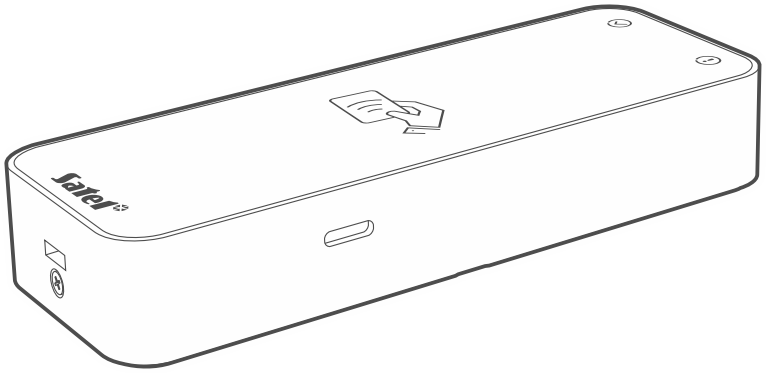
MIFARE card programmer

SO-PRG

Firmware version 1.00

EN



so-prg_en 11/23

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IMPORTANT

Changes, modifications or repairs not authorized by the manufacturer shall void your rights under the warranty.

SATEL aims to continually improve the quality of its products, which may result in changes in their technical specifications and software. Current information about the changes being introduced is available on our website.
Please visit us at:
https://support.satel.pl

The declaration of conformity may be consulted at www.satel.pl/ce

The following symbols may be used in this manual:

 - note,

 - caution.

CONTENTS

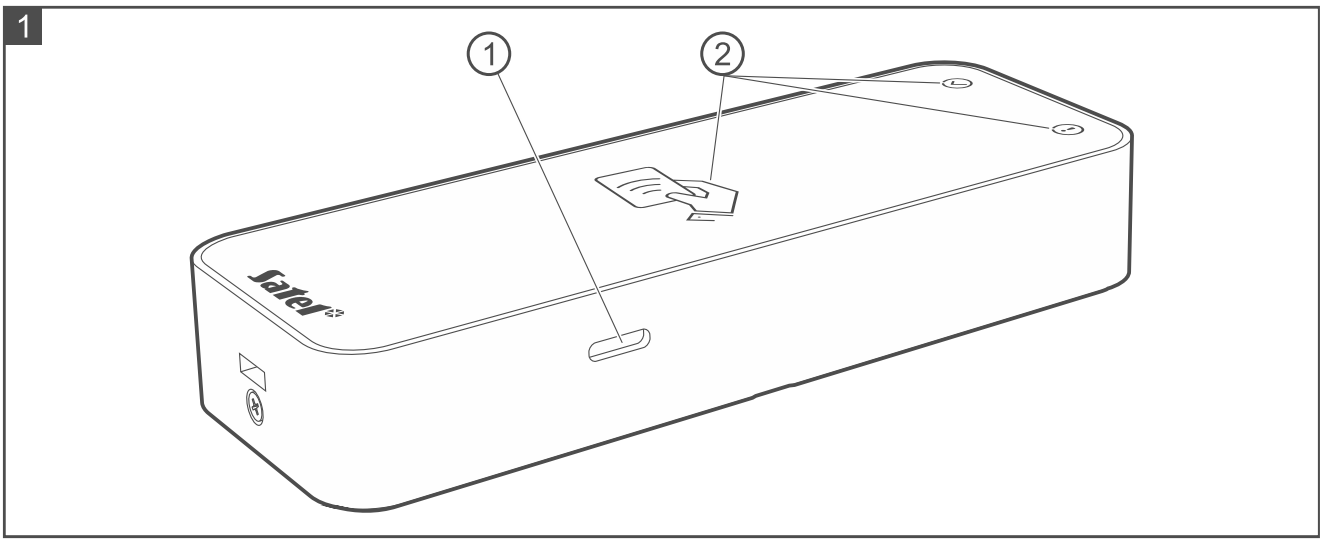
The SO-PRG programmer is used to program the MIFARE® cards (CR SOFT program required). It can also be used to read the numbers of programmed cards and write them to another program (the HID keyboard mode).

1. Features

- MIFARE® cards supported:
  - Ultralight,
  - Classic,
  - DESFire (EV1 / EV2 / EV3).
- USB 2.0 port (Micro-B).
- Powered from the computer USB port.
- LED indicators.
- Desktop-friendly enclosure with rubber feet.

2. Description

1



(1) USB Micro-B port.

(2) LED indicators (see table below).

Indicator	Color	Description
	green	**ON** – computer connected correctly
	yellow	**ON** – computer connected incorrectly (USB cable not suitable for data transfer)
	white	**ON** – power present **flashing** – programmer waiting for presenting the card (programming or clearing the card using the CR SOFT program)

3. Connecting to the computer

Connect the programmer USB port with the computer USB port. Use a USB cable suitable for data transfer. The Windows operating system will automatically detect the device and install appropriate drivers. When the drivers are installed, a virtual serial COM port and a HID-compliant keyboard will be available on the computer.

After the programmer is connected to the computer, all the programmer LED indicators will be flashing for several seconds to indicate start-up.

The HID-compliant keyboard is not available when the programmer is connected with the CR SOFT program.

4. CR SOFT program

The CR SOFT program is required to program MIFARE cards. It can also be used to program the settings of access control devices provided with the MIFARE card reader (CR-MF5 and CR-MF3). You can download it from www.satel.pl.

The program requires Windows 10 operating system (or newer).

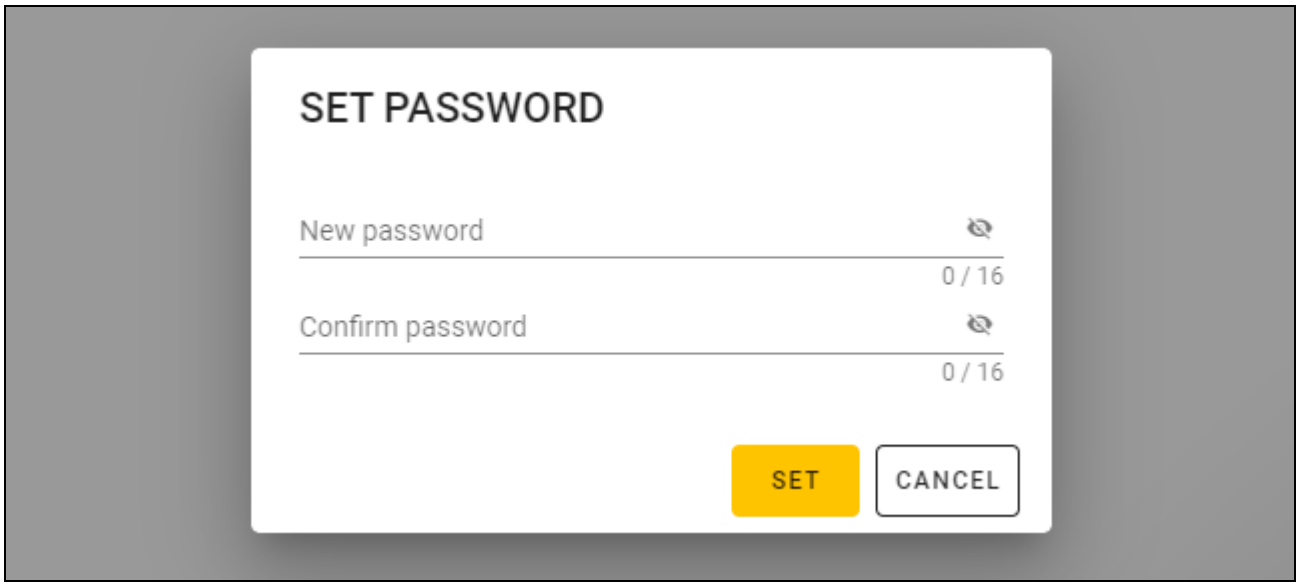
The screenshots in this manual show sample settings.

4.1 Starting out

4.1.1 Setting the administrator password

When the program is started for the first time, the “SET PASSWORD” window will be displayed. Set the administrator password there. The administrator has access to all projects created in the program.

If you do not set the password, the “SET PASSWORD” window will be displayed each time the program is started. No administrator password means no protection against unauthorized access to projects and their data.



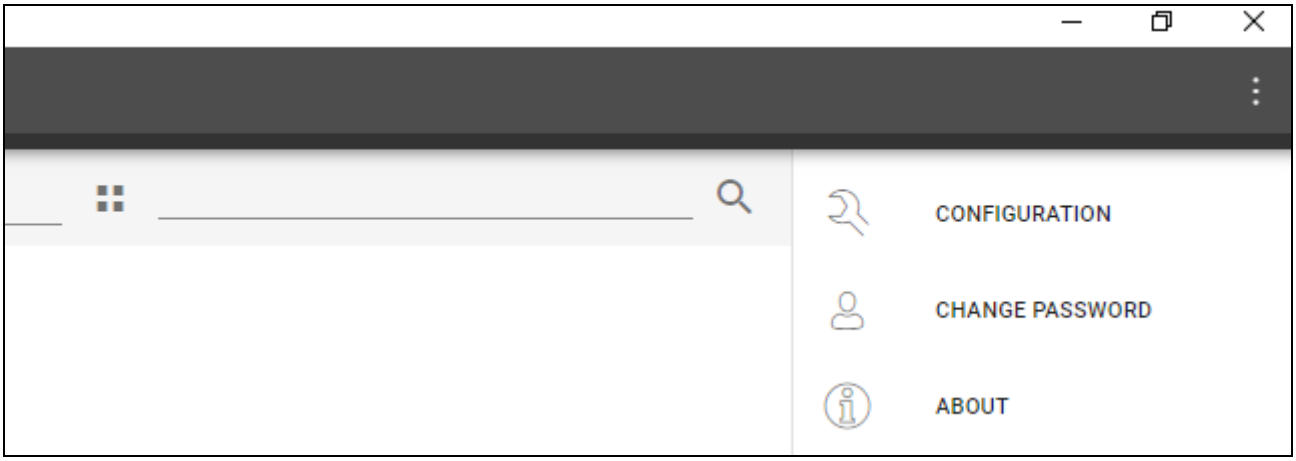
1. In the “New password” field, enter a password (1-16 digits, letters or special characters).
2. In the “Confirm password” field, enter the same password.

3. Click “Set”. The “SET PASSWORD” window will be closed. A message will confirm that the password has been set. You will access the program window (see: “Program window with the list of projects” p. 5).

