**[ 01 ] Bosch survey: Three-quarters of German drivers find car keys a pain**

**[ 02 ] Bosch system is the “key” to preventing digital car theft**

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# Press release

April 2019
PI10882 BBM Fi/BT

## Bosch survey: Three-quarters of German drivers find car keys a pain

Many drivers would prefer to start their cars using a smartphone

- Around 40 percent would replace their car keys with an app.
- The new “Perfectly keyless” app offers drivers both security and convenience.

Stuttgart – Seventy-six percent of Germans found their car keys a pain at one time or another. That is the result of a representative survey conducted by PULS, a market research institute, on behalf of Bosch*. Especially drivers below the age of 40, and those who drive a lot, have had negative experiences with conventional car keys. It starts with simple logistics: they don’t know where to put their keys (45 percent of respondents), e.g., when at the swimming pool, they misplace them and take ages to find them again (44 percent), while some have even lost them altogether (38 percent). Some used to view car keys with wireless remote controls and automaker’s logo as a status symbol; now only 6 percent of those surveyed do. It comes as no surprise, then, that around 40 percent of respondents could already imagine replacing them with a smartphone app. “The advantages of a digital car key are obvious – it is convenient, secure, and available any time and anywhere”, says Harald Kröger, president of the Bosch Automotive Electronics division. Bosch is developing the Perfectly keyless app to enable drivers to automatically unlock and start their vehicles without using a key or reaching for their smartphone. Sensors integrated in the vehicle recognize the owner’s smartphone and unlock the vehicle door for that person only; the level of security offered is comparable to fingerprint technology. It is no problem to deactivate the system if the smartphone is lost. The app can also be used to allow access by other drivers for a limited period of time.

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**From smartphone to car key**

Nowadays, most people don't go anywhere without a smartphone. The majority of those surveyed use their phones to take photos and shoot videos (74 percent), to surf the web (70 percent), and to write e-mails (55 percent). Forty-six percent of men, 32 percent of women, and every second SUV driver were excited by the prospect of having a digital car-locking app on their smartphones. People who drive between 15,001 and 20,000 km/year (49 percent) or more than 20,000 km/year (51 percent) are especially open to such a system. Even more than one in two users of contemporary keyless entry systems (54 percent) could imagine replacing them with an app. After all, with the keyless entry systems currently in use, drivers still have to carry the key in their jacket or pants pocket, or in a handbag – so it can still be forgotten or misplaced. "In recent years, a large number of everyday applications and devices have been transformed into smartphone apps. Ten years ago, it was perfectly normal to have a separate camera and cell phone, but now that has changed. It's time for the smartphone to replace our car keys," says Kröger. The survey respondents, too, see multiple advantages in a digital car key: 30 percent like that they can deactivate the system online if they happen to they lose their smartphone. Twenty-eight percent like the idea of using a smartphone to lock or unlock their car remotely. But the convenience factor is a big plus: 40 percent always have their smartphone with them anyway and 38 percent think it good that, with a smartphone app, they would never have to worry again about losing their car keys.

**Protecting radio and keyless locking systems against theft**

The majority of German drivers currently lock and unlock their cars using systems whose codes can be easily intercepted and manipulated. The majority (almost two-thirds) have wireless remote controls for their cars. Sixteen percent have keyless locking systems, i.e., the doors unlock automatically when the driver approaches the vehicle. Although 87 percent of respondents consider wireless remote controls to be secure and 78 percent think the same of keyless locking systems, one in every five has had their car stolen or hacked, or knows someone who has. Instead of transferring data using LF and UHF technology, the Bosch system utilizes the smartphone as a virtual key and Bluetooth as the transmission technology. That means the signal cannot be intercepted. "If you lock and unlock your car with a smartphone app, you are using a future-proof technology and benefiting not only from considerably enhanced security, but also greater ease of operation," says Kröger.

