EUCHNER

Software Manual

EKS Data Service PC

Electronic-Key-System EKS

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1. General notes

1.1. Use of the manual

This manual describes the functions of the EKS Data Service PC software components as part of the EUCHNER EKS Data Service Integration Kit (order no. 8163316).

1.2. Requirement for the user

Using EKS Data Service PC properly requires prior knowledge about network configuration, access management and firewall settings.

1.3. System requirements

Hardware:	Standard PC with network connection
Software:	.NET Framework 4.5 must be installed
Operating system:	Windows® 7 (32-bit and 64-bit)
	Windows® 8 (64-bit)
	Windows® 10 (32-bit and 64-bit)
	Windows® 11 (64-bit)
	Windows® Server 2012 (32-bit and 64-bit)
	Windows® Server 2012 R2 (64-bit)
	Windows® Server 2016 (64-bit)
	Windows® Server 2019 (64-bit)
	Windows® Server 2022 (64-bit)

2. General functions of the application

Data comparison or data retrieval from a central database is currently not established in most EKS applications in the PLC world. This means that the data are almost always read decentrally from the Electronic-Key and then processed individually in the PLC. Access information is thus transmitted exclusively via the Electronic-Key in this case. Many EKS operators wish to implement data comparison from the PLC world using EKM data in the PC world. The central topic is the desire to block Electronic-Keys centrally and to retrieve further data if necessary.

The Electronic-Key-Manager EKM database content is exported to a universally usable file in CSV format in the PC environment. A blocking code behind the Electronic-Key's serial number (KeyID) can be evaluated in this EKM CSV export file. This code is set to "1" as soon as the Electronic-Key is blocked.

Other data elements assigned to the Electronic-Key serial number can also be retrieved. These data elements differ for specific applications.

A request is sent from EKS Data Service PLC to EKS Data Service PC when an Electronic-Key is placed. Based on the KeyID, EKS Data Service PC searches for the entry in the EKM CSV export file and then returns the data to EKS Data Service PLC. The data are now available there to the user for further processing. Additionally, the requested data are stored in an emergency memory. If the connection to the PC is interrupted, the data of previously placed Electronic-Keys are loaded from the emergency-level memory. Up to the last 100 Electronic-Key data items are available in the emergency-level memory (size of the emergency-level memory can be adapted).

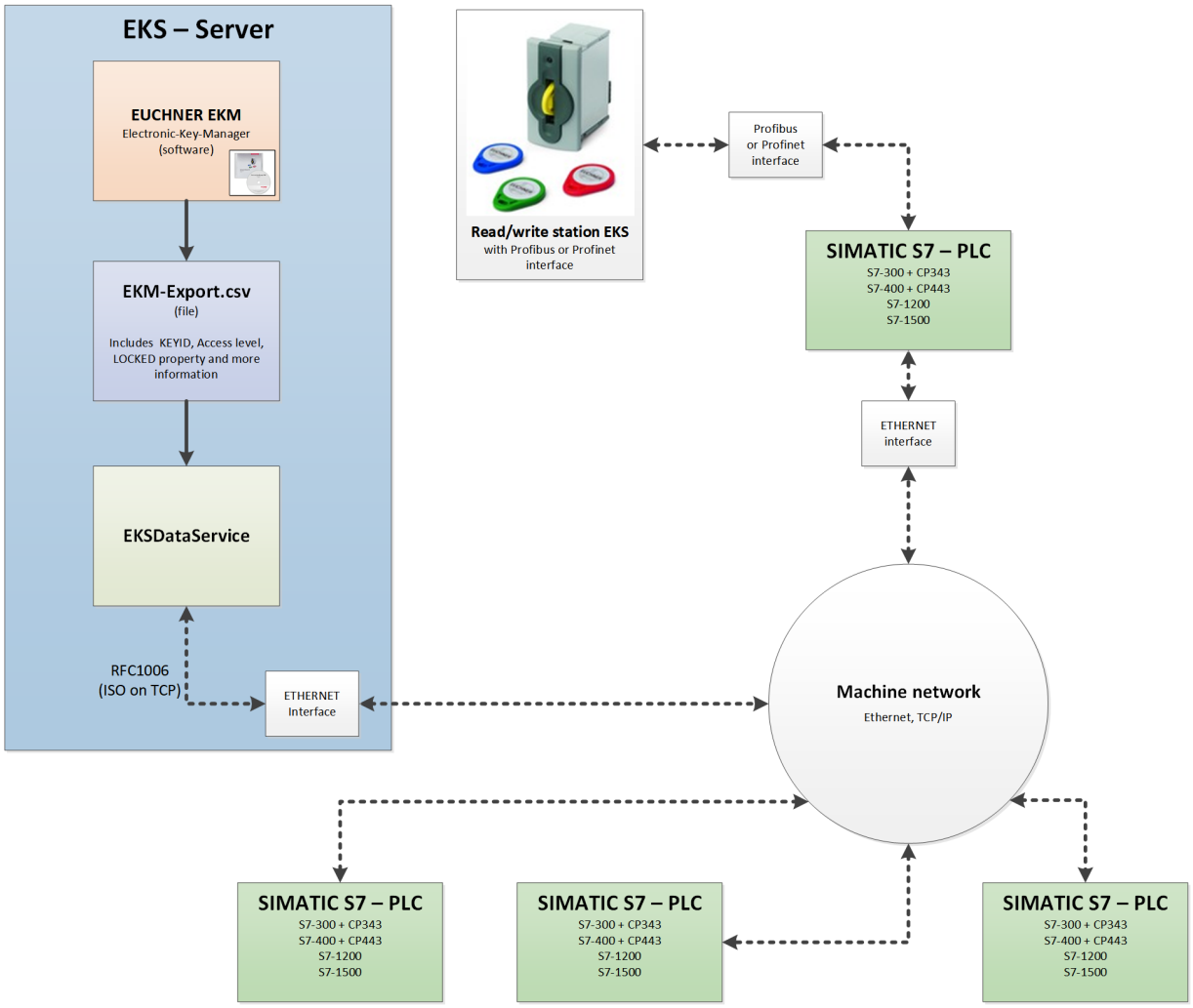
Notice about the emergency level: If the emergency-level memory is full and a new Electronic-Key is requested, the Electronic-Key that has not been requested for the longest time will be replaced. Entries of the emergency level are updated cyclically, so it is not necessarily the first Electronic-Key placed that will be replaced.

There are two emergency levels: In case of emergency level 1, EKS Data Service PC cannot access the original EKM CSV export file and instead uses the local backup file of the EKM CSV export file. In case of emergency level 2, EKS Data Service PC cannot provide any data because communication is disrupted. The data of the internal PLC data block are used instead.

3. Purpose

The **“EUCHNER EKS Data Service PC”** service is installed on a server, and it is used to distribute EKS Electronic-Key data to SIMATIC control systems that are networked with this server via Ethernet TCP/IP. EUCHNER Electronic-Key-Manager EKM generates the EKS Electronic-Key data.