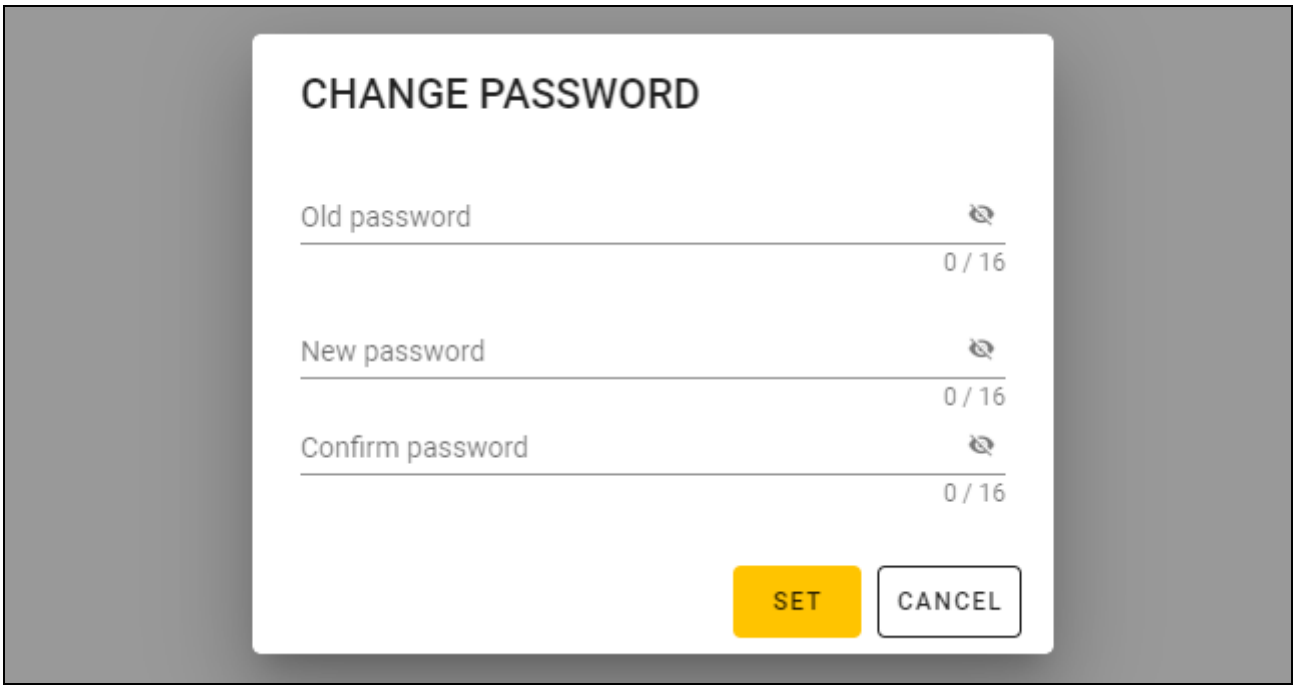
Next time you start the program, you will have to log in to access the program window.

4.1.2 Changing the password

1. Click ⋮ on the menu bar. The menu will be displayed.



2. Click “CHANGE PASSWORD”. The “CHANGE PASSWORD” window will be displayed.

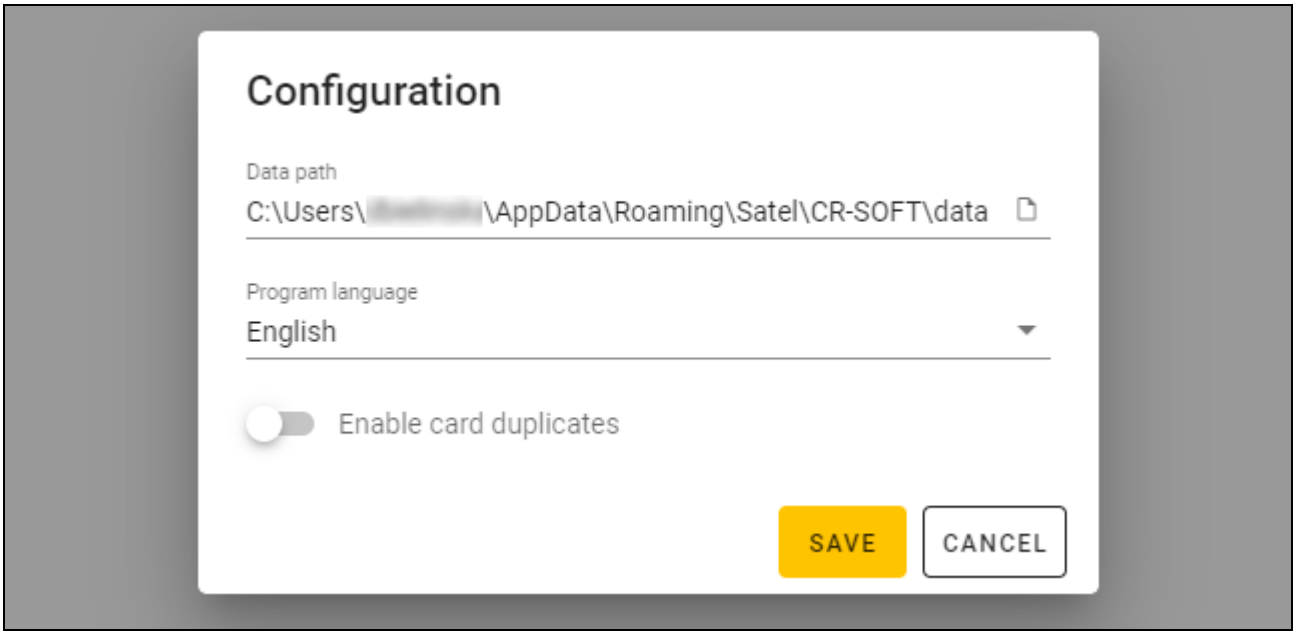


3. In the “Old password” field, enter the current password.
4. In the “New password” field, enter the new password (1-16 digits, letters or special characters).
5. In the “Confirm password” field, re-enter the new password.
6. Click “Set”. The “CHANGE PASSWORD” window will be closed. A message will confirm that the password has been changed.

4.1.3 Changing the program language

1. Click ⋮ on the menu bar. The menu will be displayed.

2. Click “CONFIGURATION”. The “Configuration” window will be displayed.

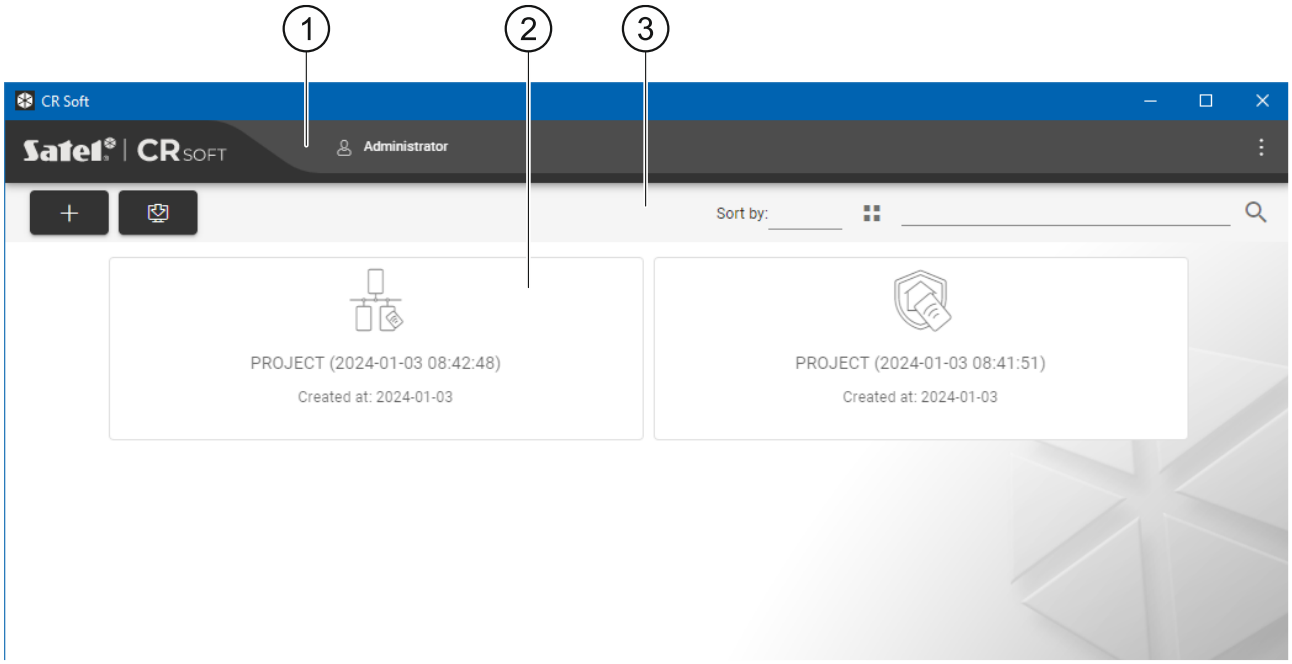


3. Click the “Program language” field. The list of languages will be displayed.
4. Click the language to be used.
5. Click “SAVE”. The “CONFIGURATION” window will be closed.

4.2 Program window

4.2.1 Program window with the list of projects

After logging in, the list of projects will be displayed in the program window.



(1) menu bar (see: “Menu bar” p. 7).

(2) list of projects.

(3) tool bar for the list of projects.

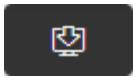
List of projects

All projects to which you have access are displayed on the list. Click a project to open it.

Tool bar for the list of projects

Project-related buttons and functions are displayed on the tool bar.

 - click to create a new project (see: “Creating a project” p. 9).

 - click to import a project (see: “Importing a project” p. 10).

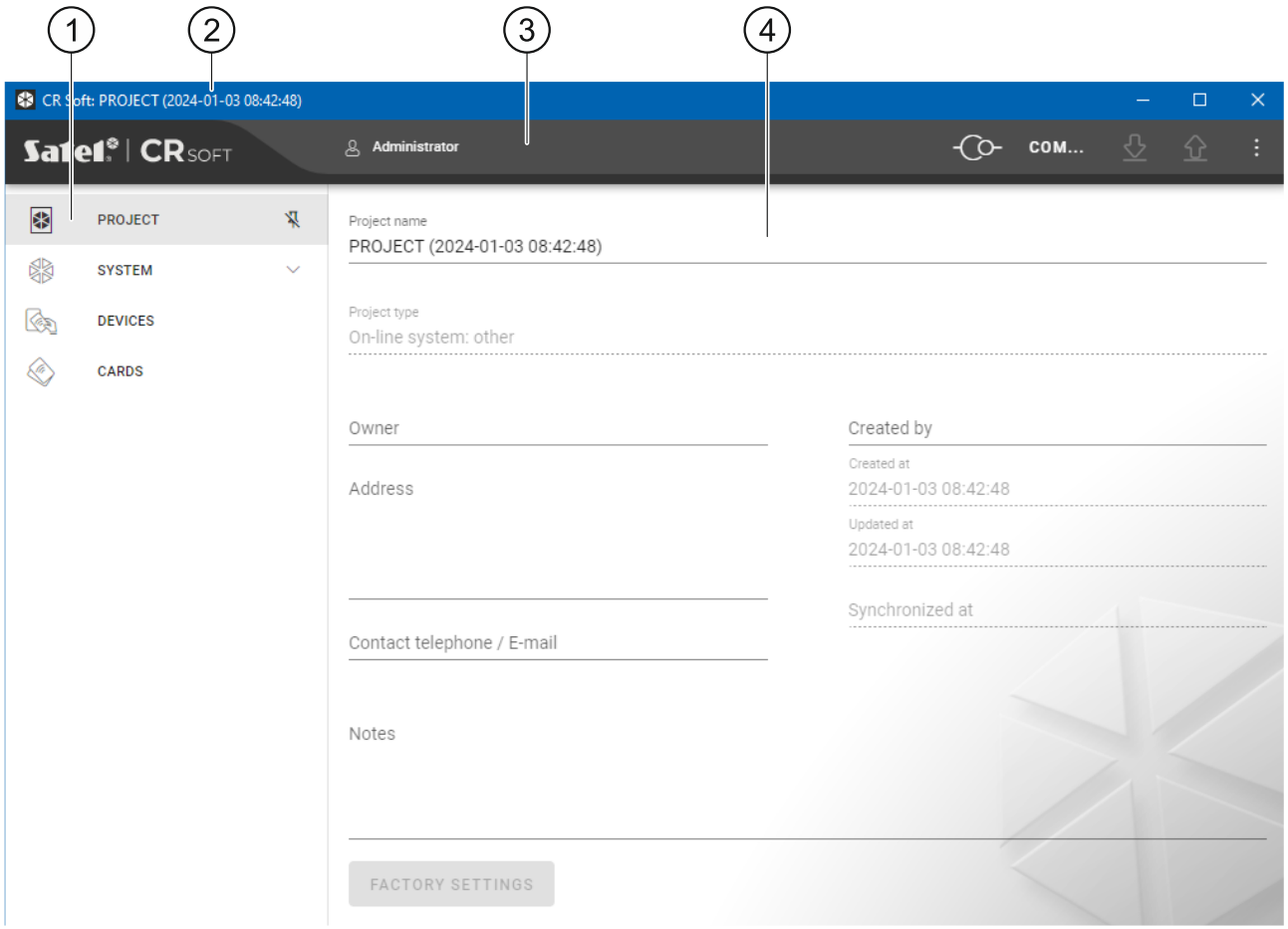
Sort by – you can select how the projects are sorted on the list (by name or creation date).

