RFID CARDS REMAIN ON TREND

Simply register at the machine and save money and time: With the RFID employee ID card

Billions of RFID cards produced and used for more than 20 years can't be wrong: Contactless cards are a success! The spectrum of possible applications is broad – from car rental to access control. For every letter in the alphabet at least one application area can be found. The RFID card owes this success to the high flexibility of the card design. The smart interior - the RFID chip and antenna – is the technological focus. The optical design options as well as the additions of envelopes, lanyards, and more make the RFID card the authentication medium of choice in applications worldwide. The Ulm-based RFID company AEG ID specialises in the development and production of RFID cards in the LF, HF, and UHF frequency ranges as well as combination solutions that are precisely tailored to the requirements of the respective users. Although billions of RFID cards are in use, 100 % reliable hardware is particularly important in security-relevant authentication processes, such as machine activation. *RFID & Wireless IoT Global* spoke to Simon Arch, Marketing and Sales Director, AEG ID, about why an RFID application can still be used in plug-and-play form on machines.

Simon Arch,
Marketing and Sales Director,
AEG ID, in an interview with
RFID & Wireless IoT Global

AEG ID is certified as a climate-neutral company.

As Efficient as Possible, as Safe as Necessary

A digital identity, stored on an RFID card, greatly simplifies authentication in a wide variety of applications. Depending on the level of security required, a simple tap on a reader is sufficient. If the security level can already be scaled via the transponder chip used, additional security hurdles can be created in combination with biometric or manual entries. The result depends on the type of application: Employees can concentrate on their work instead of implementing time-consuming logins; rental and leasing processes can be started immediately and securely. Time control systems receive exact data and employees only enter the rooms or areas for which they are authorised.

The Overall System Creates Efficiency

The most modern and secure infrastructure based on an RFID application remains susceptible to manipulation and misuse if processes are not all coordinated with each other. For the production and coding of employee ID cards, processes must be defined and implemented to ensure the non-issuance of card data. Card management must also be described - from the allocation of rights to the end of the card life cycle. For this reason, it is important to implement an overall concept. In addition to the security aspects, the focus is on process optimisation and scalability as well as investment protection and future security.

Standards for the Use of Contactless Cards

The LF, HF, and UHF chips used by AEG ID are standardised according to the globally valid standards ISO14443 or ISO15693 as well as ISO/IEC18000. The internationally applicable standards specify the physical properties as well as the radio frequency and modulation methods to be used. The structure of communication and the transmission protocol for contactless data exchange via the air interface are also defined.

Range, Lifetime, and Chip Selection

RFID cards have reading ranges of a maximum of15 centimetres (ISO14443) or150 centimetres (ISO15693), depending on the LF or HF technology used and the ISO standards applied. The actual range in a realised application depends on national legislation, the working environment of the antenna, and the specific application. This clearly defined reading zone is intended to provide additional physical security. A user must always be physically close to the reader with their card, which makes it more difficult to intercept radio communications via the air interface. The life cycle of a card is approximately 500,000 write cycles, which corresponds to a service life of approximately ten years. The life of a card also depends on the card material used, such as PVC, PET, or PETG.

MACHINE REGISTRATION WITH RFID IN DEMAND WORLDWIDE

Production machines are expensive assets. Passwords are usually used to protect them from operating errors. Machine operators, shift supervisors, or maintenance staff authenticate themselves via password entry. What sounds logical often works differently in practice. "Just a few days after a new machine has been put into operation, the password is known to large sections of the workforce," reports Simon Arch from his experience. "It is practically impossible to trace which employee logged on to the machine and started a production order." According to Simon Arch, the solution to this challenge can be found in the pocket of almost every employee worldwide: their employee ID card.

Prevent Damage Costs Running Into the Millions With Three Drill Holes

"Production lines, for example in electronics manufacturing, are designed for maximum availability. The downtime of a machine leads to enormous costs within minutes. Five to six digit amounts are not uncommon. But even manufacturing with incorrect parameters can lead to complete rejects being produced during a shift," explains Simon Arch, He continues: "Whenever such a case occurs, the question always arises: Who operated the machine? If all employees use the same password, this question cannot be answered." Many industrial companies worldwide are currently dealing with this question and are looking for an efficient, digital solution. The particular challenge here is that it must be an easy-to-install retrofit solution. "No company will purchase a completely new machine just to get an RFID-based authentication solution. It is not even possible to carry out extensive retrofitting work on running production machines," says Simon Arch, describing the requirements.

