The universal talent
Electronic-Key-System **EKS**

What is an EKS?

The Electronic-Key-System EKS is a transponder-based read/write system for industrial use. It is used primarily for electronic access control and access management as an alternative to the normal, password-based systems. Due to the combination of Electronic-Key and information memory, however, it offers much more than just a password replacement. As an open and freely configurable system with various data interfaces, EKS is of very universal application.

■ What does the EKS system comprise?

▶ EKS read/write station with key adapter for reading and writing the EKS Electronic-Key

▶ EKS Electronic-Key that contains a transponder with data memory

▶ Software components that aid integration, setting the parameters on the Electronic-Key and key management.

■ How does EKS work?

For operation the Electronic-Key is placed in the Electronic-Key adapter. The data are transferred between the Electronic-Key adapter and the read/write station without using any contacts. In a further step, the data are transferred to a control system. During this process, e.g., the owner of the Electronic-Key is identified and his user rights are transferred. Depending on the EKS system, further information can be saved on the Electronic-Key and transferred. These data can, e.g., be used to control specific functions or contain encrypted process parameters for an installation.

■ What can EKS be used for?

EKS is used during daily operation in a very wide range of sectors to

▶ Ensure more efficiency in numerous processes
▶ Create flexibility during the assignment of access rights
▶ Provide more safety for employees, systems and processes
▶ Be able to safeguard the quality of products
▶ Create transparency and traceability

Here the EKS takes over the following tasks, for example:

▶ Assigning individual authorizations to specific persons
▶ Creating traceability. Who did what and when?
▶ Saving and call up recipes
▶ Electronic signature
▶ Fast switching between user profiles
▶ Transferring ergonomic data for setting up the workplace individually
▶ Acquiring data for enterprise resource planning
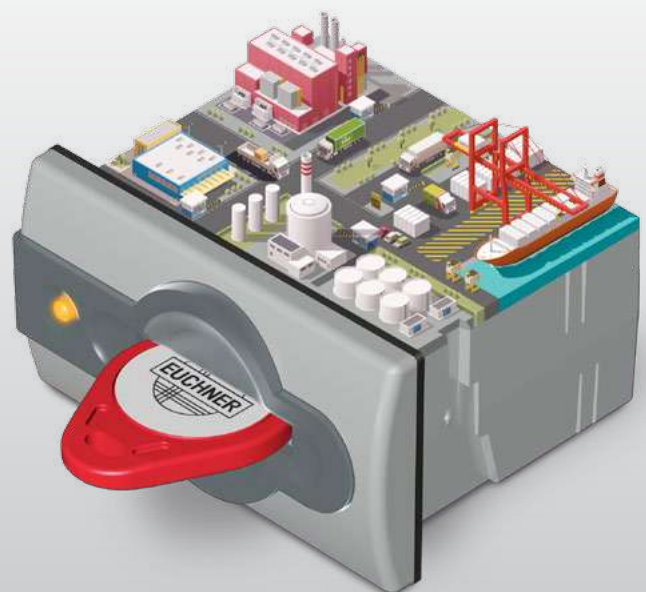
Which EKS systems are available?

■ EKS *Light*

EKS *Light* is optimized for quick, straightforward integration into a control system environment. For this purpose the Electronic-Key has a pre-defined data structure that is evaluated directly by the read-only station.

With EKS *Light* you therefore procure not just the EKS hardware, but an integrated solution for managing user groups (who is allowed to access where?) and access levels (what is the user allowed to do?).

For this purpose the data structure on the Electronic-Key and the evaluation electronics in the read-only station form a closed system with user group identification and up to 16 access levels that can be used directly for a suitable application.

The complete evaluation logic for Electronic-Key recognition is already integrated into the device and does not therefore need to be programmed into a control system. The device first determines whether the read Electronic-Key is valid and access to the machine is allowed. If this is the case, the access level is determined and transferred to the control system via the 4-bit parallel interface. The authorization for a specific machine function must be assigned in the control system for each access level detected; the machine function is enabled in this way.

■ EKS with data interface

EKS with data interface offers maximum flexibility. As the user you specify the data structure on the Electronic-Key and define how it is to be interpreted. For this purpose you program the processing logic in the control system to suit your needs exactly. In this way numerous possible scenarios can be depicted. For example:

▶ Control of certain machine functions
▶ Storage of process parameters
▶ Traceability of events
▶ Storage of a expiration date on the Electronic-Key
▶ Different access rights for multiple processes

The EKS system provides through the Eletronic-Key the data memory and through the read/write station the data interface to the control. You can choose between a total of 5 common interfaces.