 - click to change the view mode of the project list to a table.

 - click to change the view mode of the project list to tiles.

Filter – enter a string of characters and click  to display the projects whose name or settings in the “PROJECT” tab contain this string of characters.

4.2.2 Program window after opening a project



(1) tabs.

(2) title bar.

(3) menu bar (see: “Menu bar” p. 7).

(4) settings available in the tab.

Tabs

Click a tab to display the settings available in the tab.

PROJECT – project details.

SYSTEM – system settings:

INTERFACES – communication interfaces settings.

TOKEN SETTINGS – MIFARE cards settings.

DEVICES – list of access control devices in the project and their settings.

CARDS – list of MIFARE cards in the project.

USERS – list of users in the project and their settings. This tab is only available in a *Standalone system* type project.

After connection is established with the programmer, only these tabs are available: "PROJECT", "TOKEN SETTINGS", "CARDS" and "USERS" .

- click to enable the auto-hide of tab labels.

- click to disable the auto-hide of tab labels.

Title bar

The name of the open project is displayed on the title bar.

4.2.3 Menu bar

Buttons and information are displayed on the menu bar. The appearance of the menu bar depends on the program window size, content displayed in the program window, etc.

 - click to display the tabs. This button is displayed when the tabs are not displayed due to the window size.

 - click to log out. The name of the logged in user is displayed next to the button.

 - click to establish connection with the access control devices / programmer. This button is displayed when a project is open and the program is not connected with the access control devices / programmer.

If no COM port for communication has been selected, when you click the button, the "Connection" window will be displayed.

 - click to disconnect from the access control devices / programmer. This button is displayed when a project is open and the program is connected with the access control devices / programmer. Information on whether the program is connected with the access control devices or the programmer is displayed on the left of the button.

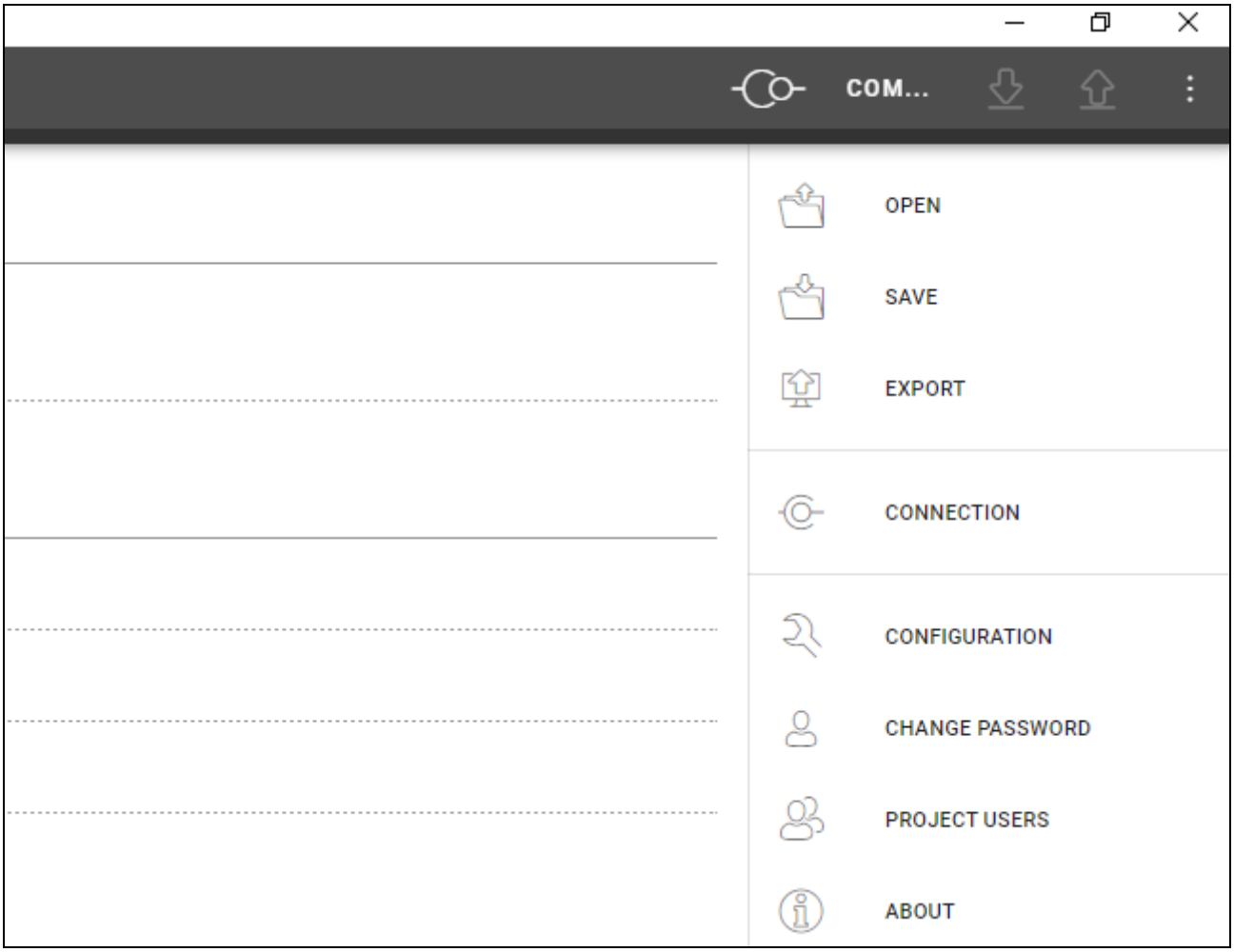
- click to select the COM port for communication with the access control devices / programmer. When the COM port is selected, the port number will be displayed instead of the three dots. You can also select the COM port in the "Connection" window. This button is displayed when a project is open.

 - click to read data from the access control devices. This button is displayed when a project is open and the program is connected with the access control devices.

- click to write data to the access control devices or the programmer. This button is displayed when a project is open and the program is connected with the access control devices / programmer.

- click to display the menu.

4.2.4 Menu



The following commands are available in the menu:

OPEN – click to close the project and return to the list of projects.

SAVE – click to save changes in the project (see: “Saving changes in the project” p. 22).

EXPORT – click to export the project (see: “Exporting a project” p. 22).

CONNECTION – click to open the “Connection” window.

CONFIGURATION – click to open the “Configuration” window.

CHANGE PASSWORD – click to change the password (see: “Changing the password” p. 4).

PROJECT USERS – click to open the “PROJECT USERS” window.

ABOUT – click to display information about the program.

When the list of projects is displayed, only the following commands are available in the menu: ”CONFIGURATION”, “CHANGE PASSWORD” and “ABOUT”.

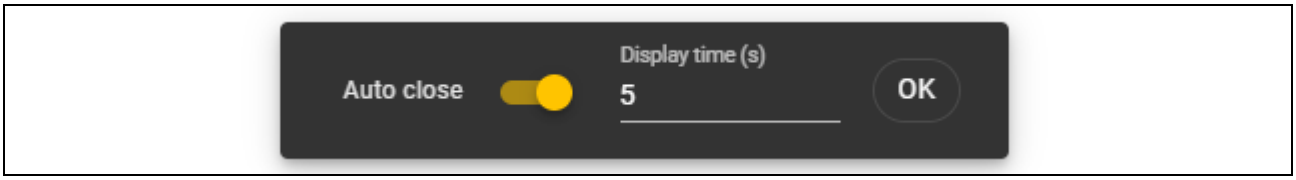
4.2.5 Message window

The message window is displayed on the bottom of the program window. It notifies the user about the actions performed by the program.

 - click to go to the message window settings.

 - click to close the message window.

Message window settings



Auto close – if this option is enabled, the message window will close automatically.

Display time (s) – time after which the message window will close when the *Auto close* option is enabled.

OK – click to close the message window settings.

4.3 Quick guide to programming user cards

For security reasons, we recommend using DESFire cards.

If the card has been written and cleared a multiple times and its memory is full, it is impossible to program it again. In such case, you must format the card before you program it (see: "Clearing a card" p. 19).

1. Create a new project (p. 9) or open an existing project.
2. Establish connection between the program and the programmer (p. 11).
3. If you created a new project, program the cards settings (p. 13). If you opened an existing project in which the cards settings are already programmed, go to the next step.
4. Add cards to the project and program them (p. 17).
5. Save the project (s. 22).

4.4 Using the program

4.4.1 Creating a project

This function is available when the list of projects is displayed.

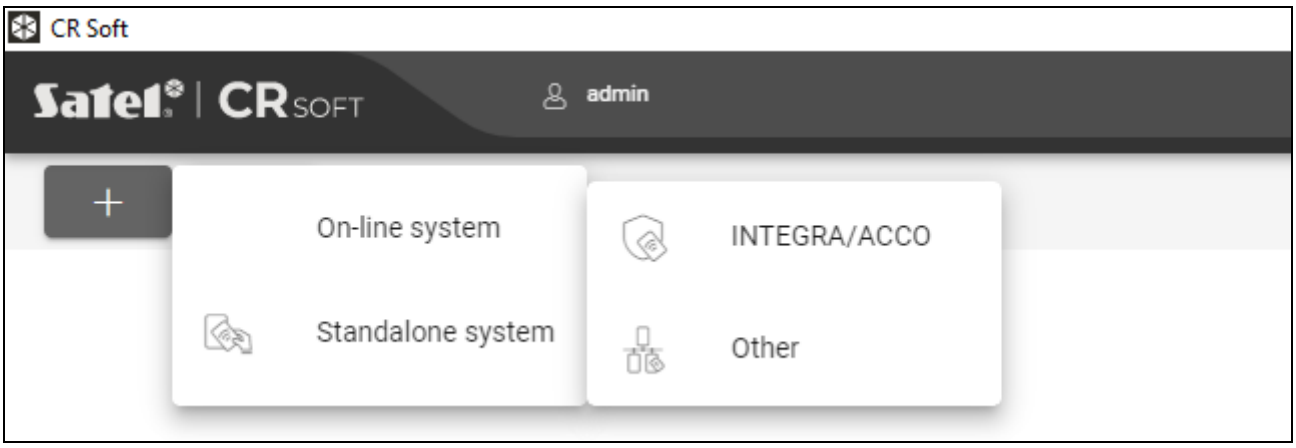
1. Click  . The menu of available project types will be displayed:

   On-line system – system in which the access control device is connected to another device (e.g. controller or control panel) which decides whether to grant access or not. You can select:

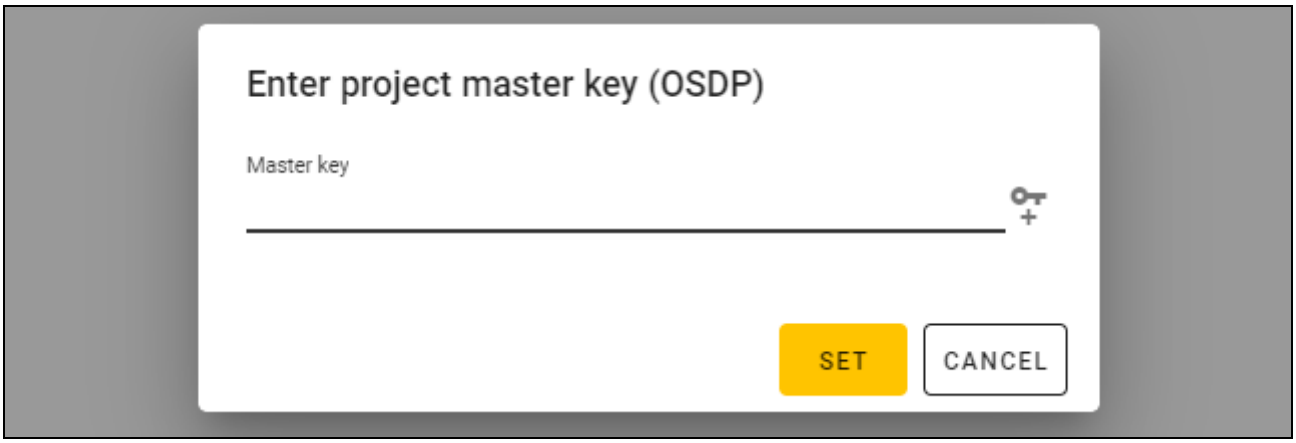
   INTEGRA/ACCO – access control devices and cards will be used in one of the SATEL systems: INTEGRA alarm system or ACCO access control system.

