COVER STORY

Two-wheeler Solutions
Greater Fuel Efficiency, Safety, Comfort, and Fun in Riding

eScooter

ABS 10 for Motorcycle
Publisher’s Note

For decades, Bosch’s cutting-edge technology has delivered efficiency, comfort, and driving enjoyment on roads around the world. Globally, Bosch has channeled, with dedicated focus, the competence gathered from such experiences onto servicing the two-wheeler segment. Our new ‘Two-wheeler and Powersports’ business unit will draw upon a worldwide network of several thousand colleagues plus the manufacturing capacity of the Mobility Solutions business sector.

Bosch provides innovative solutions for the most pressing challenges of the global two-wheeler market: many countries are passing stricter emissions legislation, and more and more two-wheeler riders are involved in fatal accidents. Bosch is already the market leader for motorcycle safety systems and provides solutions for all classes of such vehicles and price-segments in the market.

Along with safety, the desire for fun, fuel economy, and connectivity are key drivers of Bosch’s motorcycle business. Especially in Asia and India, efficient powertrains are an important step towards reducing environmental impact. For this reason, Bosch has developed an affordable and robust engine management system that is specially designed for the Indian and Asian markets.

Our systems put even more safety, efficiency, and fun to ride into the two-wheeler.

Happy Reading!

Navin Paul
Executive Vice President, OE Sales

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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, more than 150 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 motorcycle activities into one global organization: the newly formed Two-wheeler and Powersports business unit.
Electronic Engine Management

Bosch Engine Management System (EMS) is based on port fuel injection systems for cars but have been adapted for the typical motorcycle engine. Compared to carburettor engines, they consume seven to sixteen percent less fuel in driving cycles.

Fuel supply and injection: Bosch offers the full range of EMS technology with components customized especially for two-wheelers. Bosch’s efficient and compact fuel supply modules with turbine pumps are designed for an exceptionally long, trouble-free service life, provides good cold start, and impressive electromagnetic and hot-fuel behaviour. Bosch fuel injectors optimize spray preparation and configuration for any engine displacement.

Intake air adjustment: Thanks to the electronic throttle control of the EMS, two-wheeler’s speed can also be electronically controlled without driver input. In Bosch’s mechanical throttle body assembly, an angular/position sensor communicates the precise position to the Electronic Control Unit (ECU). With its modular design, the Bosch electronic throttle body offers the smallest dimensions and helps optimize costs. The best-in-class Hall Integrated Magnetic Concentrator (IMC) delivers a short response time. Bosch’s canister purge valve is made quite compact as the solenoid valve in plastic housing need not overcome any pressure differential. The compact and lightweight manifold air-pressure and temperature sensor has a robust design and integrated evaluation electronics. Bosch’s powerful engine control unit uses a software-based model for analysing engine speed, making it possible to determine an engine’s operating parameters without specialized sensors (e.g. pressure sensors). Throttle position sensors are built directly onto the throttle housing, along with an extended throttle valve shaft. Such packaging advantage due to small size provides improved fulfilment of emission regulations.

Bosch spark plugs are thoroughly reliable and meet the same stringent requirements that Bosch’s car spark plugs do and ensure that whatever vehicle they are in, everything runs perfectly.

Engine management: The ECU Motronic for two-wheelers is available as a printed circuit board in a variety of housings. It is also compatible with features such as On-Board Diagnostics (OBD), start/stop, ISO 26262, knock control, and smartphone communication. Bosch crankshaft speed sensor and camshaft sensor gives high contactless measurement accuracy even in a large air gap range. Bosch knock sensor promotes optimum use of the energy contained in the fuel, thus increasing the engine’s power output and efficiency. The temperature sensors work in a broad temperature range while exhibiting good
resistance to substances (e.g. water, fuel, oil, battery acid). For two-wheeler manufacturers, the Bosch product portfolio offers specifically miniaturized and adapted connectors that meet the specified tolerances over their lifetime even under trying conditions.

