Bosch: Industrial, energy, and building solutions for the automotive industry
Cutting-edge technologies from a global provider

All building complexes have to meet especially demanding security, safety, communication, HVAC, and energy criteria.

When you choose Bosch as a supplier of products and solutions for your automotive manufacturing project, you can be assured of cutting-edge technologies from a global provider. True to our company slogan “Invented for life,” our products and solutions are designed with our customers in mind. As a leading global supplier of technology and services, Bosch understands that professionals need to be able to rely on their industry partners for technical expertise and innovative thinking.

The Bosch Group at a glance

The Bosch Group is a leading global supplier of technology and services. It employs roughly 360,000 associates worldwide (as per April 1, 2015). The company generated sales of 49 billion euros in 2014.* Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. The Bosch Group comprises Robert Bosch GmbH and its roughly 440 subsidiary and regional companies in some 60 countries. Including its sales and service partners, Bosch is represented in roughly 150 countries. This worldwide development, manufacturing, and sales network is the foundation for further growth.

In 2014, Bosch applied for some 4,600 patents worldwide. The Bosch Group’s strategic objective is to create solutions for a connected life. Bosch improves quality of life worldwide with products and services that are innovative and spark enthusiasm. In short, Bosch creates technology that is “Invented for life.”

The company was set up in Stuttgart in 1886 by Robert Bosch (1861-1942) as “Workshop for Precision Mechanics and Electrical Engineering.” The special ownership structure of Robert Bosch GmbH guarantees the entrepreneurial freedom of the Bosch Group, making it possible for the company to plan over the long term and to

*The sales figure disclosed for 2014 does not include the former joint ventures BSH Bosch und Siemens Hausgeräte GmbH (now BSH Hausgeräte GmbH) and ZF Lenksysteme GmbH (now Robert Bosch Automotive Steering GmbH), which have since been taken over completely.
Bosch products and solutions
Bosch offers a wide range of products and solutions for effective facility management, production processes and global automotive dealer network.

- All areas and activities can be efficiently monitored, allowing emergencies, fires, and threats to be detected immediately
- The building can be evacuated fast, and in a controlled manner
- All safety, security, and communications solutions can be integrated in one facility management system
- Intelligent energy system control for increased reliability and reduction of energy costs
- Efficient energy generation systems for heating, process heat, and electric power
- Special service tools, storage solutions, diagnostics and workshop equipment ensure dealer workshops can “fix it right the first time”

A leading global supplier of technology and solutions
Bosch provides a comprehensive range of products and industrial, energy, and building solutions for the automotive industry across the world. Bosch has a choice of products that are commonplace across automotive projects, whether the project requires energy-efficient heating and hot water systems from respected brands, innovative and intuitive video surveillance systems, or the hard-wearing power tools needed for professional installation work.

undertake significant up-front investments in the safeguarding of its future. Ninety-two percent of the share capital of Robert Bosch GmbH is held by Robert Bosch Stiftung GmbH, a charitable foundation. The majority of voting rights are held by Robert Bosch Industrietreuhand KG, an industrial trust. The entrepreneurial ownership functions are carried out by the trust. The remaining shares are held by the Bosch family and by Robert Bosch GmbH.

Full circle with Bosch solutions

1. Solar thermal heating, hot water, ventilation and air-conditioning

2. Process heat and electricity

3. Fire and voice evacuation systems, conference systems

4. Access control and video surveillance systems

5. Intrusion systems

6. Building management system
11. eCall service

12. Abrasive solutions

13. Connected parking solutions

7. Energy and building solutions

8. Drive and control technology

9. Professional power tools

10. Automotive service solutions

Bosch: Industrial, energy, and building solutions for the automotive industry
Many years of experience in the industry allow Bosch Rexroth to optimally adapt products to meet changing market needs. We also work together with our customers to devise new solutions. One example of this is our range of products specially designed for the automotive industry.

Multi-disciplinary know-how is the basis for innovative solutions that are used as components or customized systems. Because Bosch Rexroth offers a complete range of drives and controls, advice to customers is free of technological bias, resulting in the most appropriate solution for the task at hand.