   Other – access control devices and cards will be used in other manufacturer's system.

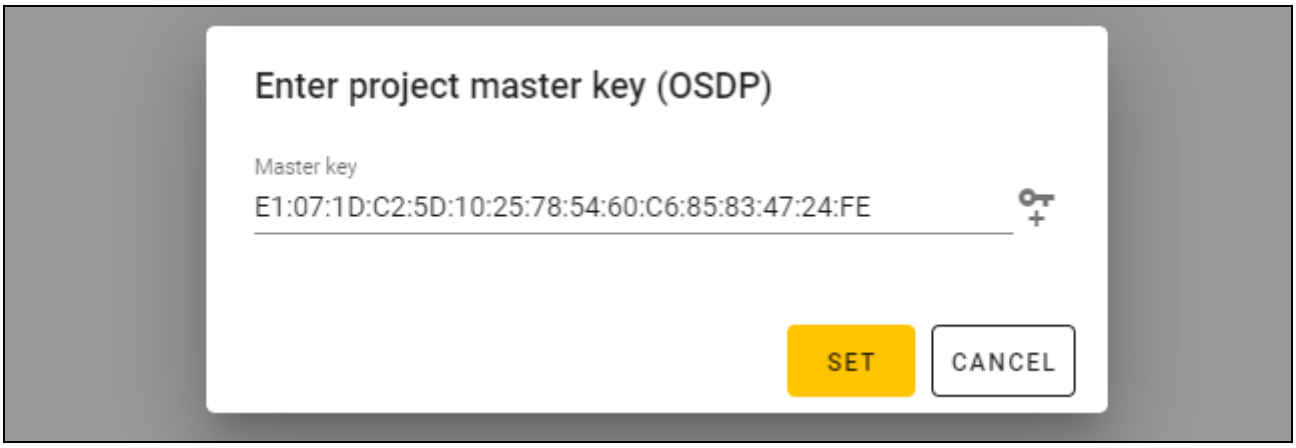
   Standalone system – system in which the access control device decides on its own whether to grant access to a single door or not (it operates as a standalone door control module).



2. Click the type of project you want to create. The “Enter project master key (OSDP)” window will be displayed.



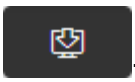
3. Enter the master key (32 hexadecimal characters) or click to generate a random master key.

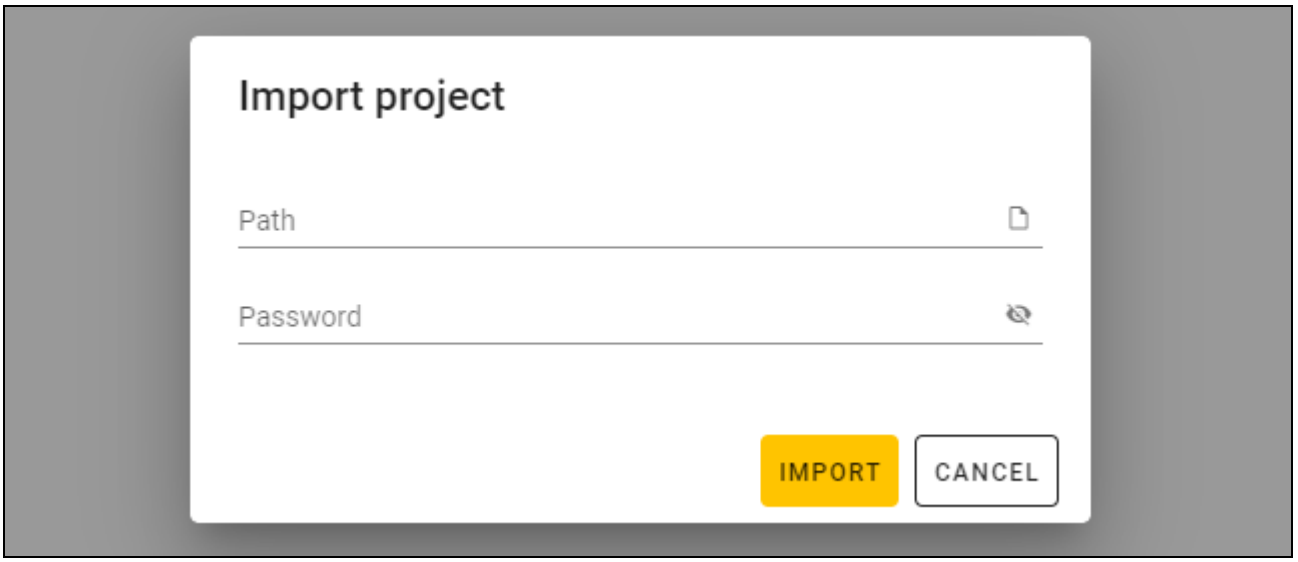


4. Click “SET”. The “Enter project master key (OSDP)” window will be closed. The “PROJECT” tab for the newly created project will be displayed.

4.4.2 Importing a project

This function is available when the list of projects is displayed.

1. Click  . The “Import project” window will be displayed.



2. In the “Path” field, enter the file path or click to indicate the file location in the system window.
3. In the “Password” field, enter the password for the file you are importing.
4. Click “IMPORT”. The project successfully imported will be displayed on the list of projects.

4.4.3 Deleting a project

This function is available when the list of projects is displayed.

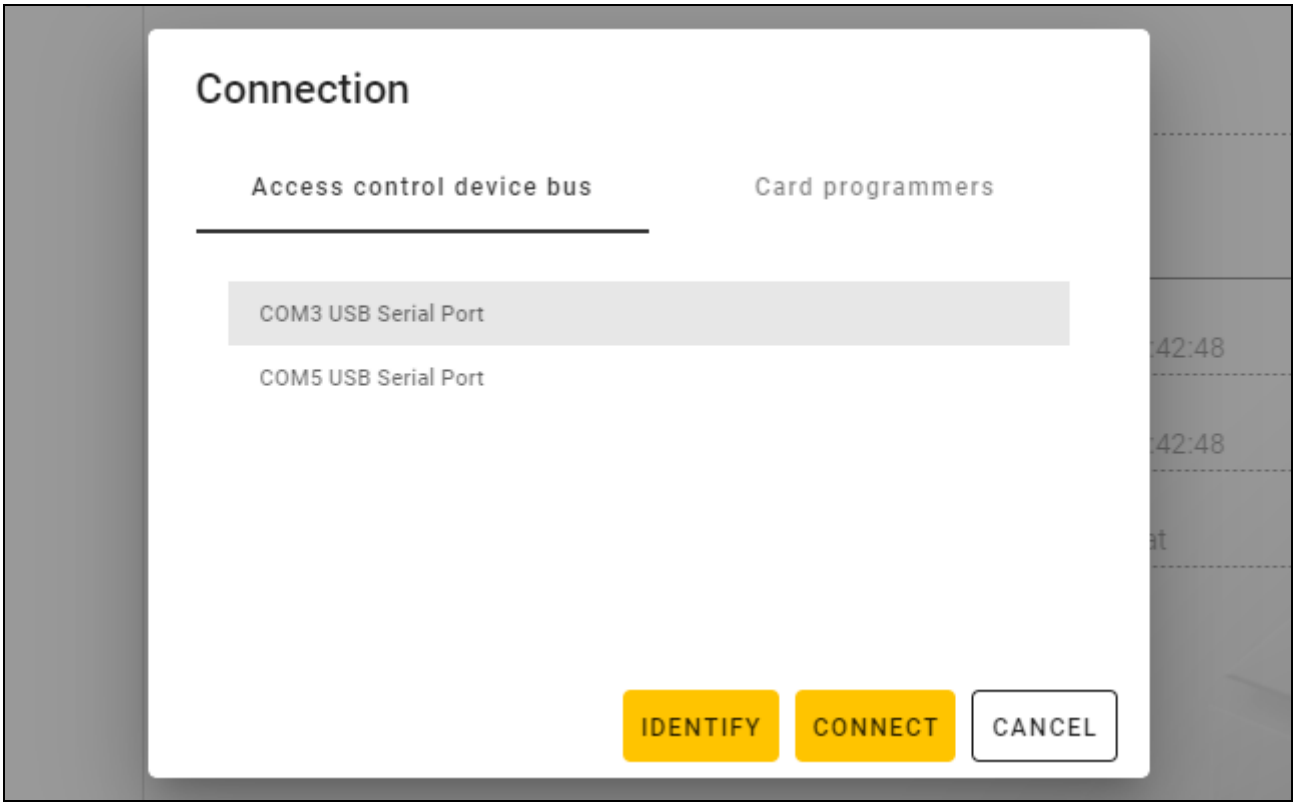
1. Hover the mouse over the project. The button will be displayed.
2. Click . A deletion confirmation window will be displayed.
3. Click “OK”. A message will confirm that the project has been deleted.

4.4.4 Establishing connection with the programmer

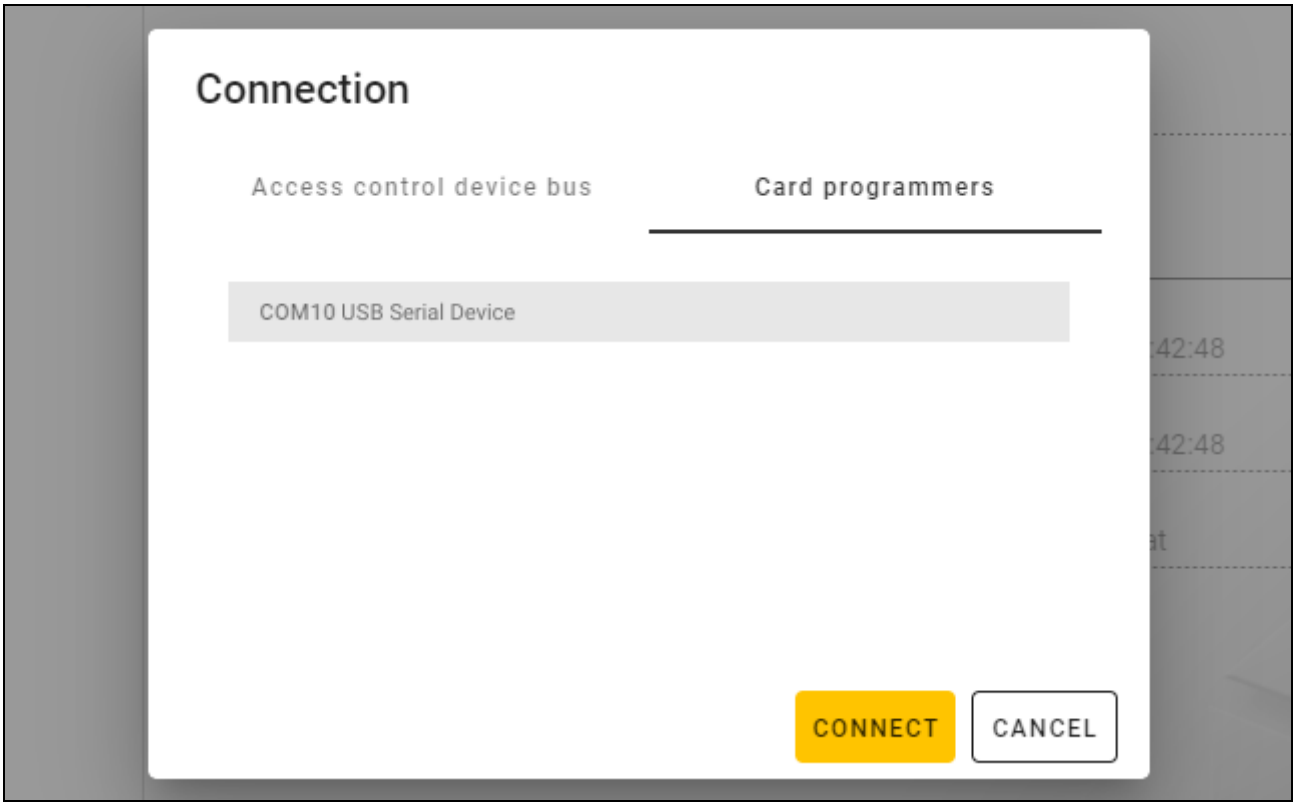
This function is available after opening a project.