**Exhaust gas treatment:** Bosch's switching-type lambda sensor is a state-of-the-art technology for effectively treating exhaust gases in gasoline-fuelled motorcycles. The sensor generates a switched signal during the transition from lean to rich operation. This precisely identifies the stoichiometric point ($\lambda = 1$), where the catalytic converter can operate most efficiently. The result is reliable adherence to even the strictest exhaust gas and diagnostic regulations.

**Riding Safety**

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 on riding dynamics.

Bosch Anti-lock Braking System (ABS) light is especially adapted to low-cost motorcycles and scooters, with the software optimized for the lower power segment and provides improved safety through front-wheel control. ABS Generation 9 systems are available in two versions viz. ABS base, and ABS plus. ABS base is ideal for any type of motorcycle with hydraulic front and rear wheel brakes whereas ABS plus with integrated pressure sensor is particularly suitable for super motorcycles and super sports bikes. ABS enhanced system from Bosch is equipped with an electronic Combined Brake System (eCBS) which distributes braking pressure between front and rear wheels regardless of which brake the driver uses.

Bosch offers the world’s first inertial measurement unit for motorcycles to deliver a significantly greater level of safety and comfort. A whole host of functions can be achieved and enhanced using the measurements provided by this unit. MSC base, a new variant of the Motorcycle Stability Control (MSC) system, is the first MSC to be based on conventional ABS technology. It features two separate braking channels, and has the advantage of being cost-efficient and compact. MSC enhanced system is based on Bosch ABS enhanced with electronic combined brake function. This means both wheels can be braked, even if the rider only applies the front brake, ensuring that the best possible braking force is applied to each wheel.

**Value added functions:** Traction control ensures that the rear wheel does not spin during vigorous acceleration and prevents the front wheel from leaving the ground. Wheelie control regulates engine torque in order to prevent the front wheel from lifting up uncontrollably and ensures maximum possible acceleration. Drag torque control counteracts critical situations that arise when drive torque suddenly increases or drops avoiding loss of traction and skidding. Off-road control provides maximum safety on off-road terrain without affecting the off-road riding style. Rear-wheel lift-up control evaluates the slip values of both wheels while braking and adjusts the pressure in the braking circuit of the front wheel with precision to keep the rear wheel on the ground and avoid rollovers. Hill hold control function prevents motorcycles from rolling backwards unintentionally while riding uphill. Vehicle hold control prevents the motorcycle from rolling away when it comes to a stop on an incline or a flat surface, saving the rider from having to continuously engage the hand or foot brake.

**Connectivity Systems**

Bosch brings connectivity to two-wheelers internally and externally. Intelligently connected on-board systems make life easier for the riders and increase safety. Furthermore, the ability to communicate with other vehicles and the wider infrastructure offers motorcyclists entirely new possibilities. One such innovative system is Bosch’s Connectivity Control Unit (CCU), which uses sensor and cloud data to increase dynamics while also improving safety and convenience.

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 motorcyclists. The ICC uses a Wi-Fi connection to provide access to additional features such as the mySPIN smartphone integration solution as well as access to and storage of a wealth of vehicle data.

For more information, visit

www.bosch-motorcycle.com
Over 120 million electric scooters (eScooters) are already snaking their way past the kilometre-long traffic jams of China’s roads for about Rs. 10 to 12 of power per charge and all without polluting the environment. Bosch technology increases the range of these nimble little vehicles to about 50 to 80 kilometres, depending on battery used and makes them both speedy and safe. Compared to conventional drive systems, the advantage of Bosch system is that it has a boost and advanced recuperation function that makes the scooter accelerate faster and gives longer riding distances by gathering the energy during braking.

Bosch has developed a new drive system for eScooters which is aimed specifically at the Chinese market. When it comes to cutting CO₂ emissions, electric drives already have the edge, but the new eScooter drive system from Bosch extends their lead even further. In terms of quality and performance, however, the drive system sets entirely new standards.