You can achieve maximum production rates when all of your control and drive technologies work together at their highest potential and as efficiently as possible. All this can be achieved with intelligent controls combined with electromechanical, hydraulic, and pneumatic drives by Bosch Rexroth. What’s more, they are easy to use and program. In this way, non-productive and idle times in production processes are considerably shortened, and productivity increased.

Solutions for the automotive industry
Whether it is matter of ultra-high precision, absolute process reliability, maximum flexibility, or optimum user-friendliness, Bosch Rexroth is familiar with the requirements of every production stage and offers a comprehensive portfolio of components and automation solutions for every process step in the production sequence.

Bosch Rexroth supports automakers around the world by supplying innovative components, modules, and systems and services designed to enhance production efficiency.

Bosch Rexroth products always incorporate state-of-the-art technology that consistently adheres to international hardware and software standards.
Press shop
- Broad range of perfectly compatible components and system solutions
- Drive and control technology for quick retooling with consistent repeatability
- Intuitive products with excellent user-friendliness

Body shop
- Reliable and flexible resistance welding systems for correct welding of different material combinations
- Rexroth tightening systems document the safety-relevant connections and ensure the quality of the tightened connection
- Robust, compact, and intelligent: Bosch Rexroth pneumatic equipment satisfies an extensive range of demands
- Scalable PLC and intelligent drive systems for flexible tasks

Paint shop
- ATEX-certified assemblies and components for explosive environments
- Bosch Rexroth drive and control solutions for ultimate precision

Powertrain machining
- Maximum flexibility thanks to scalable standard components, and open-system solutions for optimum productivity
- Systems with open-interfaced and consistent uniform look and feel for quick exchangeability

Powertrain assembly
- All required drive and control technologies from one supplier
- Universal drive and control concepts for flexible realization of complex tasks
- Reliable tightening technology with seamless documentation to ensure safety and functionality

Final assembly
- Broad range of components and systems solutions for any drive and control technology
- Easy conversion to new processes and procedures thanks to open-interfaced PLC solutions in modular design
- Tightening technology with flexible connection to superior control systems is the perfect solution for applications that require high accuracy and reliability

www.boschrexroth.com/automotive
Security systems
Safety and reliability for the future

Effectively integrating all applications
The Bosch Building Integration System (BIS) provides a single web-based control point for monitoring all security, safety, and facility management systems. This includes alarm management, fast alarm identification via location maps, and follow-up procedures. It seamlessly integrates fire and intrusion alarms, evacuation, access control, video surveillance, and building automation systems into a single platform. The BIS enables a single operator to monitor and control all security systems, as well as to respond faster to emergencies and achieve greater overall effectiveness.

For security and safety, as well as for communications products, solutions, and services, Bosch Security Systems is the perfect partner. The Security Systems division has the capacity to offer integrated systems tailored to the specific requirements of each application.

Personalized access rights and reliable visitor management
Bosch access control systems guarantee reliable access management both indoors and outdoors, such as access to production or R&D facilities. State-of-the-art readers and controllers restrict access to non-public areas (such as equipment and locker rooms). This ensures that only authorized individuals get in. Video cameras located in the vicinity monitor and observe any unauthorized access attempts.
Early detection of fire for fast evacuation
Bosch systems quickly and accurately locate a fire and trigger evacuation. At the same time, they minimize the occurrence of false alarms. The public address system allows the operator to guide employees to safety, avoiding danger areas. Surveillance cameras can monitor evacuation proceedings and help the authorities coordinate rescue operations. All these systems incorporate high levels of redundancy and can be integrated centrally using the building integration system to ensure seamless operation under any contingency.

Secured premises and production facilities
Hostile acts or vandalism on the manufacturing premises or in the factory can have severe consequences. Our systems enable early detection of suspicious behavior and help to confirm and validate alarms. In combination with intelligent video analysis (IVA), Bosch cameras establish a “virtual perimeter fence” that, if crossed, alerts a security operator. Cameras can then be used to check on the situation at any time of the day or night and initiate the appropriate action.