Upgrading Machines During Operation

AEG ID's solution is therefore designed so that only three holes need to be drilled to attach an RFID reader directly to a machine. "This is true plug-and-play. Everything can be mounted and connected without shutting down the machine. No complex wiring is required - one USB port is sufficient for power supply and data communication." Existing employee ID cards are used as an identification medium. The reader itself is recognised via the HID interface as a virtual keyboard on the machine's computer. If a machine operator now holds their RFID employee ID card against the reader, the reader writes the employee ID in any open text window in any system - regardless of whether it is Windows, Linux, or another. "No additional software or middleware is required. And it is precisely these aspects that are decisive: an installation in just a few minutes and immediate usability are convincing more and more users," says Simon Arch.

Feedback in Magenta, Blue, Green ...

AEG ID focuses its retrofit solution on cost efficiency and easy integration. However, this does not rule out individualising the solution according to the customer's requirements. "We produce all identification media such as cards and keyfobs as well as the readers from the chip upwards. This gives us a wide scope for the individual design of the components. The retrofit set for machine authentication includes the ARE DT1 reader. It has an LED that emits a ring-shaped light signal as soon as a transponder is detected. The desired colour can easily be customised. There is also the option of placing an individual design in the centre. Just because the solution is cost-effective overall does not mean that customers have to do without these aspects of their brand presentation."

A Smartphone on the Machine? No Thanks!

Why can't an NFC-enabled smartphone also be used? "We have often heard this question. But the answer in such an authentication application is: Under no circumstances! Security could never be guaranteed. Employees install apps on their smartphones, perhaps dial into insecure private wifi networks a risk that no IT department would be willing to take," emphasises Simon Arch. Although he definitely regards the NFC benefit in the production environment as added value. "For example, if a production manager uses an in-house smartphone or tablet to log on to a machine, NFC can act as an interface to visualise and edit production information or machine configurations on a mobile device. But for pure authentication of machine operators, the RFID employee ID card is and remains the best - and only - choice."

"The RFID Card Continuously Receives Add-Ons"

AEG ID started transponder production back in 1989, making it one of the pioneers in RFID worldwide. For three decades, the Ulm-based company has been developing and producing transponders for applications in industry, logistics, animal identification, access control, and security, as well as service and inventory, and in particular RFID cards in ISO format, which have always been used as company IDs. In an interview with *RFID & Wireless IoT Global*, Simon Arch, Marketing and Sales Director at AEG ID, gives an outlook on the future of RFID cards. His clear message: RFID cards should not be retired for a long while yet!

"The aim of authentication via RFID medium on a machine is not to turn production into a high-security area. Rather, the interest of the users is such that they require exact documentation of which employee worked on which machine at what time and with what parameters. And why not use the 'interface' that already exists – the employee ID card."

Simon Arch, Marketing and Sales Director, AEG ID

Mr. Arch, at present, payment applications in particular are making the use of smartphones and wearables as "card replacements" increasingly attractive. Do RFID cards still have a future?

In any situation, RFID cards have a future! Although we are aware of the increasing spread of app-based authentication solutions, especially in the private environment. Payment via smartwatch is indisputably convenient. If a person's authentication involves an internal company process, such as access control or access to machines and tools, this should be strictly separated from private, personal devices. Even in the future, companies with several thousand employees will not equip every employee – and certainly not temporary employees or service providers – with a business smartphone. Here the RFID card is the simpler and more cost-effective solution. What we can now see in the field of machine registration is absolutely consistent with our experience in the RFID card environment. Additional add-ons are integrated every few years. First it was time recording, then vending machines and canteen applications, and now authentication on machines. This automatically also increases the security level, because employees on multifunction cards - preferably loaded with credit – take good care of their cards.

Time recording and access control solutions have been available as established solutions for over 20 years. Hundreds of millions of cards are used worldwide in these applications alone. Can such a system also be implemented by less technologically experienced people today?