*On behalf of Bosch, the market research institute PULS surveyed 1,046 German drivers between the ages of 18 and 69 in the period January 11–18, 2019.

**Press photos:** #1847983, #1847984, #1847985, #1847986, #1847987, #1847988, #1847989, #1847990, #1847991

**Photo gallery about the history of car keys:** #1844197, #1844198, #1844199, #1844200, #1844201, #1844202, #1844203, #1844204, #1844205, #1844206, #1844207, #1844208

**Further information:**

Press release: Bosch system is the "key" to preventing digital car theft

Press release: No more lost keys

Perfectly keyless at Bosch Mobility Solutions

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*Mobility Solutions is the largest Bosch Group business sector. According to preliminary figures, its 2018 sales came to 47 billion euros, or 60 percent of total group sales. This makes the Bosch Group one of the leading automotive suppliers. The Mobility Solutions business sector pursues a vision of mobility that is accident-free. emissions-free, and stress-free, and combines the group's expertise in the domains of automation, electrification, and connectivity. For its customers, the outcome is integrated mobility solutions. The business sector's main areas of activity are Injection technology and powertrain peripherals for internal-combustion engines, diverse solutions for powertrain electrification, vehicle safety systems, driver-assistance and automated functions, technology for user-friendly infotainment as well as vehicle-to-vehicle and vehicle-to-infrastructure communication, repair-shop concepts, and technology and services for the automotive aftermarket. Bosch is synonymous with important automotive innovations, such as electronic engine management, the ESP anti-skid system, and common-rail diesel technology.*

*The Bosch Group is a leading global supplier of technology and services. It employs roughly 410,000 associates worldwide (as of December 31, 2018). According to preliminary figures, the company generated sales from operations of 77.9 billion euros in 2018. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. As a leading IoT company, Bosch offers innovative solutions for smart homes, smart cities, connected mobility, and connected manufacturing. It uses its expertise in sensor technology, software, and services, as well as its own IoT cloud, to offer its customers connected, cross-domain solutions from a single source. The Bosch Group's strategic objective is to deliver innovations 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 Bosch Group comprises Robert Bosch GmbH and its roughly 440 subsidiary and regional companies in 60 countries. Including sales and service partners, Bosch's global manufacturing, engineering, and sales network covers nearly every country in the world. The basis for the company's future growth is its innovative strength. At 125 locations across the globe, Bosch employs some 69,500 associates in research and development.*

*To learn more, please visit www.bosch.com, iot.bosch.com, www.bosch-presse.de, twitter.com/BoschPresse.*

# Press release
Automotive Electronics

December 2018
PI10834 BBM Fi/af

## Bosch system is the “key” to preventing digital car theft
Perfectly Keyless is as secure as a fingerprint

- Bosch division president Harald Kröger: “Our Perfectly Keyless system revolutionizes keyless entry systems.”
- With Perfectly Keyless, there is no more trade-off between convenience and safety in keyless entry systems.
- Using data transmission with a built-in digital security lock, the owner’s smartphone is accurately identified.
- Secure digital key management for car-sharing fleets, cars, and commercial vehicles.

Reutlingen, Germany – It takes less than five seconds for a hacker to compromise a standard keyless vehicle entry system. Among experts, this is known as a relay station attack. A Bosch key app is going to change all that. “Our Perfectly Keyless system revolutionizes keyless entry systems. It is the ‘key’ to preventing digital car theft,” says Harald Kröger, president of the Bosch Automotive Electronics division. The special thing about the solution is that the Bosch technology works with a virtual key stored in the smartphone. Sensors installed in the car recognize the owner’s smartphone as securely as a fingerprint and open the vehicle only for them. Digital key management links the app and the vehicle via the cloud. With Perfectly Keyless, Bosch is thus doing something that no other keyless entry system has done before, namely offering both convenience and security. The new smartphone-based key can be used in cars, entire car-sharing fleets, and commercial vehicles. Bosch believes this system with its built-in security lock has huge market potential worldwide.