Supervision of production, warehouse, and logistics processes
Bosch cameras with intelligent video analysis (IVA) provide leading technology to supervise production processes. Continuous real-time image analysis allows unplanned or critical events to be detected. An alarm then alerts the operator, who initiates and executes immediate action plans. Intelligent video analysis also offers forensic search options. This can be used to track quality deviations in the production process: for example, dirt can be identified. Forensic search can also be used to support the tracking of product deliveries by live video recording and transmission of scan data. Our IP video management system can easily be integrated into existing ERP systems and enables ex-post retrieval of video footage via forensic search.

Outstanding equipment for your meeting rooms
The flagship digital congress network system enables the smooth conduct of even the most demanding meetings. The system ensures a fast and flexible set-up with a choice of wired and wireless configurations; IR transmitters ensure that simultaneous interpretation is distributed solely to the participants for whom it is intended.
Designed and built for challenging projects: Customized HVAC solutions for the automotive industry. Our modular product portfolio enables quick installation, low cost of ownership, and high reliability. Our experts support along the whole product life cycle – from planning to commissioning to 24/7 support and remote connectivity.

**HVAC, process heat, and electricity**
Partner for efficient solutions

The planning and provision of energy solutions for automotive production processes presents particular challenges for all parties involved. Attuned system components ensure quick installation, reliable functionality, and high efficiency.

All our projects are planned using an integrated, systematic approach – our way to guarantee that the thermal systems are energy-efficient and successfully completed in time. Thanks to our modular and extremely comprehensive product portfolio, we can find the optimum solution to meet the precise requirements of each building complex. Here, we can draw on over 150 years of experience, as well as the extensive professional expertise of our associates. More than 110,000 successful projects in more than 140 countries are evidence of our competence.

We offer a broad portfolio that covers nearly all solutions from electricity to heating and process heat up to cooling and ventilation:
- Hot-water and heating boiler systems
- Combined heat and power plants
- Steam boiler systems
- Waste heat recovery systems
- Heat pumps, also with waste heat recovery
- Buffer and hot-water tanks, energy storage systems
- Air handling units, water- and refrigerant-based cooling systems
- Large solar thermal solutions
- All systems and system combinations with a complete range of intelligent controls, remote services, accessories, and services
- Ventilation and air-conditioning
Using the sun for heating and hot water
Solar thermal systems can deliver reliable heating and hot water for the whole industrial building complex. Buffer tanks decouple the heat loading and unloading processes, enabling the use of solar thermal heat also during the night. Efficient heating boilers cover peak loads with up to 110% efficiency.

Highly efficient cogeneration of heat and power
Decentralized power generation can save up to 76% on electricity bills. Island solutions provide electricity also during power blackouts, e.g. for critical systems, servers, lighting, and ventilation. The system’s total efficiency can be increased to up to 95% by using waste heat from exhaust gas of a CHP to support steam production with a 4-pass steam boiler.

Global service
Bosch provides worldwide service for all customers to guarantee the success of their projects. From in-depth consultation to 24/7 service and remote support – the international service network of Bosch and its partners is always available and provides support quickly. On request our experts analyze further efficiency potential and advise on retrofit measures that increase cost efficiency.

Reliable competence in every phase
From small to large-scale projects, the most important factor is optimum harmonization of all technologies employed. We provide professional support in every phase of energy supply for our clients from the automotive industry – from initial advice to comprehensive services that guarantee sustainably efficient and safe operation of the installed system. Bosch Thermotechnology is committed to ensuring that our solutions live up to their promise.
Energy and building solutions
Efficient energy services for your premises

We are an experienced energy-efficiency partner for the automotive industry — and as an energy services provider, we keep energy costs low while increasing supply security and comfort.

Energy services – tailored to any building
Our integrated partnership model provides you with an unrivaled range of energy services. We can manage the energy and utilities supply of a single building or an entire real estate portfolio — reliably, safely, and efficiently, offering planning, implementation, and operational services from a single source to help customers achieve long-term reductions in the energy used for heating, cooling, ventilation, and lighting. In partnering with us, they benefit from our strength and experience, individual energy solutions, and maximum energy efficiency.

The amount of energy required always depends on the current state of the building and the technical facilities in place. Our tailor-made energy concepts are designed to meet any requirements, regardless of how diverse they may be. Efficiency is not ready-made. Rather, it comes from experienced engineers who take even the smallest details into account.