The standards are set, the technologies are known, the hardware components are mature. The solution set for machine authentication that we have now introduced benefits from the high technical level of RFID today. If a company uses RFID employee ID cards, all we need to know is whether an LF or HF chip is being used and how the data on the ID medium is encoded. This information is sufficient to provide the appropriate RFID component set. The most impressive thing is that the installation does not require any electronic or radio technical knowledge. This is cost-efficient, can be implemented in just a few minutes, and almost completely eliminates integration errors.

Stepping back from the application for logging on to machines: What influence does the card performance have on the efficiency of a newly designed machine?

The influence should not be underestimated. Especially in older applications which have undergone various hardware upgrades over the years, such as ski pass or parking solutions, or in companies that may have opened new locations over the years and installed new reader hardware there, the performance of the card is crucial. In order to enable the secure authentication required for each application, comprehensive experience in card design is required. Secure and convenient authentication is only possible if the antenna geometry, chip, and capture hardware are optimally matched to each other. For this purpose, AEG ID has also developed an optimised coil geometry that delivers optimum results for both locking cylinders and terminals. In our development and in our production facilities we have the possibility to work from the chip upwards. This enables us to precisely tune antennas, materials, sensitivities, and much more so that the application requirements are always 100 percent covered.

APPLICATIONS FROM **CAR RENTAL TO ACCESS CONTROL**

1. CAR RENTAL / MOBILITY SHARING

Mobility sharing offers for the individual use of cars, scooters, or bicycles are increasing by leaps and bounds, especially in large cities - the operator "ShareNow" alone offers over 20,000 vehicles in more than 30 cities worldwide and has several million registered users. Sharing operators use RFID-based solutions to provide users with fast and convenient access to their chosen vehicle. For example, an RFID card can be used to open or unlock a vehicle and the rental process can also be started via Tap.

2. STUDENT ID

Using an RFID card as a student ID card is a convenient way to combine numerous applications on one medium. Paying in the canteen, access to university sports facilities, locking the lockers in the library, or authenticating at self-service terminals to enter or change data – a campus offers a variety of options for conveniently using RFID-based student IDs.

3. SKIPASS

Over two decades ago, ski passes were one of the first fields of application for RFID cards – and are still in use today. Here, too, the focus is on a convenient application for the user. The handling of lift and slope access is also significantly simplified with ski gloves or cold fingers.

4. MACHINE ACTIVATION

RFID cards or RFID keyfobs as keys for a production machine prevent unauthorised machine operation – for example on complex, expensive, or dangerous machines – or the manipulation of machine parameters. A user logbook is automatically created on the machine by the registration process via card, which enables digital recording of operating times and produced p[redacted] can be assigned flexibly at the machine level.

5. TIME RECORDING & ACCESS CONTROL

In working life, RFID plays a role, among other things, in time recording. The system is also used to control access authorisations or to pay in the canteen. For time recording, employees' chip cards are equipped with an RFID tag. A number is stored on this tag, which can be assigned to a user by linking it to the database. When entering and leaving the building, and depending on the service agreement also for breaks, a reader is tapped and the presence is digitally documented. A company's special security zones can be secured by access systems. These zones can only be entered by employees or visitors whose access cards have the appropriate authorisation.

6. ELECTRIC FILLING STATION

E-mobility is a big promise for the future – and the big trend topic for almost all automobile manufacturers worldwide. To enable e-mobility for all, a dense network of charging stations is needed. Since the charging process of an electric car takes longer than that of a combustion engine, the authentication and payment process takes place independently of a filling station. RFID cards are the digital key to start the charging process.

7. FOLLOW-ME PRINTING

Approve print jobs in the office via tap at the central printer – saving cost s and increasing document security. Centralised control of the corporate printer environment increases convenience of use and ensures that only authorised employees pick up specific documents from the printer. The print job is only started when the customer is in the immediate vicinity and authenticates themselves using an RFID card.

8. HOTEL CARDS

A classic field of application for RFID cards: keyless access to hotel rooms. This access method has established itself in numerous hotels worldwide. For the guest, access by card means greater convenience, while key management is simplified for the hotel. Lost cards can be blocked immediately when rights are assigned.