

Roger Access Control System 5 v 2

Application note no. 010

Document version: Rev. A

Multifunction inputs

Note: This document refers to RACS 5 v2.0.4 or higher

Introduction

RACS 5 system enables assigning of multiple function to the same input line, therefore the signal at such input can start multiple actions within the same MC16 controller and its peripheral devices. Multifunction inputs can be used among others for:

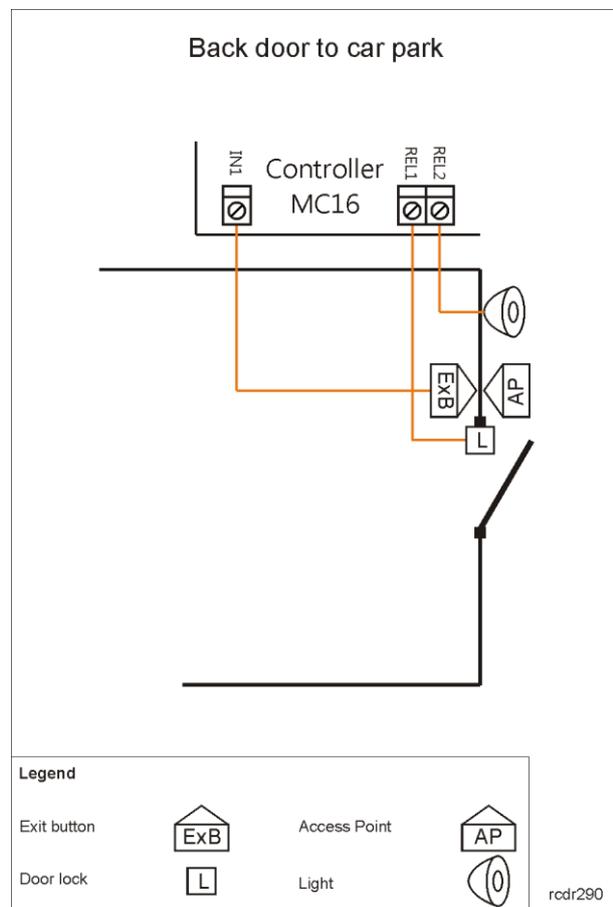
- Building automation
- Interlocking
- Emergency group opening of doors (e.g. at evacuation route)

Building automation

Multifunction inputs can be applied both in simple and advanced solutions for building automation. The practical example of simple solution is a scenario with building's back door and exit button which allows both to open the door and turn on external light on car park for certain period but only at night. More advanced solution e.g. light scenes usually include not only Automation Nodes but also multifunction outputs and possibly Local Commands.

In order to configure button which opens door and turns light on:

- Create read-in Access Door with *Add Access Door Wizard* in VISO software indicating entry terminal, REL1 (MC16) output for door lock and IN1 (MC16) input for exit button.
- Enrol user with *Add Person Online* wizard assigning Authentication Factor(s) and access Authorization.
- In the navigation tree of VISO software double click *Inputs* command within the same MC16 controller.
- In the opened window select the logical input *C1_000_IN1A* which was previously created with wizard and click *Edit* button.



- In the next window enable the option *Multifunction* and set *Function limit* = 2 as this input shall be used for two purposes. Close the window with *OK* button.

The screenshot shows the 'Edit Input' dialog box with the following fields and values:

- General:** ID: 4, Name: C1_000_IN1A input, LCD Message: (empty), Keypad Shortcut: No shortcut, Description: (empty)
- Object:** Name: MC16 v1.6_192.168.21.161_0_IN1A input, Device: MC16 v1.6, Label: IN1A input, Comment: IN1 input, Type: INP 1/[1]: NO, IP Address: 192.168.21.161, RS Address: 0
- Additional Options:** Activity Schedule: Always, Authentication Point: None, Multifunction: , Function Limit: 2
- Events:** (empty)

- Prior to configuration of *C1_000_REL2* logical output, define the Schedule in order to limit the output and consequently light switching to night time. In the navigation tree double click *Schedules* commands and then *Add* button. Enter the name e.g. Schedule 8PM-6AM and confirm with *OK* button. In the bottom part of screen select *Calendar Days* tab and *Edit* button. In the newly opened window select 12AM - 6AM period for Monday with left mouse button, right click it and use *Add Time* command. Then similarly select 8PM – 11PM period and add it to the Schedule. Repeat the same steps for remaining days.
- In the navigation tree of VISO software within the same controller double click *Outputs* command.
- In the opened window select *Add* button and in the next window assign previously created Schedule in *Activity Schedule* field in order to limit light switching to night time. In the *Name* field of *Object* area select REL2 output of MC16 controller and confirm with *OK* button.