1. Click  on the menu bar. The menu will be displayed.

2. Click “CONNECTION”. The “Connection” window will be displayed.



3. Click the “Card programmers” tab. The list of programmers connected to the computer will be displayed.



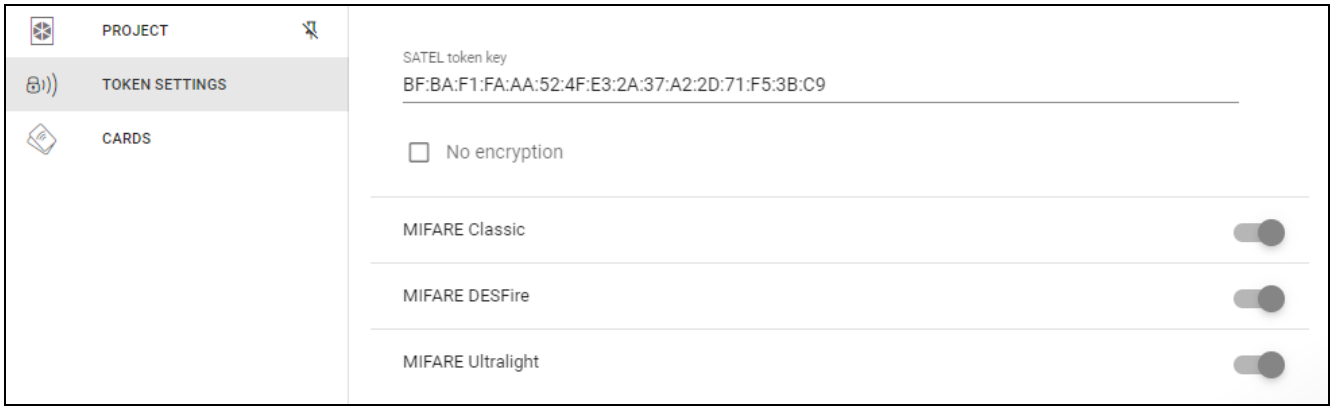
4. Click the COM port assigned to the programmer that you want the program to connect with.
5. Click “CONNECT”. The program will connect with the programmer.

4.4.5 Programming the card settings

This function is available after opening a project.

1. Click the “TOKEN SETTINGS” tab.
2. Program the token settings.
3. Click  on the menu bar to upload the card settings to the programmer.

Token settings for the INTEGRA/ACCO on-line system



SATEL token key – card number access key for all types of cards. After a project has been created, it is the same as the *Master key*. You can change it.

The key should be unique for each project.

No encryption – if this option is enabled, the card’s factory default number (CSN) is used as the card number. There is no need to program the cards.

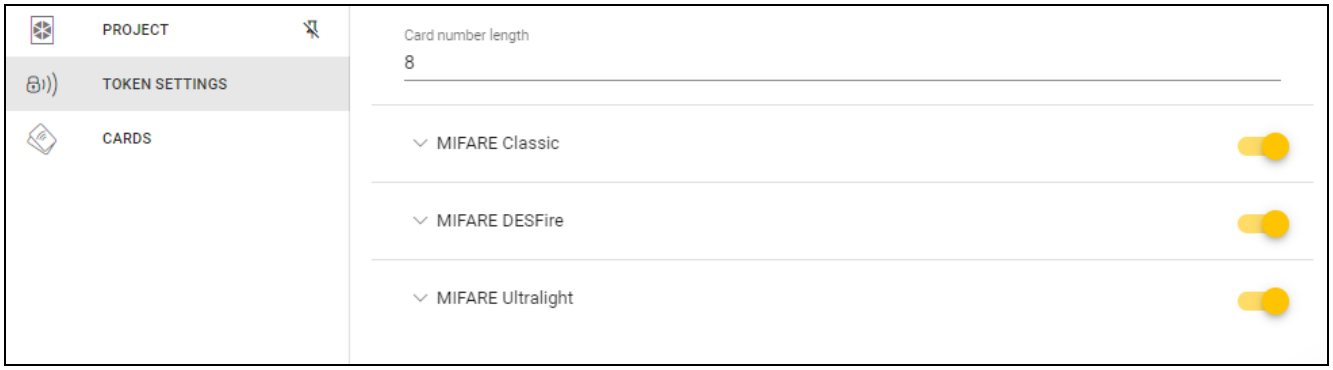
The card number length in the INTEGRA/ACCO system is 5 bytes.

For the MIFARE Classic card types, only the key’s 6 lower bytes are used.

If you enable the No encryption *option, the* SATEL token key *will be cleared.*

Program the same settings in the INTEGRA alarm system / ACCO access control system.

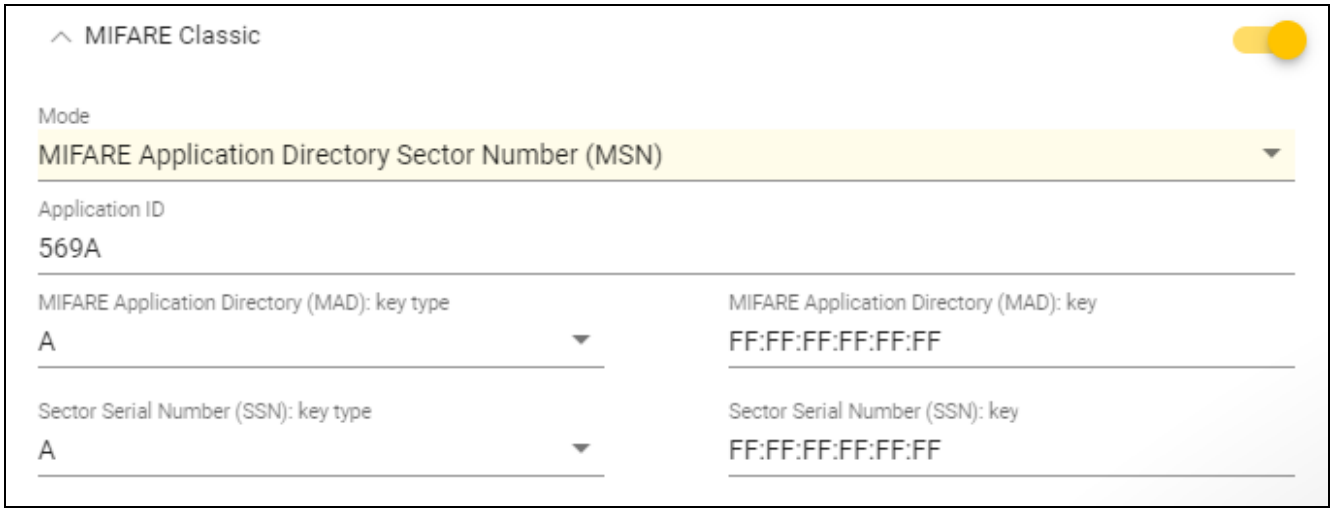
Token settings for other on-line system or standalone system



Card number length – number of bytes used for the card number. You can enter a number from 5 to 8.

The settings for each card type are available if support of these card types is enabled.

MIFARE Classic



Mode – card operating mode:

Chip Serial Number (CSN) – card's factory serial number is used as the card number. There is no need to program the cards. No additional settings are available for this mode.

Sector Serial Number (SSN) – card number can be programmed and written in the selected card memory sector.

MIFARE Application Directory Serial Number (MSN) – card number can be programmed and written in the card memory sector identified by the *Application ID* (AID).

Sector number – number of the data sector in which the card number is to be written. You can enter a number from 0 to 16. This parameter applies to the *Sector Serial Number (SSN)* mode.

Block – number of the block in the sector in which the card number is to be written. You can enter a number from 0 to 2. This parameter applies to the *Sector Serial Number (SSN)* mode.

Offset – card number's first byte position in the block. You can enter a number from 0 to 15. This parameter applies to the *Sector Serial Number (SSN)* mode.

Application ID – application identifier that indicates the sector containing the card number (AID). You can enter 4 hexadecimal characters (2 bytes). This parameter applies to the *MIFARE Application Directory Serial Number (MSN)* mode.

MIFARE Application Directory (MAD): key type – type of access key to the sector with application ID. You can select A or B. This parameter applies to the *MIFARE Application Directory Serial Number (MSN)* mode.

MIFARE Application Directory (MAD): key – access key to the sector with application ID. You enter 12 hexadecimal characters (6 bytes). This parameter applies to the *MIFARE Application Directory Serial Number (MSN)* mode.

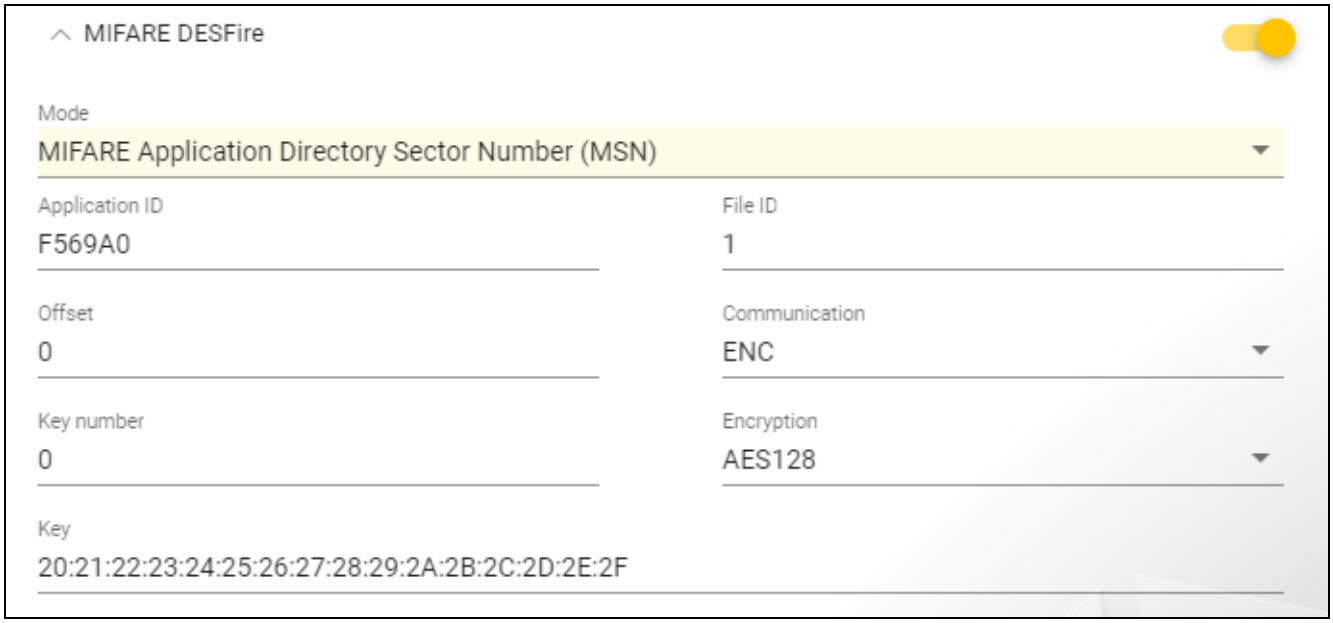
The key should be unique for each project.