The short identifier is **EKSDataService**. The executable file is named *EKSDataService.exe*. “EUCHNER EKS Data Service” is also shortened to “service” below.



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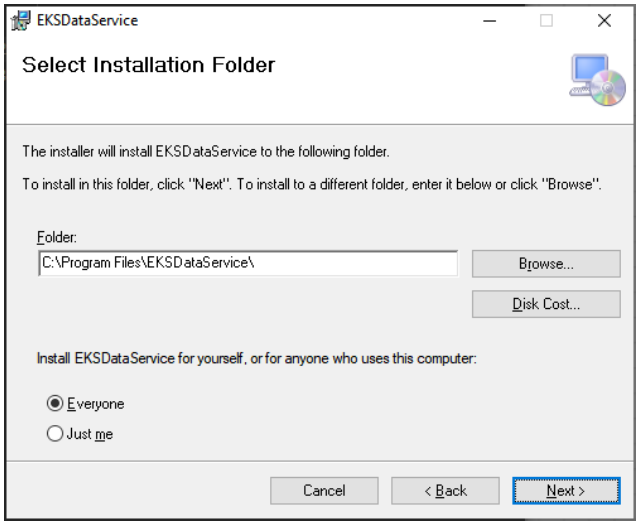
4. Installation

You must install EKS Data Service PC before you can use it. Run the installation file corresponding to your operating system.

- For Windows ®, 32-bit: \PC_Service\Setup\x86\setup.exe
- For Windows ®, 64-bit: \PC_Service\Setup\x64\setup.exe

Running the *setup.exe* file will install EKS Data Service PC as a service.



The installation directory can be changed during installation.

The **"EUCHNER EKS Data Service"** service will be launched automatically after installation and can then be configured.

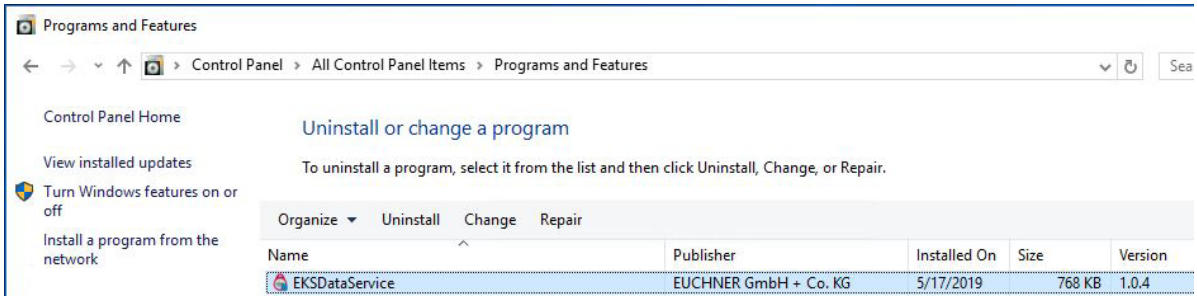
4.1. Uninstalling

Proceed as follows to uninstall EUCHNER EKS Data Service:

1. In the operating system, select *Settings* | *Control Panel* | *Programs and Features*
2. Select the entry *EUCHNER EKS Data Service* from the list of installed programs.
3. To uninstall, click *Change/Remove* and follow the instructions in the uninstall dialog box.

The service's configuration will be retained, and will be active again if the program is reinstalled.

The *%ProgramData%\EKSDataService* directory must be deleted to delete the configuration *(see chapter 10. Miscellaneous, Storage location for settings on page 26)*.



4.2. Network configuration

The server PC on which the service is installed must possess a network connection to the machine network. If a firewall is used, the following incoming port must be enabled for the machine network.

TCP port 102: RFC1006 connection of the SIMATIC control systems with the service. This port cannot be changed, and therefore also must not be reserved by other software products. Siemens software products, such as TIA-Portal, occupy port 102 with a service by default. If parallel installation is unavoidable, the SIMATIC service S7DOS Help Service (s7oiehsx64.exe) must be ended and deactivated.

The following port can optionally be enabled if configuring the service from other PCs in the machine network using a web browser is required.

TCP port 65080: http connection for configuring the service.

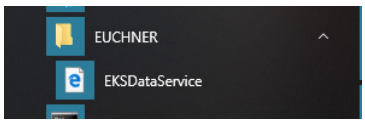
5. Operation

5.1. Web interface

The service is configured via a web interface. All common web browsers can be used for configuration. The web interface can be reached under the following address on the server by default:

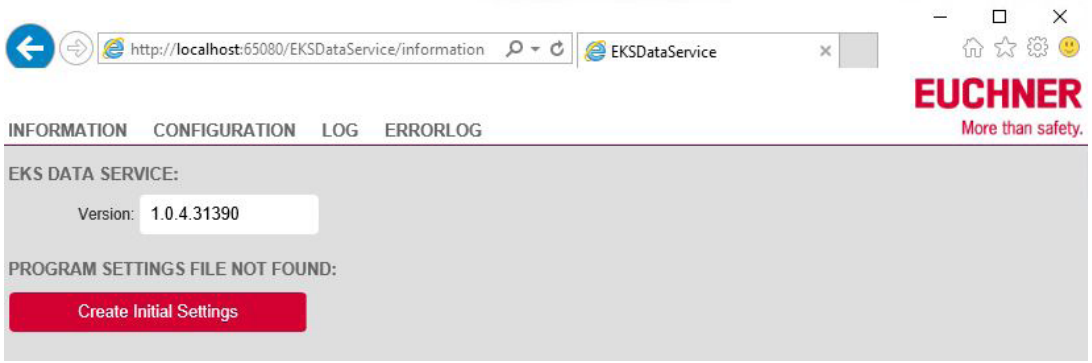
http://localhost:65080/EKSDataService

A link with this address will be created on the Desktop and in the Start menu during installation.



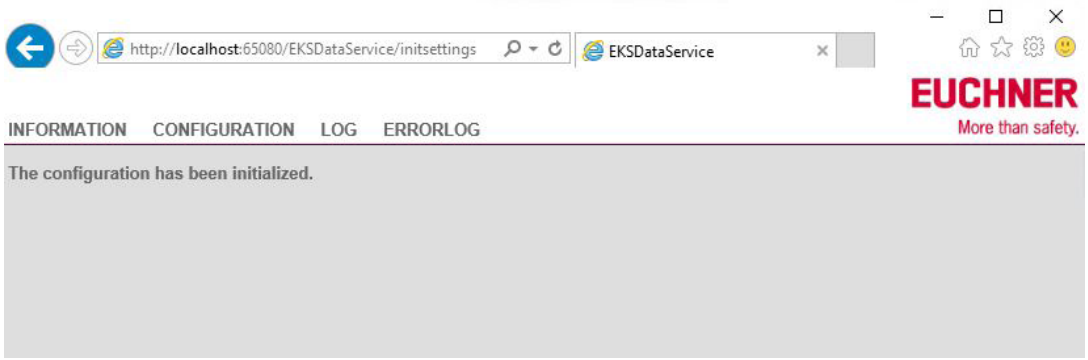
5.2. Creating initial settings

After being installed for the first time, the service is not yet configured and must first be set up for the user's application.