Climate technology – greater efficiency and comfort with air conditioning and ventilation
Modern air-conditioning and ventilation systems play a key role in the automotive industry. These systems make sure that the indoor climate is comfortable all year round, while also contributing to a building’s energy efficiency. With a conventional control system that generates directed airflows, both objectives are difficult to achieve. Continuous flows do not mix the air in the room in the most effective way, resulting in temperature layering, cold pockets, and drafts. In addition, these systems require higher volumes of fresh air — cooled in the summer...
and heated in the winter — to be supplied to the room. This requirement not only increases the complexity of a site’s systems, but also generates high energy costs.

Our special control algorithm allows the smart control of existing systems. This allows energy savings of between 30% and 70% energy to be achieved in new and existing buildings. By mixing the supply air with room air in the most effective way, the temperature is kept consistent across the room, and drafts are prevented — increasing comfort for users throughout the building. We can achieve additional savings by combining this control algorithm with our innovative duct system.

**Energy platform – greater transparency, reduced costs**

Energy costs are a major factor in the automotive industry. Our energy platform provides a full breakdown of energy consumption and costs. The concept is as simple as it is effective: we first measure the precise consumption in all locations within a building where energy is converted or required. These values are then transferred via a secure connection to the energy platform, where they are analyzed. They are then converted into useful data that can be accessed and used online.

The energy platform comprises four different modules that can be tailored to specific requirements and used to manage systems and energy consumption efficiently.
Bosch professional power tools are engineered for excellence, meeting the highest standards in speed, precision, and robustness for consistent, professional work results. Bosch also has a long history of making high-quality accessories for a wide range of applications. So whatever the job, tradespeople can rely on Bosch original accessories.

As one of the world’s leading manufacturers of power tools and accessories, Bosch offers professional tradespeople practically every tool they could ever need, from state-of-the-art lithium-ion cordless (battery-powered) to class-leading corded (mains-powered) products.

Construction industry professionals have come to expect the Bosch brand to deliver continuous innovation, high manufacturing standards, and high performance, not to mention reliable support services.

**Definite advantages for professionals**

As Bosch knows how important it is for professionals to be able to rely on their tools, we offer services for all
professional power tools and measuring tools beyond the legal warranty period.

**After-sales service**
Bosch offers top-quality after-sales services, from online information to a dedicated team of trained customer service personnel. Our partners’ authorized service centers ensure excellent availability of spare parts and a fast turnaround time for both warranty and chargeable repairs.

**For professionals, from professionals**
Bosch understands that a lot is expected of construction industry professionals: speed, reliability, competence, mobility, and endurance. We believe it is only fair that they should demand the same of their power tools. When developing new power tools, Bosch works very closely with tradespeople who use power tools as part of their everyday work.

Bosch professional power tools are tested in extreme work environments, under the harshest conditions. A power tool which passes our exhaustive tests is guaranteed to reliably fulfill the highest expectations. Bosch tools really are for professionals, from professionals.
The introduction of electronic systems has had a major impact on automotive manufacturing. Vehicle technology continues to advance at an ever faster rate, while pressure to reduce vehicle-configuration and test times is increasing. For manufacturers, the challenge is to break new ground in test technology. Bosch is helping manufacturers to meet this challenge, working closely with them on their production lines.

**Vehicle configuration and test system (VCATS)**

Through VCATS, the vehicle configuration and test system, Bosch is able to provide innovative, efficient, and value-added solutions to some of the most complex manufacturing problems found in vehicle assembly plants. The VCATS suite can be used throughout the manufacturing process to ensure quality at every stage. The Bosch VCATS suite consists of:

- Test and measurement hardware to connect to the vehicle systems and sub-assemblies.
- Software packages to link into manufacturing control systems and provide statistical quality reports for operators and management.

This unrivaled combination of sophisticated electrical test equipment and diagnostics capabilities is our key to improving efficiency at every stage of a vehicle’s manufacture and development – whether configuring, testing, measuring, or reporting. Our strong flash programming capability and concurrent channels with full bus loading technology ensures higher functionality and assured quality, at a lower cost but at greater speed. VCATS enables both static and dynamic testing via a suite of complementary products.