### Bosch revolutionizes keyless entry

With conventional keyless entry systems, the car key still needs to be carried in a jacket or suit pocket, for example. To open the door and start the engine, it communicates with the car using a radio signal in the low frequency (LF) or ultra

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high frequency (UHF) range. In the race against thieves, the automotive industry is constantly refining existing systems. It's like a marathon. "Now, with Perfectly Keyless, Bosch is launching into a sprint in the development of digital vehicle entry systems. Our motto is revolution, not evolution," Kröger says. Instead of transmitting data via low or high frequency radio technology, the Bosch system uses the smartphone as virtual key and Bluetooth as the transmission technology. This means that the car key can stay at home. And thanks to its decades of experience in semiconductors, Bosch is in a position to make this connection as secure as a fingerprint. Every smartphone contains tiny microchips to manage communication via Bluetooth, and these play a key role in the Bosch solution. Together with sensors installed in the vehicle and a special control unit, they form a system that opens the door only for the smartphone containing the virtual key that fits in the Perfectly Keyless system's digital lock. The system blocks signals from other smartphones or from electronic devices that manipulate the radio transmission. In this way, Perfectly Keyless protects against unauthorized access.

**A keyless journey**

Virtual vehicle keys on smartphones have long been a feature of car-sharing fleets. These vehicles don't move until their operator authorizes entry via the cloud; only then can a user unlock the vehicle, start it, and lock it again using an app. This conversation between the phone and the vehicle uses near-field communication (NFC), a wireless protocol for sharing data over distances of a few centimeters. For this to work, users must take out their smartphone before each journey and hold it up to a marked area on the vehicle. Only then can the system recognize the user and unlock the doors. With Bosch Perfectly Keyless, the smartphone can also stay in its pocket. This means greater ease of use for drivers, and carsharing users benefit from the added convenience. The Bosch solution also works in trucks and for entire fleets of commercial vehicles. That means no more manual administration of vehicle keys, physical handover, or hassle when a key is lost or stolen. If the smartphone is lost or stolen, and the Perfectly Keyless app with it, the digital key can be simply deactivated online, thus blocking access to the vehicle.

**Additional information:**

ADAC tests keyless entry systems for cars and motorcycles (German only):
https://www.adac.de/infotestrat/technik-und-zubehoer/fahrerassistenzsysteme/keyless/default.aspx

**Press photos**: #1713212, #1807399, #1807400, #1807402, #1807403, #1807404

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**Bosch at CES 2019**

- **Monday, January 7, 2019, from 9:00 to 9:45 a.m.** local time, in the Mandalay Bay Hotel, **South Convention Center, Level 2,** Ballrooms B, C, and D
- **BOOTH: Tuesday to Friday, January 8–11, 2019**, in the Central Hall, booth #14020
- **FOLLOW** the Bosch CES 2019 highlights on Twitter: **#BoschCES**

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# Press release

## This Bosch app makes car keys a thing of the past
Safe and stress-free key management by smartphone

August 2018
PI10715 BBM Fi/BT

- Digital, not analog: with Perfectly Keyless, Bosch puts car keys onto smartphones.
- World first: the first keyless access system for trucks.
- For fleet operators: they can now flexibly manage which drivers have vehicle access and when.
- No more hunting for keys: a digital key is always where it is needed.

Stuttgart, Germany – The key of the future is digital, and offers more features than its analog predecessors: impossible to lose or steal, there is never a need to search for it. That is because it is stored securely and specifically for each user in a smartphone app. "Our Perfectly Keyless app is making conventional vehicle keys a thing of the past. Bosch is taking the car key into the digital realm and making it available anywhere, anytime," says Harald Kröger, president of the Bosch Automotive Electronics division. With Perfectly Keyless, the smartphone replaces the analog vehicle key. This concept can offer owners of private vehicles increased convenience, but where it really shines is in vehicle fleets with multiple drivers. No more key handovers: fleet managers and logistics providers simply use the app to give drivers access to the vehicles. "Bosch's digital vehicle key gives fleets a boost towards greater connectivity," Kröger says. The company believes there is a huge market for its solution, which is making its world debut at the IAA Commercial Vehicles in Hannover: potential customers include some 15,000 logistics providers in Germany alone. Most of them manage at least a dozen vehicles and drivers.