- In the navigation tree of VISO software within the same controller double click *Automation Nodes* command.

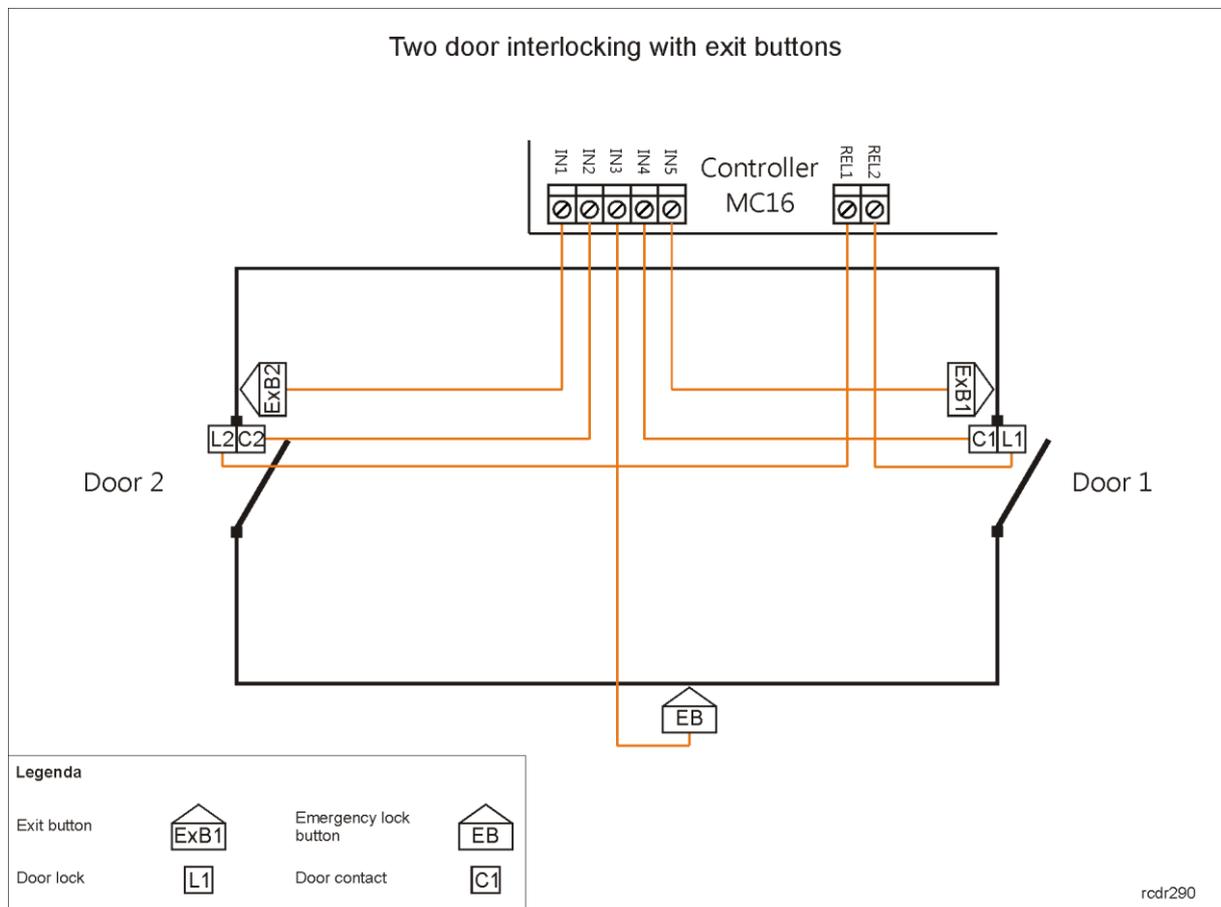
- In the opened window select the button *Add*, in the next window enter optional name and in the field *Default Time* define time for node switching on e.g. 5 minutes. This will be time for light switching on at car park.
- In the bottom part of the screen in *Inputs* tab, use *Add* button in order to assign *C1_000_IN1A* input with the function *[162]: Set Node ON with Default Time Settings* and in *Outputs* tabs use *Add* button to assign *C1_000_REL2* output with the function *[021]: Node Status*.
- Synchronize controller settings with VISO software.

Due to *Multifunction* option, the logical input *K1_000_IN1A* which represents physical IN1 input of MC16 controller could be used for two functions i.e. door opening (REL1 relay) which was configured on Access Door level with wizard and for Automation Node activation (REL2 relay) in order to control light. Additionally light switching on can be limited to night time with the Schedule. MC16 relays can control up to 30V. Therefore in practical applications external contactor or relay must be used to control 230VAC supply of a lighting.

