ABS.\*\*

increased riding fun

The EMS optimizes efficiency and riding fun – regardless of engine capacity.

more than

**2 million**

Bosch motorcycle ABS systems have been sold until 2016, increasing safety for as many riders.

in 31 %

of all powered two-wheeler accidents with casualties in Germany, ABS could reduce collision speed by 66 % on average, resulting in much less severe consequences.\*\*

10 times

per second is how often the CCU exchanges information such as location or speed data. Bike-to-vehicle communication makes other drivers aware of the two-wheeler's presence – even if not in sight – and thus increases the rider's safety.

up to

**32 %**

of motorcycle accidents with injuries in Germany could be avoided by MSC.\*\*\*



Components for high-performance bikes

- 1 Connectivity control unit
- 2 Integrated connectivity cluster
- 3 MSC hydraulic unit with attached control unit
- 4 Inertial measurement unit
- 5 Wheel-speed sensor
- 6 Ultrasonic sensor
- 7 Electronic control unit for ultrasonic sensors
- 8 Semi-active damping control unit

- 9 Electronic engine control unit
- 10 Crankshaft speed sensor
- 11 Camshaft speed sensor
- 12 Knock sensor
- 13 Electric fuel pump and pressure regulator
- 14 Fuel injector
- 15 Electronic throttle body
- 16 Canister purge valve
- 17 Manifold air-pressure and temperature sensor
- 18 Temperature sensor
- 19 Spark plug
- 20 Lambda sensor
- 21 Lithium starter battery

Components for small bikes

- 22 Lean connectivity unit
- 23 ABS hydraulic unit with attached control unit
- 24 Wheel-speed sensor
- 25 Electronic engine control unit
- 26 Crankshaft speed sensor
- 27 Fuel-supply module with turbine pump
- 28 Fuel injector
- 29 Throttle position sensor
- 30 Canister purge valve
- 31 Mechanical throttle body assembly
- 32 Temperature sensor
- 33 Spark plug
- 34 Lambda sensor

Sources

\* Bosch research (2012)  
 \*\* Bosch Accident Research studies Germany, India & ASEAN (GIDAS 2001–2004, RASSI 2009–2013, PTW ABS Study based on India 2014)  
 \*\*\* Bosch Accident Research, Study using Federal Statistics Germany and GIDAS database (2001–2014)

# Passion and competence beyond technology: Bosch – your partner for two-wheeler and powersports



## TWO-WHEELER AND POWERSPORTS EXPERTS WORLDWIDE FOR EVERY REGION AND MARKET

**Global presence** for connectivity systems, assistance systems, powertrain systems and electrification: Bosch has experts with passion for two-wheeler and powersports on three continents at hand. The Two-Wheeler & Powersports business unit has locations in Japan (global headquarters), the U.S., India, Europe, and China. This proximity to two-wheeler and powersports manufacturers makes for close, flexible collaboration and provides the best service possible. In addition, short distances help saving time and reduce costs.



## OPTIMAL SUPPORT FOR THE ENTIRE LIFECYCLE

**Long-term partnership** Bosch has teams of experts working intensively and exclusively on two-wheeler and powersports developments. As a solid partner to two-wheeler and powersports manufacturers, Bosch offers end-to-end support throughout the entire lifecycle of vehicles with technologies for connectivity systems, assistance systems, powertrain systems and electrification.



## TRANSFERRING AUTOMOTIVE EXPERTISE TO SOPHISTICATED TWO-WHEELERS AND POWERSPORTS

**Ensuring quality and reliability** The quality and reliability of Bosch technology are major factors in bringing technically sophisticated two-wheelers and powersports to the market. Bosch has extensive expertise in developing automotive systems and is able to transfer its expertise to its system solutions for two-wheelers and powersports.



## TRIED AND TESTED COMPONENTS CONNECTED TO INNOVATIVE SYSTEM SOLUTIONS

**Systems competence and comprehensive know-how** As a systems provider with more than 30 years of experience in the two-wheeler and powersports market, Bosch knows the precise technical demands placed on each of the various components and how to reconcile these as part of a functioning whole. This optimum system integration means that Bosch maximizes system benefits to further reduce fuel consumption and CO<sub>2</sub> emissions plus improve engine performance, safety, and connectivity to make riding safer, more efficient and fun.



## COMPREHENSIVE TECHNOLOGY FOR INDIVIDUAL CONFIGURATIONS AND SOLUTIONS

**Comprehensive portfolio and extensive expertise** Through its Two-Wheeler & Powersports business unit, which pools all two-wheeler and powersports activities worldwide, Bosch offers a comprehensive range of technology for two-wheelers and powersports from a single source. This includes components for fuel injection, air management, ignition, fuel supply, and exhaust-gas treatment, as well as solutions for safety, infotainment, and connectivity. In addition to single components, Bosch also offers integrated complete solutions.



## AN INNOVATIVE TEAM OF EXPERTS COMMITTED TO IMPROVING TWO-WHEELERS AND POWERSPORTS

**Driving innovation and technology** As a driver of innovation and a technology leader within the mobility sector, Bosch is continuously fine-tuning technology for two-wheelers and powersports with technical innovations that are suitable to large-scale production. Bosch's absolute commitment to research and development allows it to offer innovative system solutions for two-wheelers and powersports, and consistently improve vehicle characteristics.