Designed as a wheel hub motor scalable up to 2 kW rated power, the drive meets the standard installation requirements of electric motors for eScooters. It is intended to be mounted in dual swing arms and can easily be integrated in most scooters and mopeds through a conventional rear rim. The wheel hub motor combines high performance with a compact design.

The Electronic Control Unit (ECU) includes a boost function for maximum driving enjoyment as well as enhanced recovery of braking energy. It can also incorporate additional safety functions, for example, a sensor to detect whether the seat is occupied. When the driver is not sitting on the eScooter, the motor is automatically powered down to ensure that any unintentional contact with throttle does not cause an accident. The ECU will automatically reduce the speed if risk of overload is detected in order to save the ECU and increase its lifetime.

The ECU can be combined both with the Bosch electric drive and with most other standard drives available in the market. Optimized to work together, the wheel hub motor and control unit perform at their best as a complete drive system. Nevertheless, both components can also be deployed individually, thereby offering manufacturers maximum flexibility.

In India, sale of eScooters is gaining momentum mainly due to subsidies under the government initiative ‘Faster Adoption and Manufacturing of Hybrid and Electric Vehicles’ (FAME). The market is currently witnessing a transition from low power electric scooters to high power scooters with fun2drive features.
Innovations around the Bosch World

Bosch’s side view assist is the world’s first assistance system for motorcycles. This system uses four ultrasonic sensors that monitor their surroundings to help riders change lanes safely. The sensors cover a distance of up to five meters in areas that are difficult or impossible to see using just the mirrors. The two rear sensors monitor the blind spot in the neighbouring lanes to the left and right. The two front sensors provide a plausibility check. Whenever there is a vehicle in the rider’s blind spot, the technology warns them by way of an optical signal close to the mirror, so they can, for example, avoid a collision while changing lanes. Side view assist is active at speeds ranging from 25 to 80 kmph and supports riders whenever the difference in relative speed to other road users is small.

Bosch eBike Systems
Pure Riding Enjoyment with Active and Performance Line

The European market leader Bosch eBike Systems has two new product lines so that everyone can find the perfect eBike. The Active Line is the right system for the occasional eBiker who wants to be supported in a responsive and metered fashion. The energy is provided by two rechargeable batteries, a matching cycle computer Intuvia Active, and a Drive Unit Cruise which supports speed up to 25 kmph. For the sports-minded, the powerful Performance Line with its dynamic system and direct response characteristic is the perfect choice. It is equipped with the fast Drive Unit Speed which supports speed up to 45 kmph, rechargeable batteries, and the first multi-functional all-in-one eBike cycle computer Nyon which offers fitness and navigation features as well as smartphone connectivity in addition to the eBike functions.

Integrated Connectivity Cluster
All-in-one Information and Communication Centre

The integrated connectivity cluster is a display unit specially developed for powered two-wheelers. With a screen size and resolution that can be customized to suit OEM requirements, this compact Bluetooth-enabled unit combines a broad range of information and communication functions in a single device. Innovative features like OS-independent mySPIN smartphone integration can be utilized, thanks to the built-in Wi-Fi connectivity. Optical bonding and an anti-reflection coating assure enhanced screen readability, even in strong sunlight. The unit also includes USB, Ethernet, and CAN-bus interfaces. Riders who enjoy a sporty driving style can use the integrated connectivity cluster to track the vehicle data and dynamic parameters of their ride, such as lean angles, routes, and cornering speeds. Custom configuration of information and flexible use of display area provides easy adaptation for individual models and markets for the OEM.
Celebrating Bosch Milestones

65 Years of Bosch Limited
And More Milestones to Celebrate

In 1951, Raghunandan Saran and KC Varma set up Motor Industries Co. Ltd. (MICO), precursor to the present Bosch Limited (RBIN). To celebrate 65 years of RBIN’s operations in India, achievement of INR 10,000 crore milestone and 130 years of Bosch globally, special events were held across all RBIN locations in India. Since the early days, Bosch Limited has been known for engineering excellence and has been the first to market many ground-breaking technologies. Bosch Limited has been delivering products and services that have enhanced the quality of life for millions of Indians. Cultural programs reflecting the uniqueness of the regions in which RBIN has factories were part of the event at eight manufacturing facilities across the country. Smaller events were organized at sales and regional offices as well.