Two door interlocking with exit buttons

In RACS 5 system it is possible to configure interlocking Access Doors. In such case if the door is not closed then the next door cannot be opened. In practical applications the functionality is used at banks, airports and other places where additional control of user movements is necessary. The interlocking within single MC16 controller does not require additional cabling and it is configured with multifunction inputs.

The principle of this solution is such that input used for connection of door contact at certain door is at the same time used for locking another door.



Exemplary interlocking includes two doors and if one of them is not completely closed then the other door cannot be opened. In the example above only users movement is controlled without their identification and related Authorizations. In order to enter the room a handle must be used and in order to leave the room an exit button connected to controller’s input must be pressed. Door contacts are applied to monitor door opening status. Additional EB button is installed to lock the room in case of emergency.

In order to configure two door interlocking as in example above:

- Within low level configuration of MC16 controller configure IN2 and IN4 inputs as NC type using RogerVDM software or VISO v2 software. These inputs shall be used for connection of door contacts.
- Proceed with typical configuration steps such as database creating, services configuration and MC16 controller detection in VISO software.
- In the navigation tree of VISO software within particular controller double click *Inputs* command.
- In the opened window select *Add* button in order to define logical input.
- In the next window, in the *Name* field of *Object* area indicate IN1 input of the controller and confirm with *OK* button.
- When input with default name *C1_000_IN1A* is created then similarly configure four more for IN2, IN3, IN4 and IN5 inputs. In case of inputs IN2, IN3 and IN4 additionally enable the option *Multifunction* and define *Function limit = 2*.

The screenshot shows the 'Add Input' dialog box with the following configuration:

- General:**
 - Name: C1_000_IN2A input
 - LCD Message: (empty)
 - Keypad Shortcut: No shortcut
 - Description: (empty)
- Object:**
 - Name: MC16 v1.6_192.168.21.161_0_IN2A input
 - Device: MC16 v1.6
 - Label: IN2A input
 - Comment: IN2 input
 - Type: INP 2/[1]: NO
 - IP Address: 192.168.21.161
 - RS Address: 0
- Additional Options:**
 - Activity Schedule: Always
 - Authentication Point: None
 - Multifunction:
 - Function Limit: 2
- Events:** (empty)

- Similarly, using *Outputs* command in the navigation tree create two logical outputs for REL1 and REL2 relays at MC16 controller. They will be used to control door locks.
- In the navigation tree within the same controller double click *Access Doors* command.
- In the opened window select *Add* button.
- In the next window enter *Door 1* name and confirm with *OK* button.
- In the bottom part of the screen select *Inputs* tab and then *Add* button in order to define input functions as follows:
 - Input *C1_000_IN2A* with function *[132]: Disable Door Toggle*.
 - Input *C1_000_IN3A* with function *[138]: Emergency Locked Door Mode Toggle*.
 - Input *C1_000_IN4A* with function *[130]: Door Contact Toggle*.
 - Input *C1_000_IN5A* with function *[128]: Generate Door Lock Pulse*.

The screenshot displays the configuration interface for 'C1_Access Doors'. The top section, titled 'Access Doors', contains a toolbar with buttons for Add, Edit, Select All, Delete, Remote Command, Access Users, Access Credentials, Refresh, and Report. Below this is a table with the following data:

ID	Name	LCD Message	Keypad shortcut	Re-lock
2	Door 1		No shortcut	Disabled

The bottom section, titled 'Details', has tabs for Main, Inputs, Outputs, Function Keys, and Local Commands. The 'Inputs' tab is active, showing a toolbar with Add, Edit, Select All, Delete, Refresh, and Report. Below this is a table with the following data:

ID	Input	Function
5	C1_000_IN2A input	[132]: Disable Door Toggle
6	C1_000_IN3A input	[138]: Emergency Locked Door Mode Toggle
7	C1_000_IN4A input	[130]: Door Contact Toggle
8	C1_000_IN5A input	[128]: Generate Door Lock Pulse