■ EKS *FSA* (For Safety Applications)

The EKS systems are further differentiated by the optional *FSA* (For Safety Applications) version, which is available both for the EKS with data interface and for EKS *Light*. The *FSA* devices feature in addition a second, redundant channel, which is generally available in the form of an additional semiconductor switching contact. This switching contact is used in connection with functionally safe applications.

Which designs are available?

■ Compact design

For the compact design, the key adapter and the electronics are mounted in one housing. The Electronic-Key is inserted into the Electronic-Key adapter and is held in place by a spring clip.

▶ Electronic-Key adapter and electronics in one housing
▶ Very reliable retention of the Electronic-Key, even if there is heavy vibration
▶ Degree of protection: IP65, IP67
▶ Robust housing for use in harsh environments

■ Modular design

With the modular design, the Electronic-Key adapter and electronics are mounted spatially separate. Due to the separation, the Electronic-Key adapter fits in standard mounting holes with Ø 22.5 mm. The rounded shape of the Electronic-Key adapter and the FDA-approved plastic permit usage in hygienically sensitive areas. With this design the Electronic-Key is only held in front or dropped into place.

▶ Electronic-Key adapter mounted physically separated from the electronics
▶ Straightforward installation in standard mounting hole Ø 22.5 mm
▶ Degree of protection: IP65, IP67, IP69K
▶ Suitable for hygienic areas
▶ Very robust housing for use in extremely harsh environments

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More than safety.

Selecting the suitable EKS system for my application		
Essential requirements	**EKS with data interface**	**EKS Light**
Assignment of access rights	✓ Several levels per key	✓ One level per key
Identification of persons	✓ Individual	✓ In groups
Recording of events, traceability via a dedicated database	✓ Individual	✓ In groups
Representation of different data elements	✓ Electronic-Key freely configurable	✗ Electronic-Key structure pre-defined
Usage of date functions	✓ E.g. issue date, expiration date	✗
Comparison of Electronic-Key data with database	✓ E. g. via Electronic-Key serial number	✗

Selection of a suitable interface						
Interfaces available	RS232 serie RS422 Serial	USB USB	ETHERNET Ethernet TCP/IP	PROFIBUS PROFIBUS DP	PROFINET PROFINET IO	PROFINET PROFINET IO	Light Digital outputs (4-bit, parallel)
Usage on PLC	✓	✗	✗	✓	✓	✓	✓
Usage on PC	✓	✓	✓	✗	✗	✗	✗
Possible cable lengths (EKS to the control system)	5 m	3 m	100 m	1,200 m	100 m	100 m	50 m
Version FSA	✗	✓	✓	✓	✓	✓	✓

Selection of a suitable design				
Design	**compact**	**modular**	**compact**	**modular**

How is the EKS Electronic-Key structured?

The Electronic-Key contains an RFID transponder with memory chip.
The data are transferred by induction without using any contacts. The Electronic-Key is operated
without batteries. The Electronic-Keys have the shape of a robust tag and are available in various colors.

EKS
key colors

■ Data structure in the Electronic-Key memory

Every Electronic-Key has a combined read/write and fixed-code memory with 116 bytes of E²PROM (programmable) plus 8 bytes of ROM (as unique serial number). As such it is possible, e.g., to save data elements such as the department, personnel number, access levels for one or more processes, an expiration date and much more on the Electronic-Key. This information is then read from the Electronic-Key by the machine control and used to derive machine functions.

Memory	E² PROM (programmable)														ROM (fixed)		
Number	116 bytes														8 bytes		
Byte no.	0	1	2	3	4	5	6	...	110	111	112	113	114	115	116	...	123

Example data structure for EKS with data interface

A typical example for the utilization of the freely programmable memory for EKS with data interface could be as follows:

▶ Department (here: WT)
▶ Personnel number (here: 37)
▶ Reserve block
▶ Access level for process 1 e.g. milling (here 3)
▶ Access level for process 2 e.g. turning (here 5)
▶ Safe operation mode MSO 0 (here 0F0F)
▶ Unused memory (freely available)
▶ Fixed serial number (here: 02...32)

WT37
03
05
0F0F
02...32

Example for utilization with data interface																
Byte no.	0	1	2	3	4	5	6	7	8	...	112	113	114	115	116	...	123
Value [HEX]	57	54	33	37	00	03	05	0F	0F						02	...	32
Value [ASCII]	W	T	3	7													
Function	Department		Personnel number		Res.	Level	Level	Operation mode selection			Freely available				Serial number		

Pre-defined data structure for EKS *Light*

The data structure for utilization with EKS *Light* is as follows:

▶ Unused memory (freely available)
▶ Pre-defined structure for the related operating state (information on access code and access level)
▶ Fixed serial number

Example for utilization with EKS *Light*																
Byte no.	0	1	2	3	4	...	108	109	110	111	112	113	114	115	116	...	123
Function	Freely available						Used for the related operating state (pre-defined structure)								Serial number		

How do I program and manage the EKS Electronic-Keys?