Clicking the *Create Initial Settings* button creates the initial settings. The settings of the service are saved in the *%ProgramData%\EKSDataService* directory.

The service is ready for use and can be configured once the initial settings have been created.



5.3. Navigation

Four main menus are available. Clicking one of the links at the top opens the corresponding page.

INFORMATION

This menu displays status information about the service.

CONFIGURATION

This menu is used to configure the service.

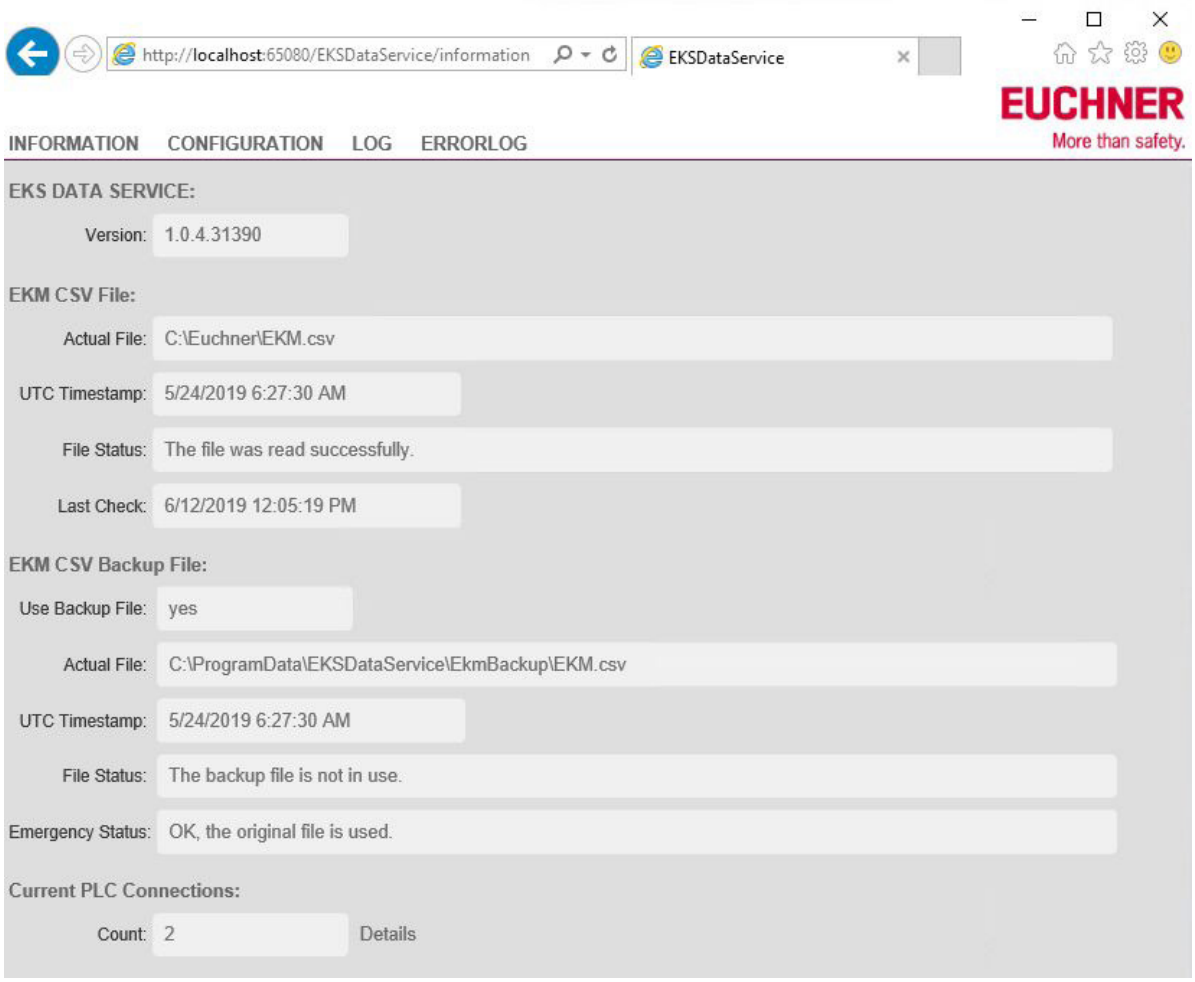
LOG

This menu displays operating events.

ERRORLOG

This menu displays errors.

6. INFORMATION – status information about the service



6.1. EKS DATA SERVICE

Version: Display of the current software version of the service in the format:
`[Major].[Minor].[Build].[Revision]`

6.2. EKM CSV File

Actual File: Display of the currently used EKM CSV export file with path information.

UTC Timestamp: Display of the date and time of the last EKM CSV export file save operation in UTC format.

File Status: Display of the current file status.

Last Check: Display of the date and time of the last check of the EKM CSV export file in local time.

6.3. EKM CSV Backup File

Use Backup File: Display of whether a backup file of the EKM CSV export file is to be created for use in the event of a malfunction (original EKM CSV export file inaccessible).

Actual File: Display of the currently used EKM CSV backup file with path information.

UTC Timestamp: Date and time of the last save operation of the EKM CSV backup file in UTC format.

File Status: Display of the current file status.

Emergency Status: Display of whether or not the backup file is currently being used.

6.4. Current PLC Connections

Count: Number of currently connected SIMATIC control systems.

Details: Clicking the link displays a list of all connected SIMATIC control systems with names, IP addresses and connection dates and times.

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7. CONFIGURATION – settings of the service

7.1. LOGIN

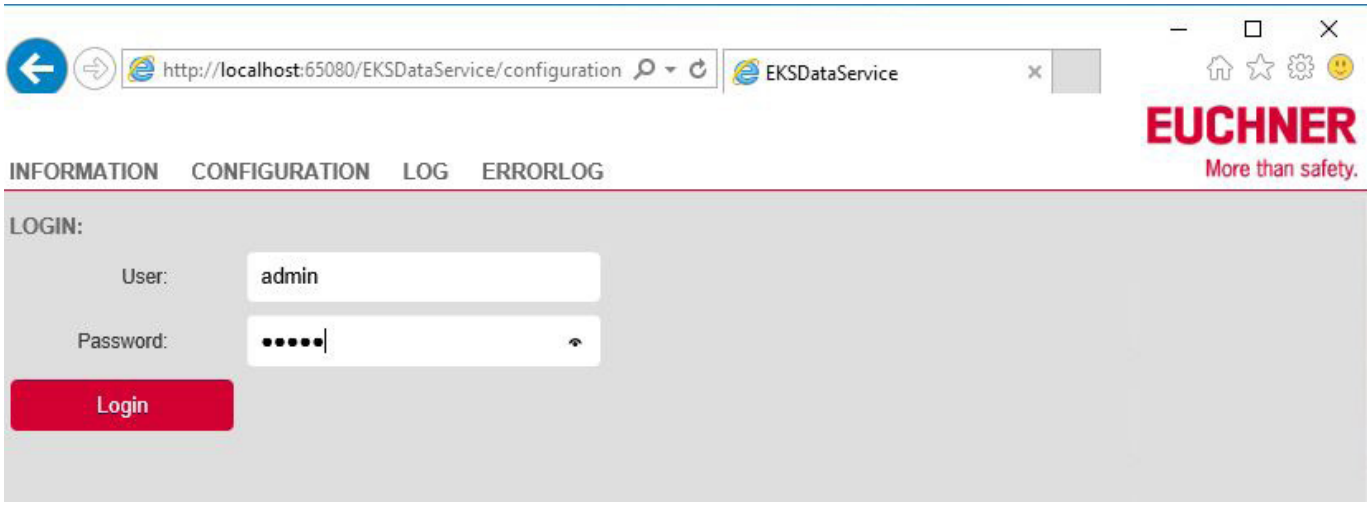
By default, configuration is possible only after login with username and password.