**VCATS FlashBay**

Bosch has invested over 200 man years to develop a suite of core software components that our developers can utilize to quickly build customized diagnostic solutions. FlashBay Runtime uses the same software kernel as our high-performance and highly reliable end-of-line diagnostics solutions. This kernel has been continuously improved over the past 25 years. FlashBay is fully multi-threaded and capable of parallel flashing over multiple buses.
Special tools for manufacturing
The complex nature and reduced installation space of modern vehicles gives rise to a specific set of challenges during the manufacturing process. Bosch uses the knowledge it has gained from many years of manufacturing and service operations support to provide assembly process-related solutions. Special tools developed to support specific tasks can help reduce cycle time, reduce the risk of damage, alleviate strain on assembly personnel, and reduce the incidence of problems caused by incorrect fitment. Bosch can provide a full service to the manufacturer:
- Tool design and concepts
- Prototype development and testing
- Certification and sign-off
- Tool manufacturing (low to high volume)

Manufacturing rectification training support
Bosch has been helping vehicle manufacturers to develop the capabilities of their production and service teams for several years. The knowledge and skills that are required in the rectification area are very similar to those needed in the service environment. Bosch has developed both generic and manufacturer-specific training courses from apprentice to senior technician to meet these requirements. Bosch courses are designed to prepare the manufacturer for the challenges that launching a new vehicle or new technology may pose. Key benefits:
- Training needs assessment
- Basic training to senior technician certification
- Product and technology specific training
- On/off site, direct training, train-the-trainer, and technology-based training solutions

Manufacturing conformance and quality support
Conformance and quality testing is an important part of the manufacturing process. Sample testing undertaken by the manufacturer provides an early warning of any issues that could prevent the sale of a vehicle. Bosch provides state-of-the-art solutions that allow low-volume testing. Using software-driven integrated test equipment, Bosch can:
- Automate aspects of the testing process
- Reduce the testing cycle time
- Increase repeatability
- Ensure correct set-up and recording of results for multiple vehicle types and variants

Rectification bay and workshop solutions
Bosch provides a full service offering for rectification and workshop support. The experience Bosch has gained from developing efficient workflow solutions, installing thousands of workshop bays and upskilling technicians can also be applied to the rectification area. Bosch can support automakers with:
- Workshop design, workflow, and layout services
- Equipment selection, sourcing, and installation services
- Tooling selection, sourcing, and supply services
- Rectification training service
The location of the car and the direction of travel are determined using GPS data. This information is especially crucial on the freeway.

Mobility services

eCall service – crucial in the event of an emergency.

eCall makes it possible to provide more accurate and effective support when help is needed.

After a car accident, every second counts for the victims. Thanks to the Bosch eCall Service, rescue forces can be notified more quickly, so that they can be on the scene sooner. In some cases, the time gained can make the difference between life and death. The European Commission estimates that eCall could save the lives of up to 2,500 people every year in the 27 EU member states. The reason for this is that emergency service response times are reduced by up to 50% in rural areas and up to 40% in urban areas. In addition, relevant and precise information is provided, adding to the efficiency of the rescue forces. For this reason, the European Commission wants to make eCall mandatory by 2015. The emergency call system is activated by in-vehicle sensors (e.g. sensors for airbags). Once an eCall is triggered, accident-related data is transmitted to the Bosch emergency service center, including the exact location, time, type of vehicle, and direction of travel. A voice connection is also established with a Bosch associate, while the nearest rescue services are identified. One of the advantages of this solution is that the multilingual associates at Bosch Communication Center, a business unit of Security Systems, always use the relevant language to communicate both with the people involved in the accident and with the local authorities. Also, the additional information provided through the voice connection adds valuable details which are relevant for the emergency services.
**Extensive Bosch expertise makes for an integrated solution**

The main Bosch divisions contributing to the development of eCall solutions were Security Systems, Chassis Systems Control, and Car Multimedia, which each contributed their respective expertise.

To ensure eCall works smoothly, Bosch Communication Center has developed an innovative service and IT infrastructure and platform which runs globally at multiple sites. The in-vehicle systems are provided by Car Multimedia, one of the most experienced providers of navigation and information systems. Chassis Systems Control provides a whole series of driver assistance systems such as ABS, ESP®, ACC adaptive cruise control, predictive emergency braking systems, and Night Vision, which allows drivers to see people or objects on or next to the road when visibility is bad.