Basically the Electronic-Keys can be written and read using a read/write station. This can be done centrally on a programming station with the aid of a suitable software package, or on any read/write station from the application. The Electronic-Keys and the users can be managed either using the management software Electronic-Key-Manager EKM on a PC, or a custom solution.

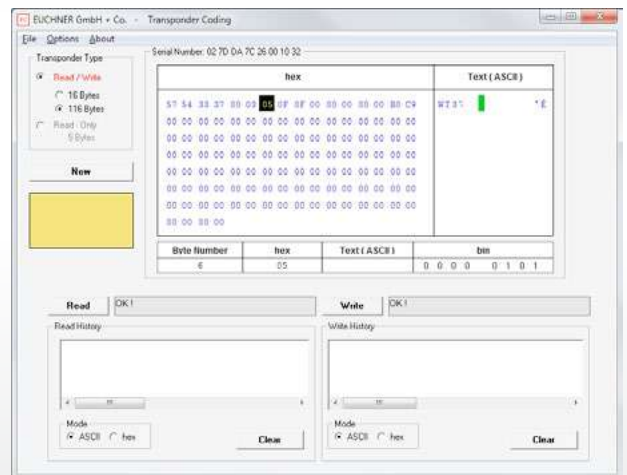## ■ Programming station for writing data to the Electronic-Keys

In the simplest case the following is required to write data to EKS Electronic-Keys:

▶ Windows PC
▶ Electronic-Key adapter with USB interface
▶ EKS desktop case (optional)
▶ Software: Transponder Coding TC or Electronic-Key-Manager EKM

■ Electronic-Key editor „Transponder Coding TC"

The Transponder Coding TC software is used to write data to EKS Electronic-Keys on a programming station. TC is a simple hex/ASCII editor that can be used to read and write the Electronic-Key data conveniently on the PC. This makes it a helpful tool during system integration and makes it easier to understand the memory structure.

■ Electronic-Key database „Electronic-Key-Manager EKM"

The Electronic-Key-Manager EKM is a flexible software for writing and managing the EKS Electronic-Keys on a programming station. All Electronic-Keys and their contents are managed in a database. The freely programmable memory on the Electronic-Key can be allocated to the specific database fields. You can configure the database fields and the input screen as required. You can assign editing permissions individually using the EKM user manager. EKM can also be integrated into any existing EKS environment. The full version of EKM is network capable.
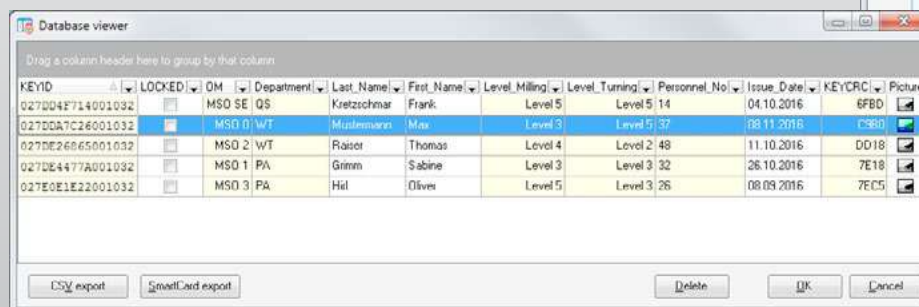
What are the advantages for me if I use EKS?

▶ Secure, controlled access to my processes

▶ Automatic logging on and logging off by positioning the Electronic-Key

▶ Variety of possible applications in all sectors due to industry-suitable housing

▶ Straightforward integration by means of various interfaces

▶ Increased product quality due to controlled manufacture

▶ Increased reliability of my installations and as a result lower production costs
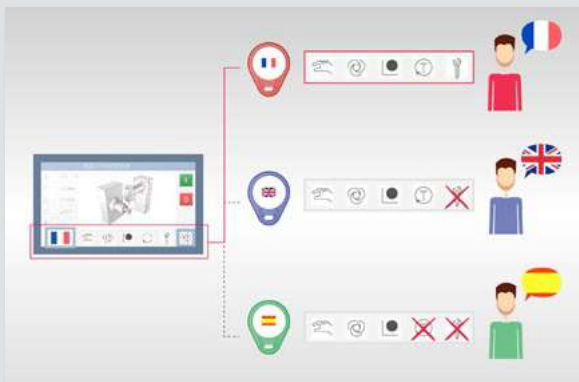
Rapid switchover of user profiles

Save time by reducing setup times

Automate enterprise resource planning procedures

Traceability though electronic signature

For detailed information about the various EKS systems and the accessories, please refer to the product catalogs or visit our homepage at www.euchner.com.

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