Sector Serial Number (SSN): key type – type of access key to the sector containing the card number. You can select A or B.

Sector Serial Number (SSN): key – access key to the sector containing the card number. You enter 12 hexadecimal characters (6 bytes).

The key should be unique for each project.

MIFARE DESFire



Mode – card operating mode:

Chip Serial Number (CSN) – card's factory serial number is used as the card number. There is no need to program the cards. No additional settings are available for this mode.

MIFARE Application Directory Serial Number (MSN) – card number can be programmed and written to the card.

Application ID – application identifier that indicates the directory containing the card number file. You can enter 6 hexadecimal characters (3 bytes).

File ID – number of the file with card number.

Offset – card number's first byte position in the file. You can enter a number from 0 to 99.

Communication – type of encryption used for communication:

PLAIN – communication is not encrypted.

MAC – communication is not encrypted but it is digitally signed.

ENC – communication is encrypted.

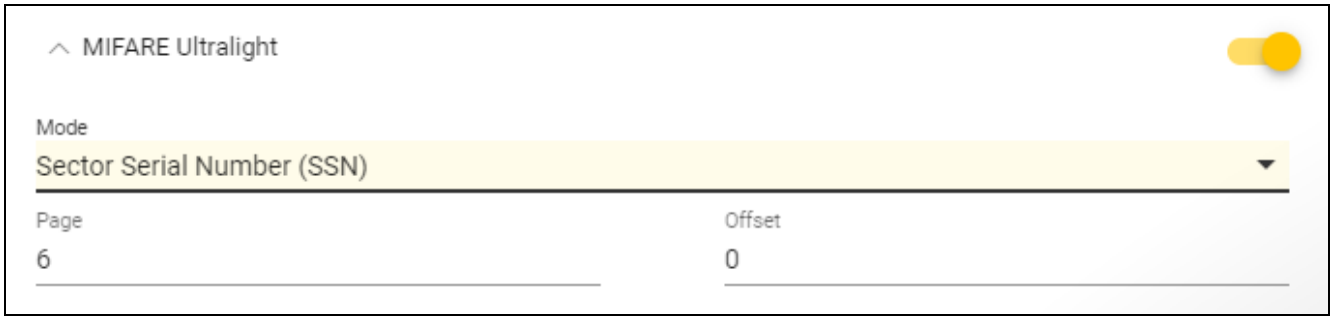
Key number – number of the key used to encrypt the card number file. This parameter applies to digitally signed communication (MAC) and encrypted communication (ENC).

Encryption – type of encryption key. You can select *DES*, *2K3DES* or *AES128*. This parameter applies to digitally signed communication (MAC) and encrypted communication (ENC).

Key – access key to the card number. This parameter applies to digitally signed communication (MAC) and encrypted communication (ENC).

The key should be unique for each project.

MIFARE Ultralight



Mode – card operating mode:

Chip Serial Number (CSN) – card's factory serial number is used as the card number. There is no need to program the cards. No additional settings are available for this mode.

Sector Serial Number (SSN) – card number can be programmed and written to the card.

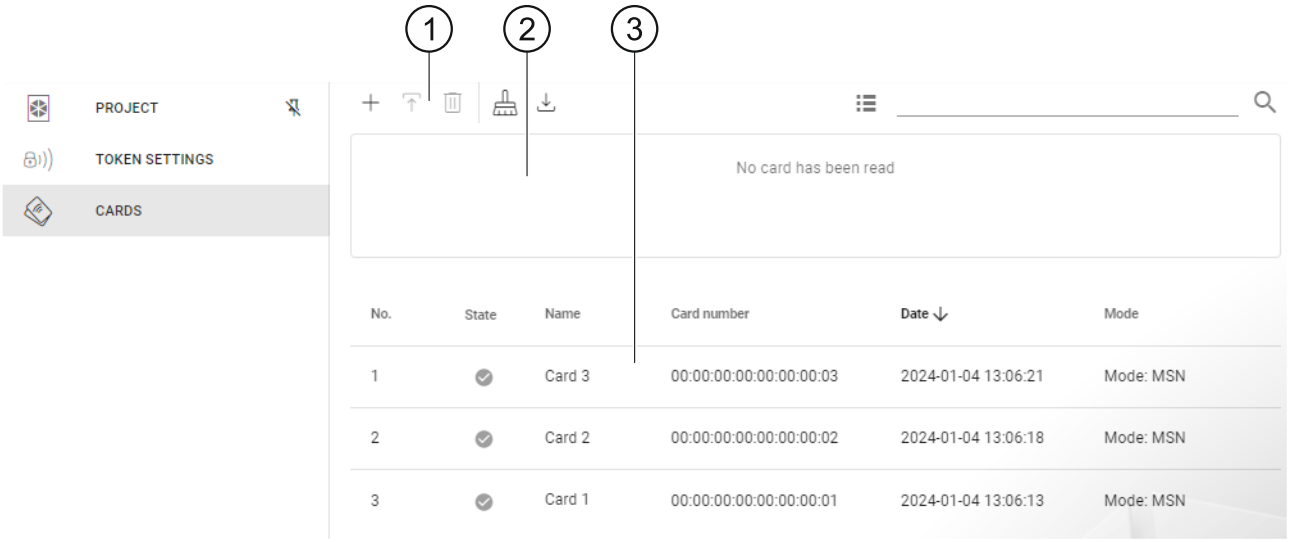
Page – number of the page containing the card number. You can enter a number from 0 to 100.

Offset – card number's first byte position on the page. You can enter a number from 0 to 3.

4.4.6 Managing the cards

This function is available after opening a project. You can manage the cards in the "CARDS" tab.

Description of the "CARDS" tab



(1) tool bar for the list of cards.

(2) section where information about the card currently presented to the programmer is displayed (see: "Checking the user card number" p. 21).

(3) list of cards.

Tool bar for the list of cards

Card-related buttons and functions are displayed on the tool bar.

+ - click to add a card to the project (see: "Adding a user card to the project" p. 17).

- click to program a card already added to the project (see: "Programming a card already added to the project" p. 19).

- click to delete selected card(s) from the project (see: “Deleting a card from the project” p. 21).

- click to clear the card (see: “Clearing a card” p. 19).

- click to import a CSV card file exported from the DLOADX program.

- click to change the view mode of the card list to tiles.

- click to change the view mode of the card list to a table.

Filter – enter a string of characters and click to display the cards whose name, number or added to project date contain this string of characters.

List of cards

The cards added to the project are displayed on the list.

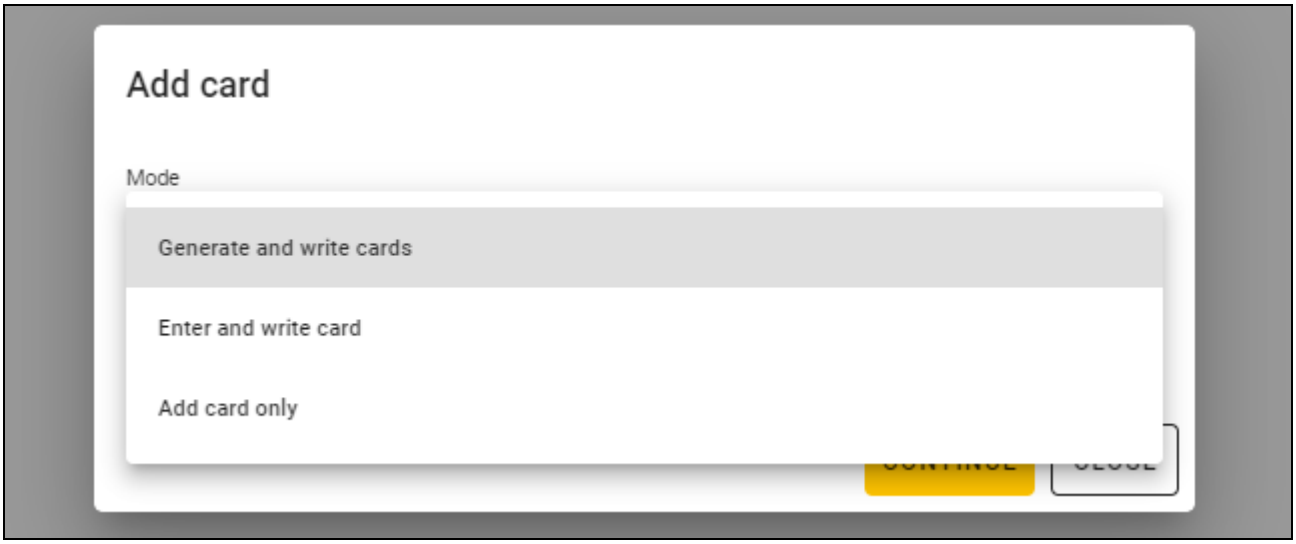
Adding a user card to the project

1. Click . The “Add card” window will be displayed.
2. Select the card adding mode:

   Generate and write cards – the card number will be generated and written to the card. This mode cannot be selected if the factory serial number (CSN) is used for all card types or the program is not connected with the programmer.

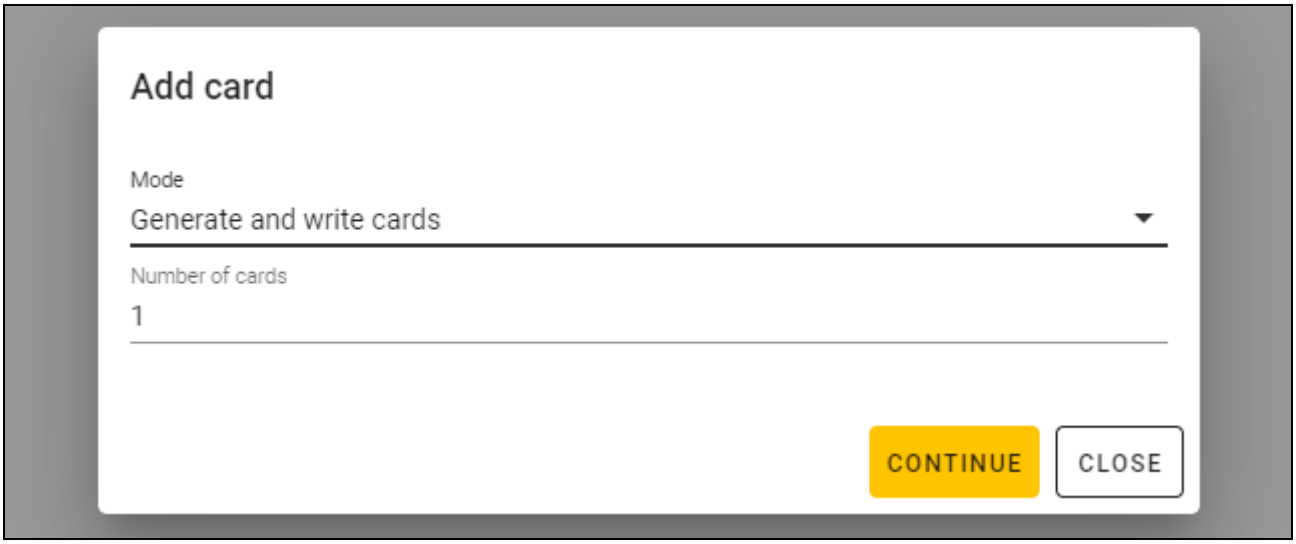
   Enter and write card – you can enter your own card number and write it to the card. This mode cannot be selected if the factory serial number (CSN) is used for all card types or the program is not connected with the programmer.

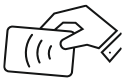
   Add card only – the card will be added to the project but it will not be programmed.