The following username and password are used for initial login.

User: *admin*

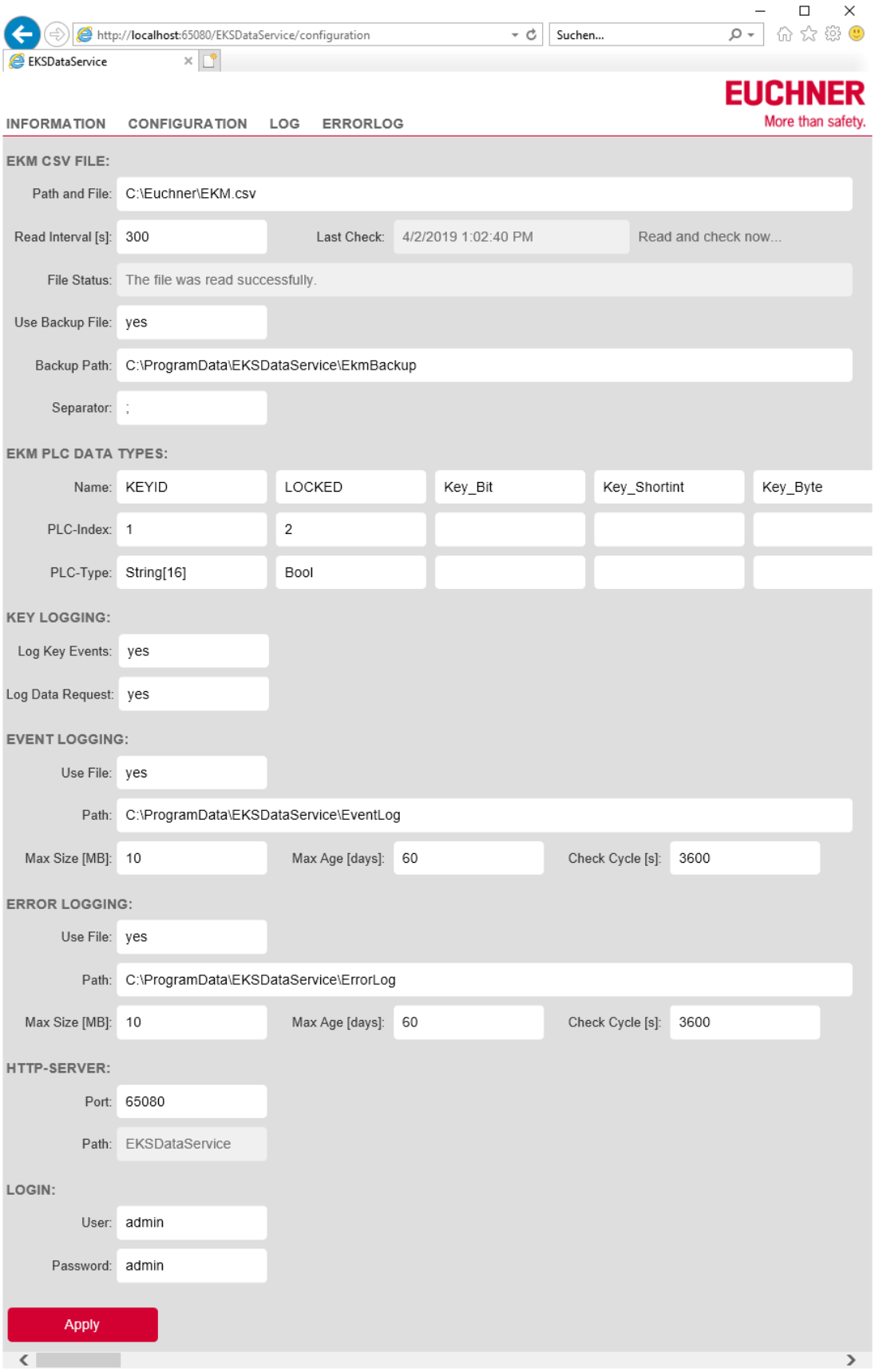
Password: *admin*

The username and password can be changed after login.



Only one user can be logged in using the service at a time. If another user logs into another computer, the first user will be logged out automatically.

7.2. Settings



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7.2.1. EKM CSV FILE

Path and File: Specification of the EKM CSV export file with path. Both local paths and network paths can be specified.

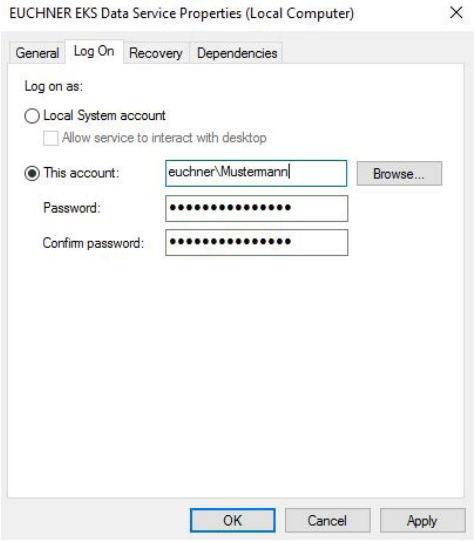
Examples of permissible paths:

- C:\Euchner\EKM.csv
- \\EKMServer\Data\EUCHNER EKM Export\EKM.csv

When specifying network paths, it is important to set the read authorization for the EKM CSV export file to the user *Everyone*. This is because the service runs under the local system account by default.

However, it is also possible to specify a certain user for running the service if this user possesses at least read access to the file.

The service properties can be changed via *Computer Management* | *Services* | *EUCHNER EKS Data Service*.



Read Interval [s]: Interval (in seconds) at which the EKM CSV export file is checked for changes.
Minimum = 5, maximum = 100000
Default value: 300

The EKM CSV export file is read for the first time when the service is started. The UTC time stamp will then be saved after the EKM CSV export file has been read successfully. After expiry of the interval time, the time stamp of the EKM CSV export file is compared with the saved time stamp. If the time stamp differs, it is assumed that the EKM CSV export file has changed. The file will be read again.

Last Check: Date and time of the last check of the EKM CSV export file in local time.

Read and check now…: Clicking this link performs the check immediately (prior to expiration of the interval time) and displays the result under *File Status*.