New Business Unit: Two-wheeler and Powersports
Bosch Strengthens Presence in Motorcycle Markets Globally

Bosch has pooled its motorcycle activities from the areas of riding safety systems, powertrain technology, and display instruments into one business unit, ‘Two-wheeler and Powersports’. It addresses the individual requirements of motorcycle manufacturers worldwide. The new unit was founded in April 2015. Headquartered in Yokohama, Japan, it has branches in United States, Europe, India, and China and is already the leading supplier of motorcycle safety technology. The new business unit offers safety solutions such as ABS, Motorcycle Stability Control (MSC), and Side View Assist. In the powertrain area it provides electronically controlled injection systems which can reduce fuel consumption by up to 16 percent.

20 Years of Bosch Packaging Technology in India
From Machine Supplier to Complete Solutions Provider

On March 03, 2016 the Bosch’s Packaging Technology celebrated 20 years of its journey in India. Over the past two decades the business has focused on staying customer oriented and this has yielded positive results. Globally, Bosch Packaging Technology has an installed base of over 1,700 machines coming from India. It delivers complete single machine or line solutions from processing through to end-of-line packaging and services in line with the needs of the customer. It has also invested in a modern manufacturing facility to boost India operations by inaugurating a state-of-the-art plant in Verna, Goa in 2012. With a built-up area of 7,150 square meters, the facility houses, besides technology manufacturing, the latest testing infrastructure.
Bosch Service Solutions (SO), former Bosch Communication Centre, is a leading, innovative, comprehensive service solution provider across a wide range of different industries. It offers companies worldwide tailored services in the fields of Mobility, Customer Interaction, Building & Infrastructure, and Business Support in more than 30 languages.

Mobility Services

Bosch SO offers a full portfolio of networked mobility services in the automotive sector including eCall, mobile security, breakdown assistance, concierge, maintenance, tracking, and remote services. Its solutions for comfort and safety can be combined to meet each customer’s individual needs, making them the ideal choice for OEMs and the aftermarket.

Planning and design involves business model development, service components definition, and detailed process design derivation. Small, agile teams under the leadership of a global Project Manager implement the project. The global network of service centres offer 24/7 premium services with high cost efficiency and consistent service quality.

Business Support Services

Bosch SO offers a wide range of services including sales and marketing support, payroll, seminar organization, HR support, trust centre services, and eFile, thereby allowing its clients to focus their attention on core business.

Support services are offered in areas viz. value stream analysis and mapping, holistic solutions for end-to-end processes and operation of business support processes. Outsourcing business support functions often leads to major improvements across process quality, efficiency, transparency and cost flexibility.

Customer Interaction Services

Bosch SO offers services in the fields of contact management, hotlines, IT & technical help desks, sales campaigns, and social media to boost the level of service each company offers and strengthen its customer relationships.

Services are offered across analytics (assessing quality of existing touchpoints using Net Promoter Score), design (assistance in implementing social media solutions, enhancing the existing infrastructure by implementing big data and data mining/analytics), and operations (with state-of-the-art workforce management systems and continuous training) to secure a 360° customer interaction experience.

Building & Infrastructure Services

To help protect its clients’ goods and keep their property secure, Bosch SO offers reliable, high-quality services in the fields of alarm management and intervention, including remote video surveillance, elevator alarm systems, and smart home services.

In monitoring and intervention area, Bosch SO partners in developing, implementing, and operating technology-driven, innovative security solutions. It also offers comprehensive, innovative solutions in the field of condition monitoring.
Bosch has launched ABS 10, its new generation of motorcycle Anti-lock Braking System (ABS) designed with a focus on the needs of emerging markets like India, Indonesia and other Asian countries. ABS 10 is 30 percent lighter and 45 percent smaller compared to the current version ABS 9. A cost-effective solution, the system is now also suitable for use in small motorcycles with up to 250cc displacement – a segment that is both price-sensitive and popular in emerging markets.