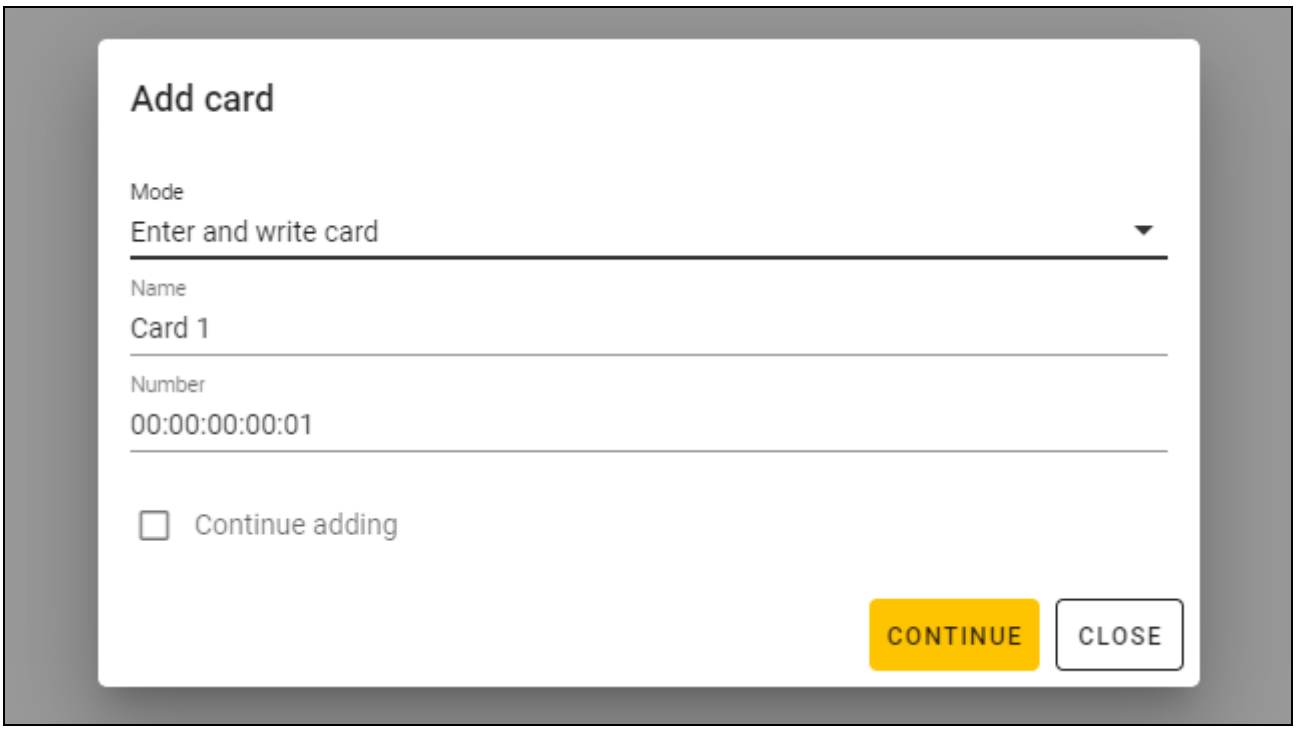
If you add cards to a Standalone system *type project, the* Create user *option will be available in the window. If you enable this option, after the card is added, a user will be created and the card will be assigned to the user.*

Generate and write cards



1. Specify the number of cards you want to add.
2. Click “CONTINUE”. The “Present and hold card” window will be displayed.
3. Present the card to the programmer  indicator. A message will confirm when the card has been programmed.
4. Repeat step 3 for each next card that you want to program.
5. After the last card has been programmed, the “Present and hold card” window will be closed.

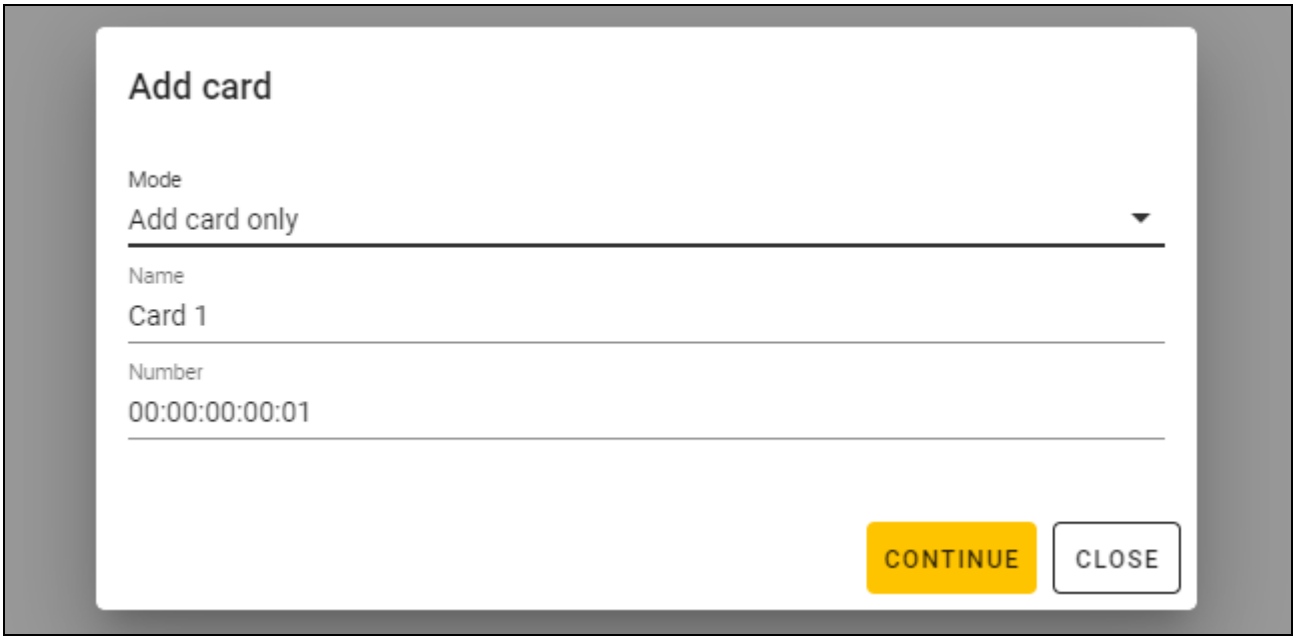
Enter and write card



1. In the “Name” field, enter the card name.
2. In the “Number” field, enter the card number.
3. Enable the *Continue adding* option if you want to enter the number and program more than 1 card.
4. Click “CONTINUE”. The “Present and hold card” window will be displayed.

5. Present the card to the programmer  indicator. A message will confirm when the card has been programmed. The “Present and hold card” window will be closed. If you enabled the *Continue adding* option, the “Add card” window will be displayed and you will be able to add and program another card.

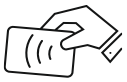
Add card only



1. In the “Name” field, enter the card name.
2. In the “Number” field, enter the card number.
3. Click “CONTINUE”. A message will confirm that the card has been added.

Programming a card already added to the project

If you added a card to the project but did not program it (e.g. you used the *Add card only* mode):

1. Click the card to select it.
2. Click . The “Write cards” window will be displayed.
3. Click “CONTINUE”. The “Present and hold card” window will be displayed.
4. Present the card to the programmer  indicator. A message will confirm when the card has been programmed.

Clearing a card

If you want to program a card that has already been programmed, you must clear it first:

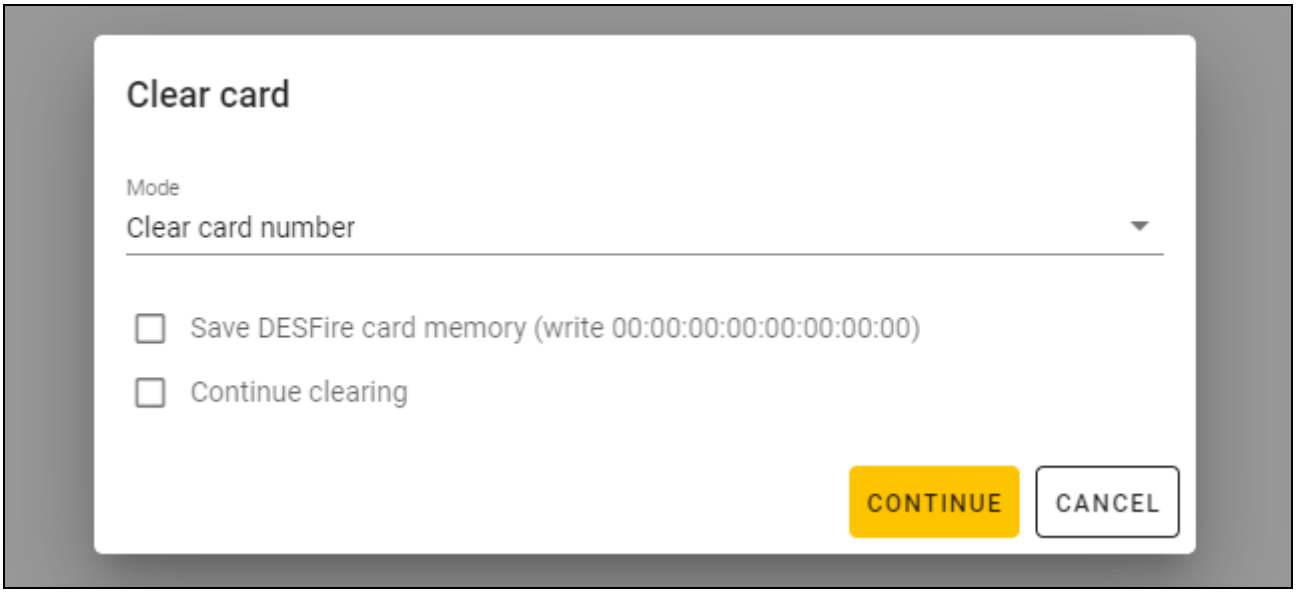
1. Click . The “Clear card” window will be displayed.
2. Select the card clearing mode:

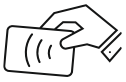
   Clear card number – use this mode if you want to delete from the card a number that has been programmed according to the settings in the “TOKEN SETTINGS” tab.

   Format card – use this mode if you want to delete all data written to the card or you do not know the card settings and you want to clear its number.

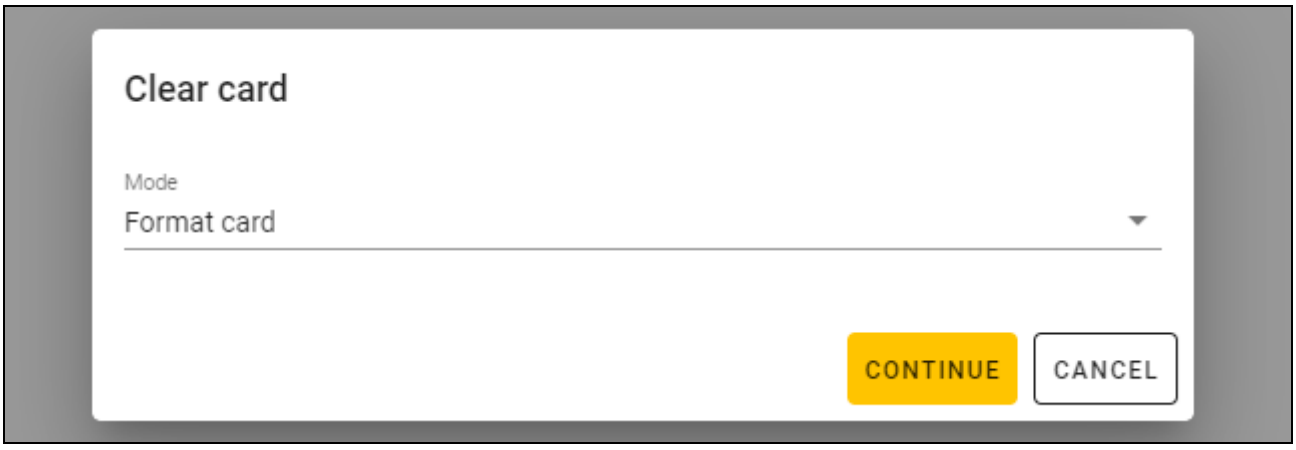
If the card is on the list of cards in the project, it will be deleted from the list when its number has been cleared or it has been formatted.