File Status: Display of the current file status.

Use Backup File: A backup file is to be created automatically and used as a substitute in case of an access error when reading the EKM CSV export file.
Permissible inputs: *yes / no*
Default value: *yes*

Backup Path: Path in which the backup file is saved.
Default value: *C:\ProgramData\EKSDataService\EkmBackup*

The backup of the EKM CSV export file is designated emergency level 1. Once the EKM CSV export file has been read successfully, a copy of the file is automatically created in the directory specified under *Backup Path*. In the event of a read error, the Electronic-Key data will then be read from the backup file. SIMATIC control units are informed that this emergency level is being used, and this information is output at the function block.

7.2.2. EKM PLC DATA TYPES

A valid EKM CSV export file must be configured before the data are assigned.

The data of the EKM CSV export file are then assigned to the data structure of the SIMATIC control systems. Up to 200 columns can be assigned to the EKM CSV export file.

Name: Designation of the column in the EKM CSV export file. This is adopted directly from the EKM CSV export file.

PLC-Index: Index in the data structure of the data description at the PLC level.
Minimum: 1

PLC-Type: PLC data type

Defining assignment of the data (PLC-Type)

Exporting the EKM database into the EKM CSV export file does not export the original EKM data types as well. These data types are essential for the data request and for further processing in the PLC, and they therefore must be configured in the service again. This process must be performed manually. You can read the original data types from EKM Database Designer.

Different data types are available in EKM and in the PLC. The PLC's data type must be used during configuration.

The following table can assist with definition.

EKM format	PLC data type S7-300 and S7-400	PLC data type S7-1200 and S7-1500	Example
KEYID	STRING[16]	STRING[16]	'018019E580001032'
Bit	BOOL	BOOL	True
ShortInt (-128 - 127)	INT	SINT / INT	-33
Byte (0..255)	BYTE	BYTE	233
SmallInt (-32768 - 32767)	INT	INT	-14322
Word (0 - 65535)	WORD	WORD	16#43A2
Integer (32 bits, signed)	DINT	DINT	-55778899
Float	REAL	REAL / LREAL	3.1416
String	STRING[n]	STRING[n]	'Euchner EKS'
StringBlankFilled	STRING[n]	STRING[n]	'Component 5T'
StringPassword	-	-	
Time	TIME	TIME	13h_54m_23s
TimeAscii	STRING[8]	STRING[8]	'15:38:32'
Date	DATE	DATE	2018-02-11
DateAscii	STRING[8]	STRING[8]	'02.11.2018'
BitString	BYTE / WORD / DWORD	BYTE / WORD / DWORD / LWORD	16#F565E01A
CRC	WORD	WORD	16#60FE
Memo	-	-	
Graphic	-	-	
Nibble	BYTE	BYTE	16#B

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Example configuration

The *KEYID* and *LOCKED* fields are always present, and they must always be transmitted to the SIMATIC control system. The *Key_Integer*, *Key_String*, *Key_Date*, *DB_Smallint* and *DB_Float* fields are to be transmitted as well in our example.

Fiel...	OnKey	Fieldname	Type	StartByte	Length	BitNo	Display...	Unique	Template
1	☑	Key_Bit	Bit	0		0		☐	☐
2	☑	Key_Shortint	ShortInt (-128 .. 127)	1	1			☐	☐
3	☑	Key_Byte	Byte (0 .. 255)	2	1		Hex	☐	☐
4	☑	Key_Smallint	SmallInt (-32768 .. 32...	4	2			☐	☐
5	☑	Key_Word	Word (0 .. 65535)	6	2		Hex	☐	☐
6	☑	Key_Integer	Integer (32 Bit mit Vor...	10	4			☐	☐
7	☑	Key_Float	Float	16	8			☐	☐
8	☑	Key_String	String	24	12			☐	☐
9	☑	Key_StringBlankFilled	StringBlankFilled	36	10			☐	☐
10	☑	Key_Time	Time	48	8			☐	☐
11	☑	Key_TimeAscii	TimeAscii	56	8			☐	☐
12	☑	Key_Date	Date	64	8			☐	☐
13	☑	Key_DateAscii	DateAscii	72	8			☐	☐
14	☑	Key_BitString	BitString	80	2		Hex	☐	☐
15	☑	KEYCRC	CRC	0	82	114	Hex	☐	☐
16	☐	DB_Bit	Bit					☐	☐
17	☐	DB_Shortint	ShortInt (-128 .. 127)					☐	☐
18	☐	DB_Byte	Byte (0 .. 255)				Dez	☐	☐
19	☐	DB_Smallint	SmallInt (-32768 .. 32...					☐	☐
20	☐	DB_Word	Word (0 .. 65535)				Dez	☐	☐
21	☐	DB_Integer	Integer (32 Bit mit Vor...					☐	☐
22	☐	DB_Float	Float					☐	☐
23	☐	DB_String	String		14			☐	☐
24	☐	DB_StringBlankFilled	StringBlankFilled		12			☐	☐
25	☐	DB_StringPassword	StringPassword		10			☐	☐
26	☐	DB_Time	Time					☐	☐
27	☐	DB_Date	Date					☐	☐
28	☐	DB_Memo	Memo					☐	☐
29	☐	DB_Graphic	Graphic					☐	☐
30	☐	DB_BitString	BitString		1		Dez	☐	☐

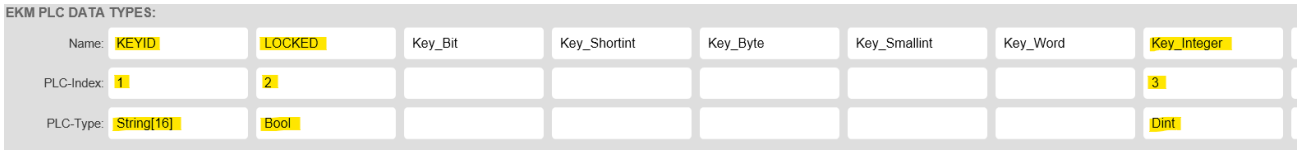
Field name	EKM data type	EKM length	PLC-Type S7-1500	PLC-Index
KEYID	KEYID	16	String[16]	1
LOCKED	Bit		Bool	2
Key_Integer	Integer (32 bits, signed)	4	DInt	3
Key_String	String	12	String[12]	4
Key_Date	Date	8	Date	5
DB_Smallint	SmallInt (-32768 - 32767)		Int	6
DB_Float	Float		Real	7

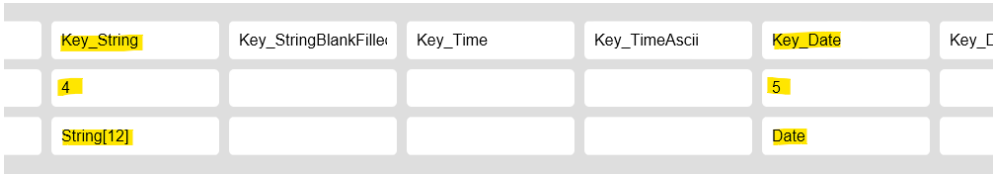
The *KEYID* field always receives the index 1, and the *LOCKED* field the index 2.