With the assurance of shorter braking distances, fewer accidents, and greater safety, ABS makes riding a motorcycle safer. Studies in India show that approximately one in three accidents could have been avoided with the help of ABS. In a further 16 percent of accidents, the speed of impact would be reduced. ABS prevents the wheels from locking during an emergency braking maneuver keeping the motorcycle stable, enabling riders to brake without fear.

Bosch already offers a cost-effective ABS solution in India. Bajaj began offering ABS 9 light, a one channel solution for the front wheel, as an optional feature in the Pulsar RS 200. Bosch was recognized with India’s Car & Bike Award in the ‘Technology of the Year’ category in 2015 for its versatility in the motorcycle ABS range.

Accolades for Bosch

**Bosch Vocational Centre declared Best Establishment**
Bosch Vocational Centre (BVC) Bangalore has been declared as the Best Establishment by the Government of India for the 51st time. BVC will receive the President of India’s trophy for the 15th time in a row. Five apprentices from BVC also won Gold medals taking the medal tally to a total of 231.

**Outstanding Contribution to Technology Innovation Award by Volvo Eicher**
Diesel System division of Bosch Limited was felicitated with the award for ‘Outstanding Contribution to Technology Innovation’ at the Volvo Eicher Commercial Vehicles vendor conference 2016 held at Indore in March, 2016. The award was in recognition for Bosch’s contribution in launch/project management, cost reduction, and fuel efficiency improvement across various projects.

**Technology Support Award by KOEL**
Bosch Limited was honoured with the Technology Support Award by Kirloskar Oil Engines Limited (KOEL) for the excellent technical support given to them during various projects. The award was presented to Bosch delegates at the KOEL vendor conference in March, 2016.

**Cost Reduction Packaging Design Award by Nissan India Group**
Starter Motors and Generators division of Bosch Limited was felicitated with the award for ‘Best Cost Reduction Packaging Design’ for B02E (CMFB) project. The award was presented to Bosch delegates at the recently held Nissan Supplier Packaging Award Ceremony at Chennai in February 2016.
EICMA International Motorcycle Show

Bosch Innovations Offer More Safety, Convenience, Efficiency, and Fun on Motorcycles

EICMA 2015 marked the first presentation of Bosch’s new ‘Two-wheeler and Powersports’ business unit, established in April 2015. The division brings together all the motorcycle expertise to be found across the technology and services company. The ‘Two-wheeler and Powersports’ unit takes Bosch product developments and services for cars and derives from them new, useful solutions for tomorrow’s motorcycles.

Connectivity Systems: Connected Solutions for More Convenience

The Bosch Connectivity Control Unit (CCU) connects motorcycles with the cloud. It helps implement automatic emergency call service functions such as eCall, provides riders with useful information on potential danger spots on the roads, or tracks a stolen motorbike. The Integrated Connectivity Cluster (ICC) is a rider information system developed especially for motorcycles that features variable display sizes and resolutions that is easy to read and can use the mySPIN smartphone integration solution. This connects the smartphone with the vehicle. Apps can be controlled via the ICC and riders can also view dynamic trip and vehicle data.

Assistance Systems: Greater Safety on Two Wheels

Motorcycle ABS 10 is lighter by almost 30 percent and smaller by around 45 percent compared to the current ABS 9. The system is especially suitable for use in small motorcycles with up to 250cc displacement. Bosch’s generation 9 front ABS system uses a single hydraulic brake channel to control just the front wheel, ensuring that it does not lock during braking. Motorcycle Stability Control (MSC) is a type of ESP® for motorcycles. By monitoring two-wheeler parameters such as lean angle, the system instantaneously adjusts its electronic braking and acceleration interventions to suit the current riding status. With Side View Assist, Bosch has developed the world’s first surround sensor-based assistance system for motorized two-wheelers. It relies on four surround sensors with ultrasonic technology to help motorcyclists change lanes safely. Vehicle hold control is an ABS value added function that prevents the bike from rolling away when it comes to a stop on an incline or a flat surface.