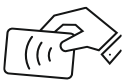
Clearing the card number



1. Enable the *Save DESFire card memory (write 00:00:00:00:00:00:00:00)* option if you want to continue using the memory occupied by the deleted number (if the option is not enabled, the memory occupied by the deleted number will no longer be in use – you will need to format the card in order to retrieve the memory).
2. Enable the *Continue clearing* option if you want to clear the number of more than 1 card.
3. Click “CONTINUE”. The “Present and hold card” window will be displayed.
4. Present the card to the programmer  indicator. A message will confirm when the card number has been cleared.
5. When you have cleared the last card number, click “CLOSE” to close the “Present and hold card” window.

Formatting a card



1. Click “CONTINUE”. The “Present and hold card” window will be displayed.
2. Present the card to the programmer  indicator. A message will confirm when the card has been formatted. The “Clear card” window will be displayed.
3. Click “CANCEL” to close the “Clear card” window.

Renaming a card

1. Hover the mouse over the card. The button will be displayed.
2. Click . You will enter the edit mode.
3. Enter the new card name.
4. Click outside the name area to exit the edit mode.

Deleting a card from the project

1. Click a card on the list to select it.
2. Click . A deletion confirmation window will be displayed.
3. Click “OK”. A message will confirm that the card has been deleted.

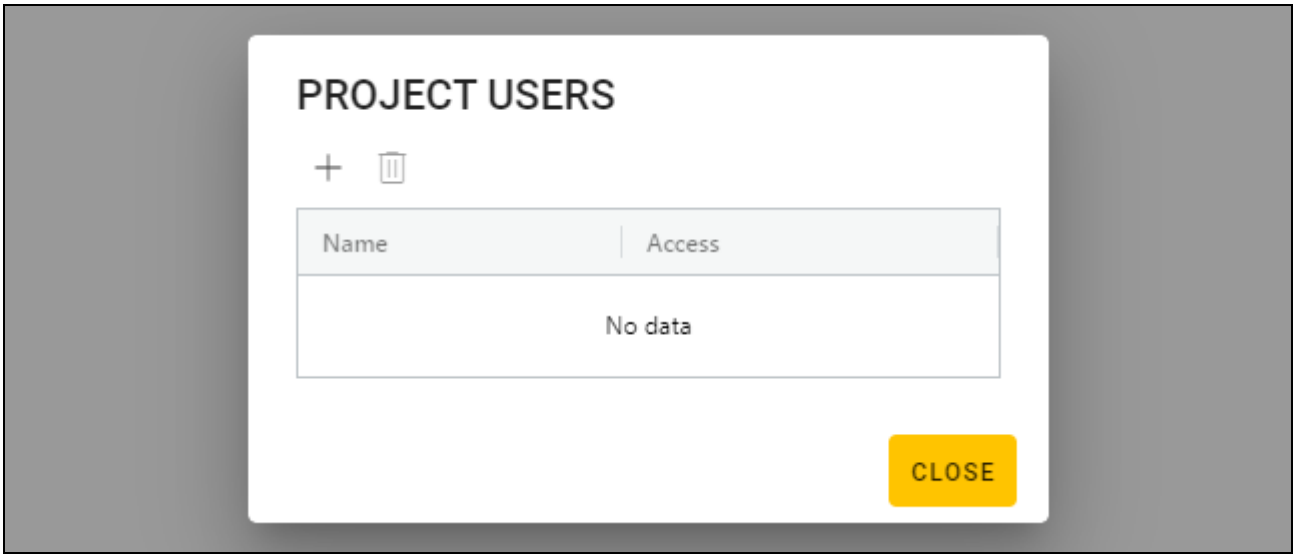
Checking the user card number

Present the card to the programmer indicator. The card number and other card details will be displayed in the upper part of the window.

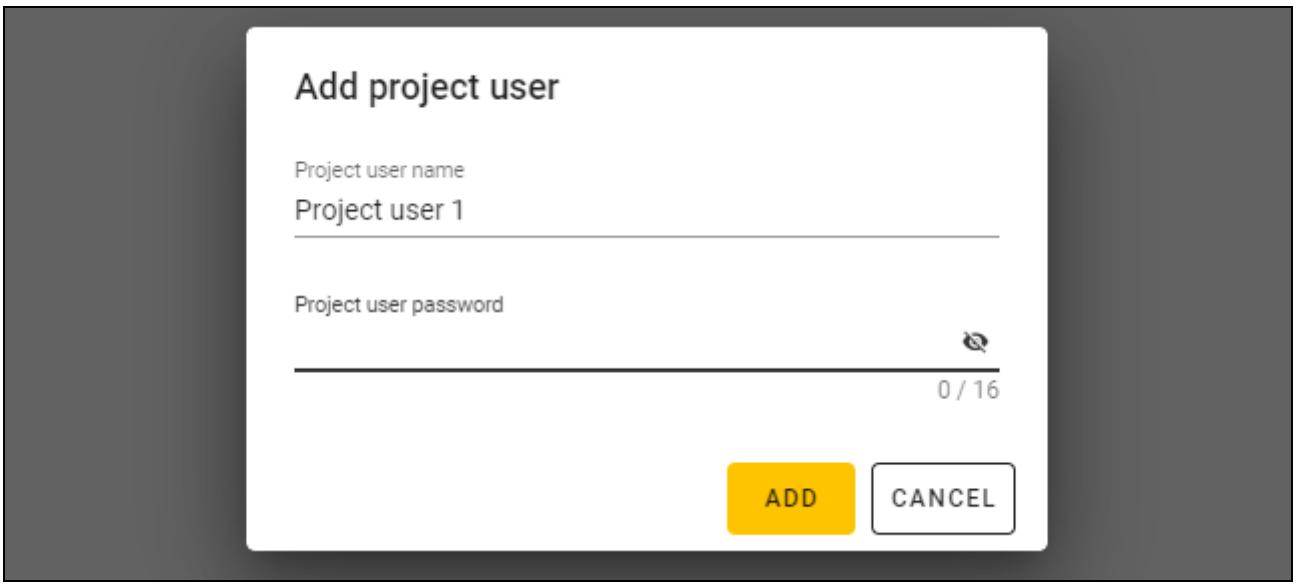
4.4.7 Adding a project user

This function is available after opening a project. Project users have only access to the project they have been added to. They can only manage user cards.

1. Click on the menu bar. The menu will be displayed.
2. Click “PROJECT USERS”. The “PROJECT USERS” window will be displayed.



3. Click +. The “Add project user” window will be displayed.



4. In the “Project user name” field, enter the project user name.
5. In the “Project user password” field, enter the project user password (1-16 digits, letters or special characters).
6. Click “ADD”. A message will confirm that the project user has been added.

4.4.8 Saving changes in the project

This function is available after opening a project.

1. Click  on the menu bar. The menu will be displayed.
2. Click “SAVE”. A saving window will be displayed.
3. Click “SAVE” if you do not want to rename the project or click “SAVE AS” if you want to rename the project.

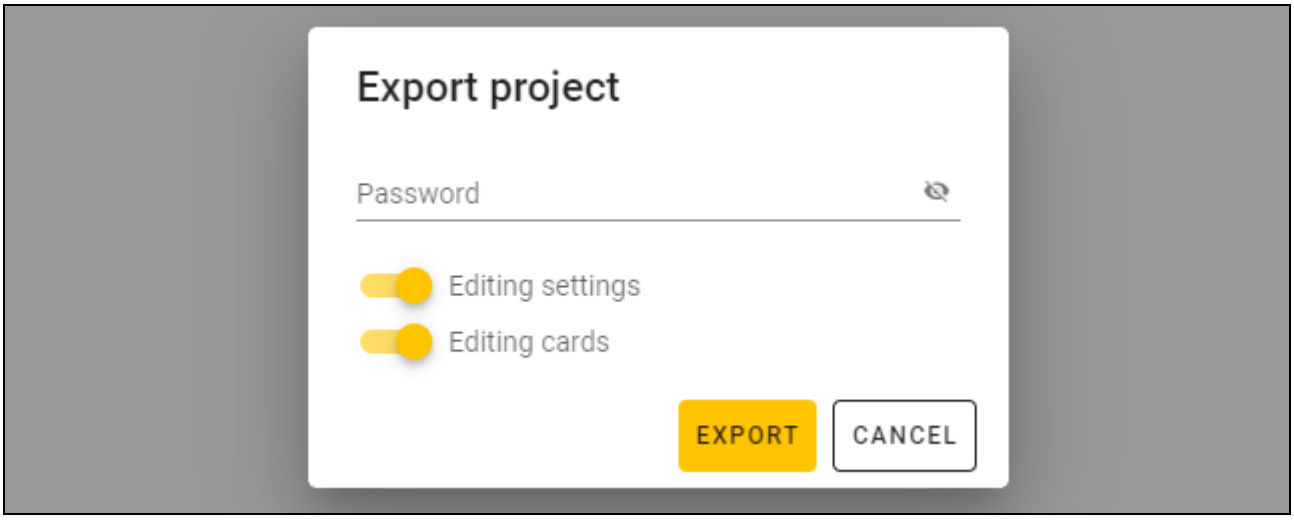
You can use the Ctrl + S shortcut to skip the first two steps and open the saving window right away.

4.4.9 Exporting a project

This function is available after opening a project.

1. Click  on the menu bar. The menu will be displayed.

2. Click “EXPORT”. The “Export project” window will be displayed.



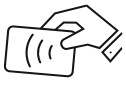
3. In the “Password” field, enter the password to secure the file you are exporting (1-16 digits, letters or special characters).
4. Disable the *Editing settings* option if the system settings are to be unavailable after the file is imported (the “System” and “Devices” tabs will not be displayed).
5. Disable the *Editing cards* option if card editing is to be unavailable after the file is imported (the “Cards” tab will be displayed but you will not be able to manage the cards).
6. Click “EXPORT”. A system window will be displayed in which you should indicate where the exported file is to be saved.

5. HID keyboard operating mode

The HID keyboard mode is available when the programmer is not connected with the CR SOFT program. The programmer can then be used to read the user card number and write it to any program where the cursor is located. If the programmer is to be used to read encrypted cards:

1. Open a project containing the cards whose numbers you want to write to another program in the HID keyboard mode.
2. Establish connection between the program and the programmer (p. 11).
3. Click  on the menu bar to upload the card settings to the programmer.
4. Click  on the menu bar to disconnect from the programmer.

The programmer stores the card settings that were last saved. When connection is established with the CR SOFT program, these settings are cleared.

5. Start the program in which you want to enter the card numbers (e.g. DLOADX or ACCO-WEB).
6. Click where you want to enter the card number.
7. Present the card to the programmer  indicator. The number will be entered in the selected field.

6. Firmware update

1. Download the programmer firmware update program from the support.satel.pl website.
2. Start the downloaded program.
3. Click the  button.
4. In the window that will open, indicate the COM port used by the programmer, and then click “OK”.
5. When a command is displayed prompting you to power the programmer off and on, disconnect the programmer from the computer, then reconnect it.
6. The program will read information on the installed firmware version from the programmer.
7. When a prompt is displayed asking if you want to continue the firmware update, click “Yes”.
8. The programmer firmware will be updated.

7. Specifications

Supply voltage (from USB port) ..... 5 VDC
Standby current consumption .....45 mA
Maximum current consumption .....74 mA
Operating frequency .....13.553...13.567 MHz
Operating temperature range.....-10...+55 °C
Maximum humidity .....93±3%
Dimensions ..... 45 x 21 x 129 mm
Weight.....65 g