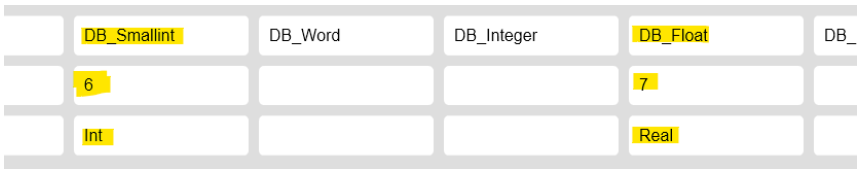
The required additional data are selected, and the PLC index is assigned in ascending order.

One PLC data type in each case is assigned in accordance with the EKM data type.

The assignment to the SIMATIC PLC data type and index is then defined in the service's settings.





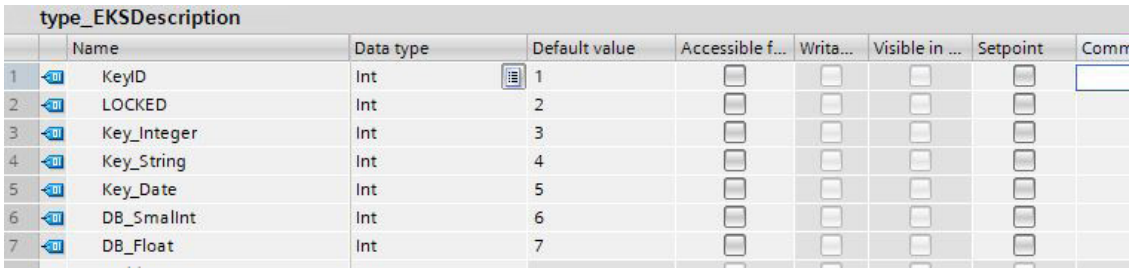


SIMATIC PLC data configuration

Details about the EUCHNER EKS Data Service – SIMATIC PLC library – are described in the respective programming manual.

The assignment defined above must now be adopted into the PLC configuration (example: TIA Portal).

The field name and the index in PLC data types *type_EKSDescription* are adopted first.



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Subsequently, PLC data type *type_EKSDatabase* is defined in accordance with the field names and the PLC data types.

type_EKSDatabase

	Name	Data type	Default value	Accessible f...	Writa...	Visible in ...	Setpoint	Comment
1	KeyID	String[16]	''					
2	LOCKED	Bool	false					
3	Key_Integer	DInt	0					
4	Key_String	String[12]	''					
5	Key_Date	Date	D#1990-01-01					
6	DB_SmallInt	Int	0					
7	DB_Float	Real	0.0					

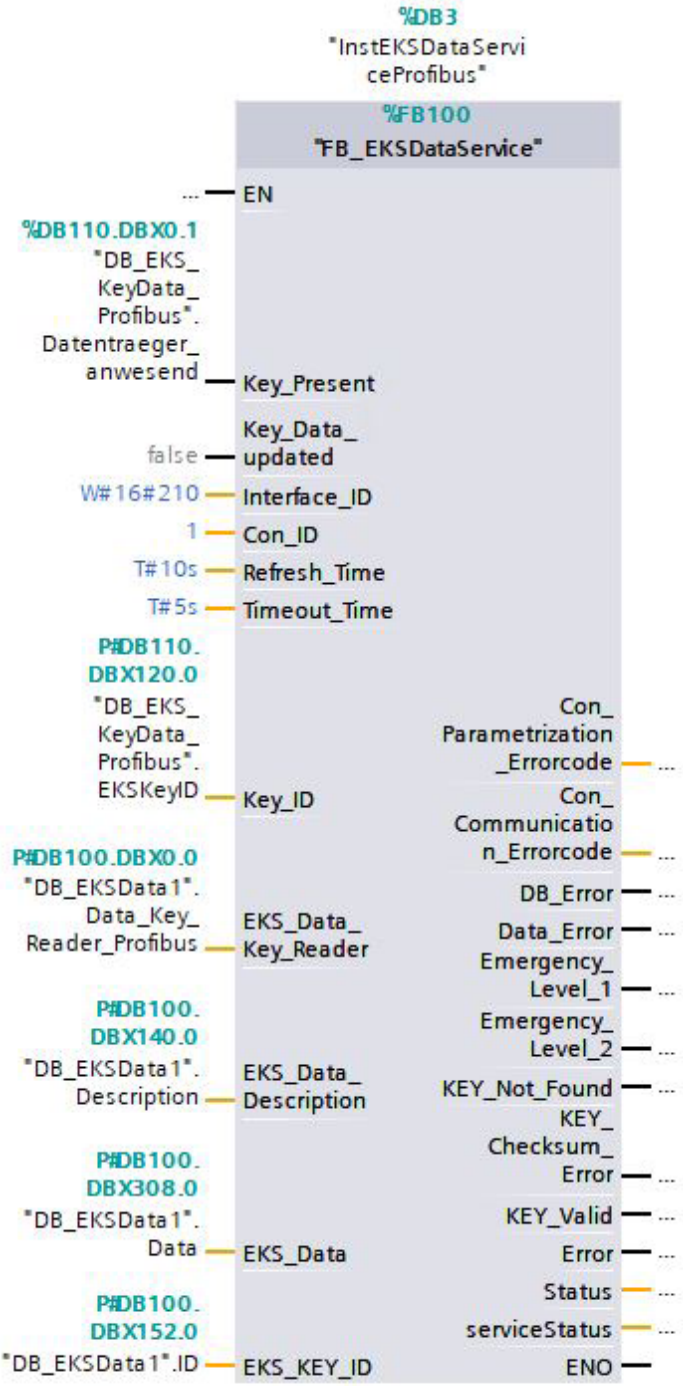
SIMATIC PLC network configuration

Details about the PLC network configuration are described in the respective programming manual for the SIMATIC PLC library.

Important: The IP address, the subnet mask and possibly the router address of the SIMATIC PLC interface used must be set so that the PLC can access the service via the Ethernet interface of the server used.

The IP address of the server on which the service runs must be specified as a connection configuration parameter. The local TSAP of the connection must be unique. It can be the machine designation, for example.