### A keyless journey

Row upon row of hundreds of keys hanging on large boards – logistics providers still often use this method to organize the keys to their fleet vehicles. A missing key triggers a massive search operation. But every minute counts, especially with commercial vehicles. After all, if a truck isn't moving, it's not making any money. At the core of the new system is an app that dispatchers and truck drivers both have on their phones. This makes it possible to grant vehicle access with just a

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few clicks. In the future, the Bosch solution will also allow logistics providers to completely integrate digital key management into their dispatch and scheduling systems. As soon as dispatch has assigned drivers and trucks to a route, the system automatically generates digital keys for the vehicles and sends them to the drivers' smartphones. If the route scheduling changes, the software adjusts the keys accordingly. "Thanks to Bosch's fully digital key management, logistics providers enjoy both security and flexibility in their planning. This is the only way the logistics of the future will be able to function efficiently," Kröger says.

**Secure key management with app and cloud**

Bosch digital key management connects trucks and the smartphone app via the cloud. Dispatchers or fleet managers use the app to assign a truck to a driver for a particular route. Perfectly Keyless generates a personal, secure digital key and sends it via the cloud to the truck and to the driver's smartphone. As the driver approaches the assigned truck, the sensors installed in the truck detect the smartphone via a wireless connection. The vehicle doors will open only if the key on the phone "fits" the digital lock in the vehicle. These sensors can also tell when the driver is in the driver's seat, and the engine starts up as soon as the driver presses the start-stop button. When the driver gets out of the car at the end of the journey, the system detects this and automatically locks the doors.

**Battery dead? No problem!**

But what happens if the smartphone's battery dies, or the device has gone missing? In the future, the vehicle key in the smartphone will work even if the phone battery is dead. In that case, the phone and truck will communicate using near-field communication (NFC), a wireless protocol for sharing data over short distances. Bosch plans to make it the "double hull" of its solution. If the smartphone is lost or stolen, and the app with it, the digital key can be simply deactivated online, thus blocking access to the vehicle. It cannot be opened and started until the fleet manager uses the app to provide another driver or a new phone with access to the truck.

**Press photos:** #1452339, #1452340, #1452341, #1452342

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**BOSCH AT THE IAA COMMERCIAL VEHICLES 2018**

- **Press conference: Wednesday, September 19, 2018,** from 1:20 p.m. to 1:40 p.m., with Dr. Rolf Bulander, chairman of the Mobility Solutions business sector, and Dr. Markus Heyn, Member of the Board of Management, Robert Bosch GmbH, at the Bosch booth A01 in Hall 16.

- **Follow the Bosch IAA 2018** highlights on www.bosch-iaa.com or on Twitter: #BoschIAA

- **Panels with Bosch experts at the New Mobility World Forum, pavilion 11, section D:**
  - **Wednesday, September 26, 10:00 a.m. – 11:00 a.m.:** Presentation "The enhancement of automated driving (and AI)" with Johannes-Jörg Rüger, head of the Commercial Vehicle and Off-Road unit
  - **Thursday, September 27, 11:15 a.m. – 12:15 p.m.:** Panel discussion "Aftermarket – more than just repair and maintenance"
  - **Thursday, September 27, 2:30 p.m. – 3:30 p.m.:** Presentation and discussion "Masters of digitalization: digitizing businesses and mobility ecosystems" with Dr. Rainer Kallenbach, president of the Connected Mobility Solutions division

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