Powertrain Systems and Electrification: More Fun, Lower Fuel Consumption

Bosch’s new electronic engine management, with a control unit to analyse all powertrain data, can reduce fuel consumption by up to 16 percent compared to a mechanically controlled carburettor. Bosch eScooter powertrain has an all-electric wheel-hub motor and an Electronic Control Unit with an output of just 1.8 kilowatts, but its electronically controlled boost function packs a punch.
Economical, precise, safe, energy efficient drive and control technology from Bosch Rexroth moves machines and systems of any size. The company bundles global application experience in the market segments of mobile applications and industrial applications (machinery applications and engineering, factory automation, and renewable energies) to develop innovative components as well as tailored system solutions and services.

One such tailored solution that was proven to be better than the current market offering is the welding solutions offered to passenger car OEM Ford in India. Ford India was using Japanese weld systems for spot welding application in the body shop at their state-of-art manufacturing facility in Chennai. Bosch Rexroth India pitched in strongly for a changeover to their adaptive weld technology. Weld systems experts from Bosch Rexroth were able to convince Ford India to consider this idea if the products proved superior to their current systems.

**Bosch Rexroth welding systems for their new project B515 after the team was able to prove that Bosch weld controls are far superior to the Japanese ones. Bosch Rexroth went on to successfully supply 200 adaptive weld cabinets, and secure a business worth approximately Rs. 150 million. Today the widely popular compact SUV Ecosport from Ford, is welded with the state-of-the-art adaptive technology from Bosch Rexroth.**

**One Success Deserves Another**

Furthermore, this success story had ramifications at Sanand facility of Ford as well. Ford India has plans to set up a fully automated plant at Sanand, capable of producing two lakh cars annually by 2015-16. And their welding technology provider of choice was once again Bosch Rexroth. Bosch Rexroth has supplied about 350 adaptive robotic weld cabinets for Sanand project worth approximately Rs. 200 million.

**Welding Systems Put to Task**

Ford India did on-line trials of Rexroth weld controls continuously for two months. They eventually recommended
Automotive Puzzle Time - 17

ACROSS

2) Inventor of gearshift lever used in motorcycle
3) A 5-step process used to make appropriate judgements and apply them correctly in different traffic situations
6) This sports car from Dodge is named after a snake
8) Which car company used the slogan ‘Bold moves’?
9) Motorcycle model name inspired by a second world war Japanese Kamikaze fighter plane

DOWN

1) In automotive terms, LSD stands for Limited ___ Differential
4) Honda’s first true motorcycle was built in 1950. What was it called?
6) Indian two-wheeler OEM used this Indian Navy aircraft carrier’s metal to make the fuel tank of a particular bike variant. Name the aircraft
7) Engineering genius and company owner who wrote all of his company’s advertising copy describing his motorcycles as ‘atmosphere disturbers’

We invite you to participate in the puzzle section. Please send your scanned entry along with your details through an e-mail to oe.marketing@in.bosch.com and win a Bosch Automotive Handbook! Winner will be announced in the next issue.

Please note: This puzzle is not open for Bosch Associates. Winner will be chosen by lot amongst the correct entries received.

Thank you for your overwhelming response to ‘Puzzle Time’. We have picked by lot a winner amongst the correct entries and the prize goes to:

R Rajesh, Ashok Leyland Ltd., Chennai

Congratulations!

Feedback

Please write to us with your feedback and suggestions at: oe.marketing@in.bosch.com
You could be the winner of a surprise gift.
Safe braking
with motorcycle ABS from Bosch.

If a wheel locks during braking, it will almost inevitably result in a fall. The Bosch Antilock Braking System (ABS) helps you bring your motorcycle to a safe stop, even in critical situations. ABS significantly reduces the risk of a fall and helps shorten braking distance. A 2009 Swedish Road Administration study has shown that up to 48 percent of all serious and fatal motorcycle accidents could be prevented using ABS. Invented for life.

www.bosch-motorcycle.com
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