Example – TIA block for a SIMATIC CPU 1500:



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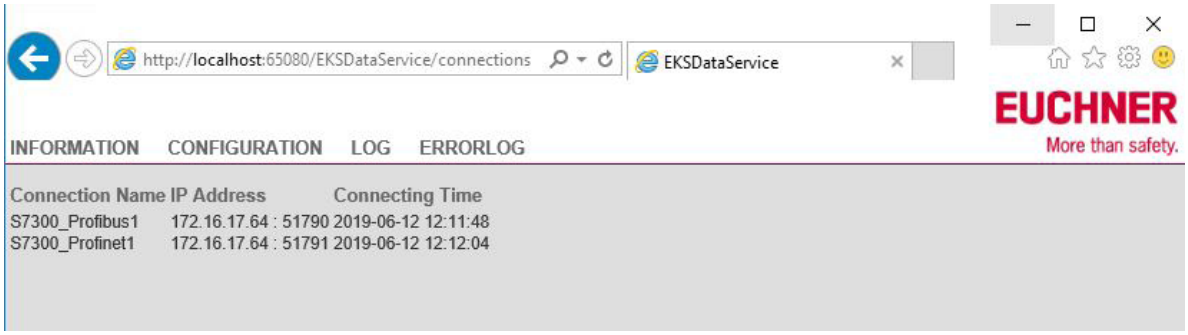
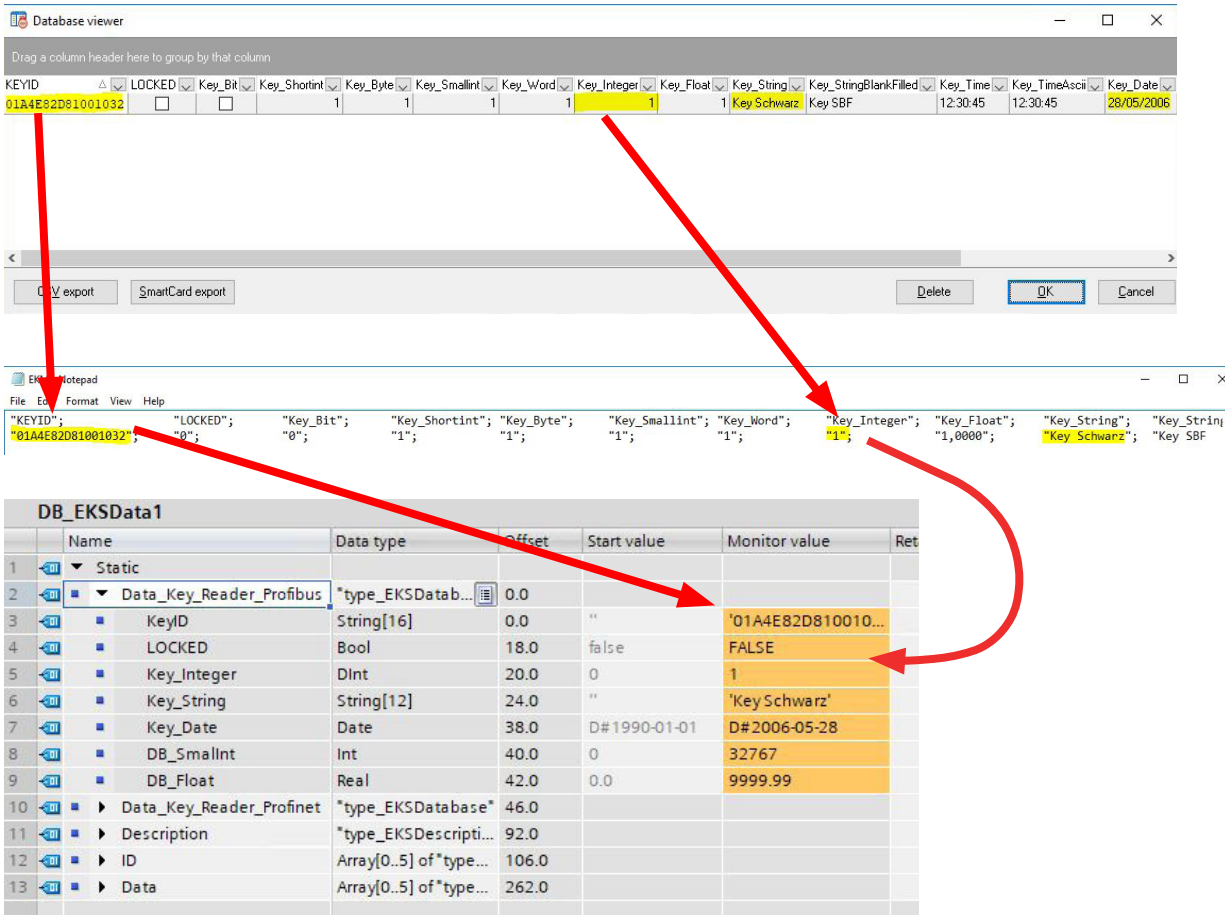
Communication test

The connection is always established from the SIMATIC PLC to the service. Once the connection to the server has been set up successfully, this is indicated under *INFORMATION* | *Current PLC Connections* | *Details* in the web interface.



Once a valid Electronic-Key is placed, this information is transmitted to the SIMATIC PLC and adapted in data block DB_EKSData1.



7.2.3. KEY LOGGING

It can be defined here whether events regarding the Electronic-Key data are recorded.

Log Key Events:	Setting to define whether Electronic-Key placement or removal events are recorded in the event log. Permissible inputs: *yes / no* Default value: *yes*
Log Data Request:	Setting to define whether cyclical reading of the Electronic-Key data is recorded in the event log. Permissible inputs: *yes / no* Default value: *yes*

7.2.4. EVENT LOGGING

Events, such as connection setup by a SIMATC PLC, can be written into log files for subsequent analysis.

Use File:	Occurring events are to be written into log files. Permissible inputs: *yes / no* Default value: *yes*
Path:	The log files are stored in the specified directory. Default value: *C:\ProgramData\EKSDataService\EventLog*
Max Size [MB]:	Maximum size of a log file in MB. Once a log file grows to this size, it will be closed and the events will be written into a new log file. Minimum = 1 Maximum = 2000 Default value = 10
Max Age [days]:	Maximum age of a log file in days. Older log files will be deleted automatically. Minimum = 1 Maximum = 3650 Default value = 60
Check Cycle [s]:	Checking interval in seconds for automatic deletion of older log files. All log files that are older than the specified age will be deleted when the set time expires. Minimum = 5 Maximum = 86400 Default value = 3600

A log file name consists of the “Logfile” designation and the date when the file was generated.

“Logfile_” + *year* + *month* + *day* + *hour* + *minute* + *second* + “.csv”

Example: Logfile_20190402093835.csv

A new log file is generated at least once per day.

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7.2.5. ERROR LOGGING

Errors, such as a read error of the EKM CSV export file, can be written into error log files for subsequent analysis.

Use File:	Occurring errors are to be written into log files. Permissible inputs: *yes / no* Default value: *yes*
Path:	The log files are stored in the specified directory. Default value: *C:\ProgramData\EKSDataService\ErrorLog*
Max Size [MB]:	Maximum size of a log file in MB. Once a log file grows to this size, it will be closed and the events will be written into a new log file. Minimum = 1 Maximum = 2000 Default value = 10
Max Age [days]:	Maximum age of a log file in days. Older log files will be deleted automatically. Minimum = 1 Maximum = 3650 Default value = 60
Check Cycle [s]:	Checking interval in seconds for automatic deletion of older log files. All log files that are older than the specified age will be deleted when the set time expires. Minimum = 5 Maximum = 86400 Default value = 3600

A log file name consists of the “Logfile” designation and the date when the file was generated.