**Years of expertise in emergency call management**

Bosch Communication Center’s eCall Service makes it possible to support emergency operations more precisely and effectively. Specially trained associates play a key role. As intermediaries, they provide the local emergency services with all the relevant facts in a professional and efficient manner. But there is more to it than that. They also play an important psychological role in staying in contact with the victims while help is on the way. In addition, Bosch Communication Center also filters out emergency calls that were triggered unintentionally, thus reducing the burden on local emergency control centers.

Set up in 1985 as a monitoring center offering communication services, today Bosch Communication Center is a provider of complex, technology-driven services. Combining the technical expertise of one of the world’s largest automotive suppliers, Bosch Communication Center also offers the whole range of connected mobility services. The comfort and safety solutions include breakdown, information, maintenance, tracking, and remote services.

A German driver involved in an accident in Spain can give the monitoring center associates important details about the nature of the accident and the people involved, without having to speak a foreign language. Based on the data transmitted and on the additional details provided, Bosch then alerts the local emergency services immediately.
As abrasives specialists, we have solutions for:
- Deburring
- Cleaning
- Removing surface imperfections
- Flattening
- Blending
- Fine sanding
- Keying
- Scuffing
- Applying structure
- Lacquer reworking
- Polishing
- Finishing

Headquartered in Switzerland, sia Abrasives is one of the world’s leading suppliers of innovative abrasives. Since 1875, we have been developing and manufacturing complete abrasive systems, tailored to specific requirements and applications, for the surface treatment of every type of workpiece.

**Finishing applications for engine components**

Reproducible surfaces require defined tolerances. When manufacturing ultra-precise components in the automotive industry, this definition is a must. Finishing plays a key role in the manufacture of consistent, reproducible surfaces. Our range of intercompatible products satisfies these requirements, and contributes to highly cost-efficient production processes.

- Microfinishing
  - Hydraulic and pneumatic components
  - Engine components such as camshafts and crankshafts
  - Steering components
  - Shock absorber parts

**Sanding applications for car bodies**

sia Abrasives offers the automotive industry a fully coordinated system for OEM and OES parts, comprising products and services designed to ensure a perfect finish – abrasives, accessories, and services.

- Presswork components and body shell
  - Removing flaws
  - Flattening unevenness
- Cathodic dip coat and filler / primer systems
  - Keying bodywork
  - Removing flaws
  - Flattening unevenness
- Clear coat incl. polishing
  - Removing dust inclusions
  - Removing sanding scratches
  - Refurbishing surfaces

www.sia-abrasives.com
Connected parking solutions
Systems solutions for parking-lot management

With its active parking lot management system, Bosch pursues an integrated systems approach for connecting individual parking spaces and entire parking lots – both on-street (e.g., in downtown areas) and off-street (e.g., in parking garages).

Systems solutions from a single source
The concept comprises three main components: the parking space sensor, the gateway, and the backend (incl. a web portal and web-service interfaces). The parking space sensor detects a parking vehicle and relays this information to the cloud server. For both the parking-lot operator and the driver, this opens up the possibility of a whole array of new services, such as:
- Easy-to-find vacant parking spaces
- Parking space reservation
- Cashless payment
- Additional location services
- Optimized parking-lot use
- Statistical analysis of parking-space and parking-lot use

Advantages
- Easy installation (on or in the pavement) of the parking space sensors
- Immediately operational
- Reliable occupancy detection with double measurement method using Bosch MEMS (micro-electro-mechanical system) sensors
- Up to seven years energy self-sufficiency
- Highly available incl. 1st, 2nd, and 3rd level support
- Simple integration into existing IT infrastructure
- Identity management (multi-tenancy, roles, and rights)
- Easy retrofitting for existing parking spaces and parking lots
Reliability all the way

We are driven by the desire to provide outstanding solutions and services which ensure that our customers get the most out of their processes and operations. We want to be an active, long-term partner for our customers, and to share with them our experience, know-how, and technological innovations.
For more information on Bosch, visit our website www.bosch.com