“Logfile_” + *year* + *month* + *day* + *hour* + *minute* + *second* + “.csv”

Example: Logfile_20190402093835.csv

A new log file is generated at least once per day.

7.2.6. HTTP-SERVER

The integrated web server for service diagnostics and configuration can be reached under the following address by default:
http://localhost:65080/EKSDataService

Port:	The TCP port of the web server can be changed here. The change will be effective only after the service is restarted. Minimum = 80 Maximum = 65535 Default value = 65080
Path:	The URL path is shown here. Default value = EKSDataService

7.2.7. LOGIN

The user must log in with username and password before settings can be changed or log outputs can be viewed. Only one user can be set up.

User:	Name of the user Default value = *admin*
Password:	Password of the user. Default value = *admin*

If no username is specified, login will no longer be required in future.

8. LOG

Events, such as connection setup by a SIMATIC PLC, are directly displayed here. Events can be simultaneously written into a log file as well. Events are displayed only after a valid login.

Time Stamp:	Local date and time of the event. Format: year-month-day hour:minute:second.millisecond Example: 2019-04-03 16:31:15.453
Object:	Designation of the object (instance) triggering the event. In the case of objects of the PlcConnection class, i.e., the current connection between SIMATIC PLC and service, the object is renamed to the TSAP designation of the RFC1006 connection during the runtime so that these events can be unambiguously assigned to the PLC connection (installation/machine). Examples: HTTPServer, eksData, 3423 Sockelfraese
Code:	Description of the event. The event description is output as comprehensible plain text in English. Examples: *Login successful. User = admin, Reading EKM Data, EKM data request*
Text:	Additional information about the event, such as IP address and port of the connected SIMATIC PLC or the KeyID. Examples: “10.10.3.101:61718,” 00D46217D9001032
Class:	Class of the object. Examples: eksData, PlcConnection
UTC Time Stamp:	Date of time of the event in Universal Time Coordinated. Format: year-month-day hour:minute:second.millisecond Example: 2019-04-03 14:31:15.453

9. ERRORLOG

Errors, such as a read error of the EKM CSV export file, are directly displayed here. Errors can be simultaneously written into a log file as well. Events are displayed only after a valid login.

Time Stamp:	Local date and time of the error. Format: year-month-day hour:minute:second.millisecond Example: 2019-04-03 16:31:15.453
Object:	Designation of the object (instance) triggering the error. In the case of objects of the PlcConnection class, i.e., the current connection between SIMATIC PLC and service, the object is renamed to the TSAP designation of the RFC1006 connection during the runtime so that these events can be unambiguously assigned to the PLC connection (installation/machine). Examples: HTTPServer, eksData, 3423 Sockelfraese
Code:	Description of the error. The error description is output as comprehensible plain text in English. Examples: *EXEPTION reading EKM-CSV-File, Key not found in EKM-Data*
Text:	Additional information about the error, such as information from the operating system about triggered EXCEPTIONs or the KeyID. *Examples: file C:\Euchner\EKM.csv not found.* 00D56217D9001032
Class:	Class of the object. Examples: EksData, PlcConnection
UTC Time Stamp:	Date of time of the error in Universal Time Coordinated. Format: year-month-day hour:minute:second.millisecond Example: 2019-04-03 14:31:15.453

EN

10. Miscellaneous

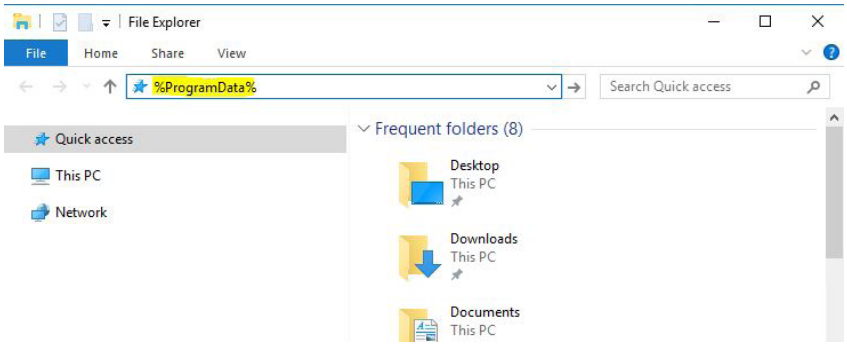
Storage location for settings

The settings of the service are saved in the file %ProgramData%\EKSDataService\Settings.xml.

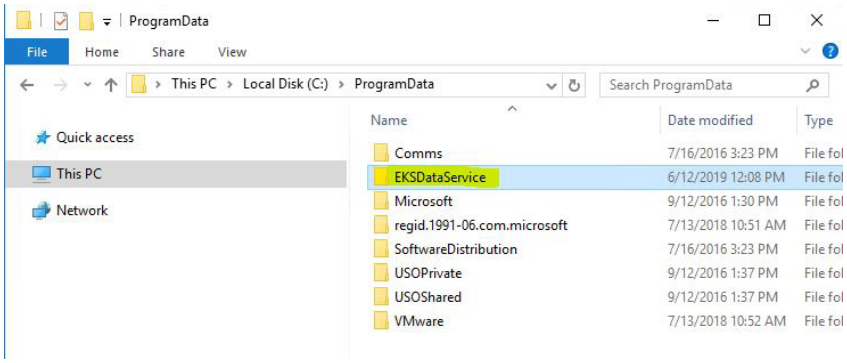
After a setting of the service is changed via the web interface, the file will be updated and a backup copy of the old file (with date and time in the file name) will be created in the directory "%ProgramData%\EKSDataService\SettingsBackup\." Backup copies that are older than 10 days will be deleted automatically.

The %ProgramData% directory is generally C:\ProgramData.

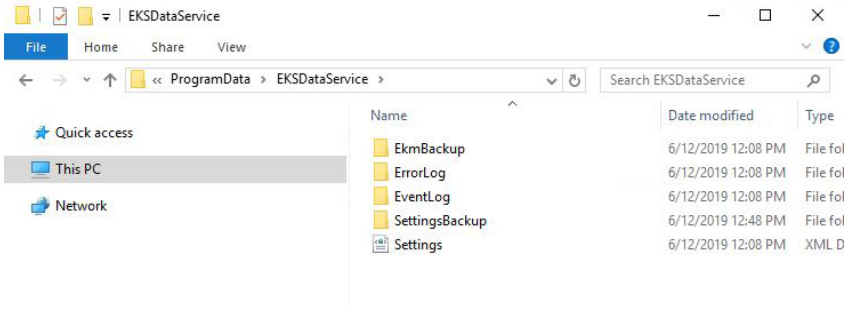
To open the directory, enter %ProgramData% in the input line at the top in File Explorer.



Confirm the input with ENTER.



You can now open the directory by double-clicking *EKSDataService*.



EkmBackup:	Subdirectory for saving the EKM CSV backup copy.
ErrorLog:	Subdirectory for saving the error log files.
EventLog:	Subdirectory for saving the event log files.
SettingsBackup:	Subdirectory for saving backup copies of the setting files.
Settings.xml:	File in which the service configuration is saved in XML format.

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