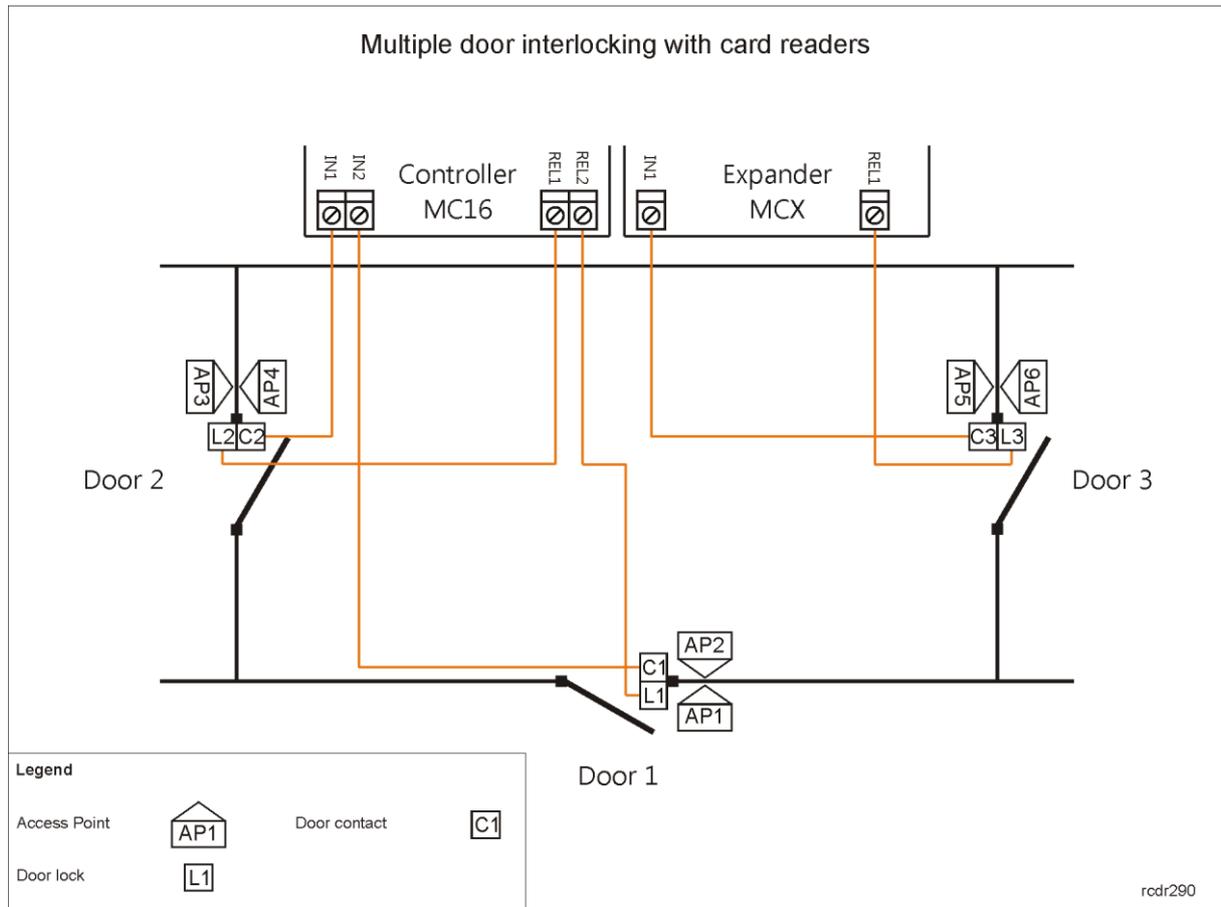
- In the bottom part of screen select *Outputs* tab and then *Add* button in order to define output function as follows:
 - Output *C1_000_REL2* with function *[031]: Door Lock*.
- Similarly create Door 2 as follows:
 - Input *C1_000_IN1A* with function *[128]: Generate Normal Door Lock Pulse*.
 - Input *C1_000_IN2A* with function *[130]: Door Contact Toggle*.
 - Input *C1_000_IN3A* with function *[138]: Emergency Locked Door Mode Toggle*.
 - Input *C1_000_IN4A* with function *[132]: Disable Door Toggle*.
 - Output *C1_000_REL1* with function *[031]: Door Lock*.
- Synchronize controller settings with VISO software.

Based on applied settings, a signal on IN2 input from door contact C2 blocks Door 1 opening. Similarly input IN4 from door contact C1 is operated. Additionally, as long as EB button connected to IN3 is pressed then both doors are locked. The function *[138]* has higher priority than other functions and method used for door opening. Emergency room locking and unlocking can alternatively be configured with *[121]*, *[122]*, *[123]* functions and in case of IN3 input the output of another system (e.g. alarm) can be connected instead of the button.

Multiple door interlocking with proximity readers

When multifunction inputs are applied then more complex interlocking with more than two doors can be configured. Moreover door opening can be based not on exit buttons but user identification at Access Point (reader).

In the example below Door 2 and Door 3 cannot be opened if Door 1 is not closed and at the same time Door 1 cannot be opened if either Door 2 or Door 3 is not closed.



In order to configure multiple door interlocking as in example above:

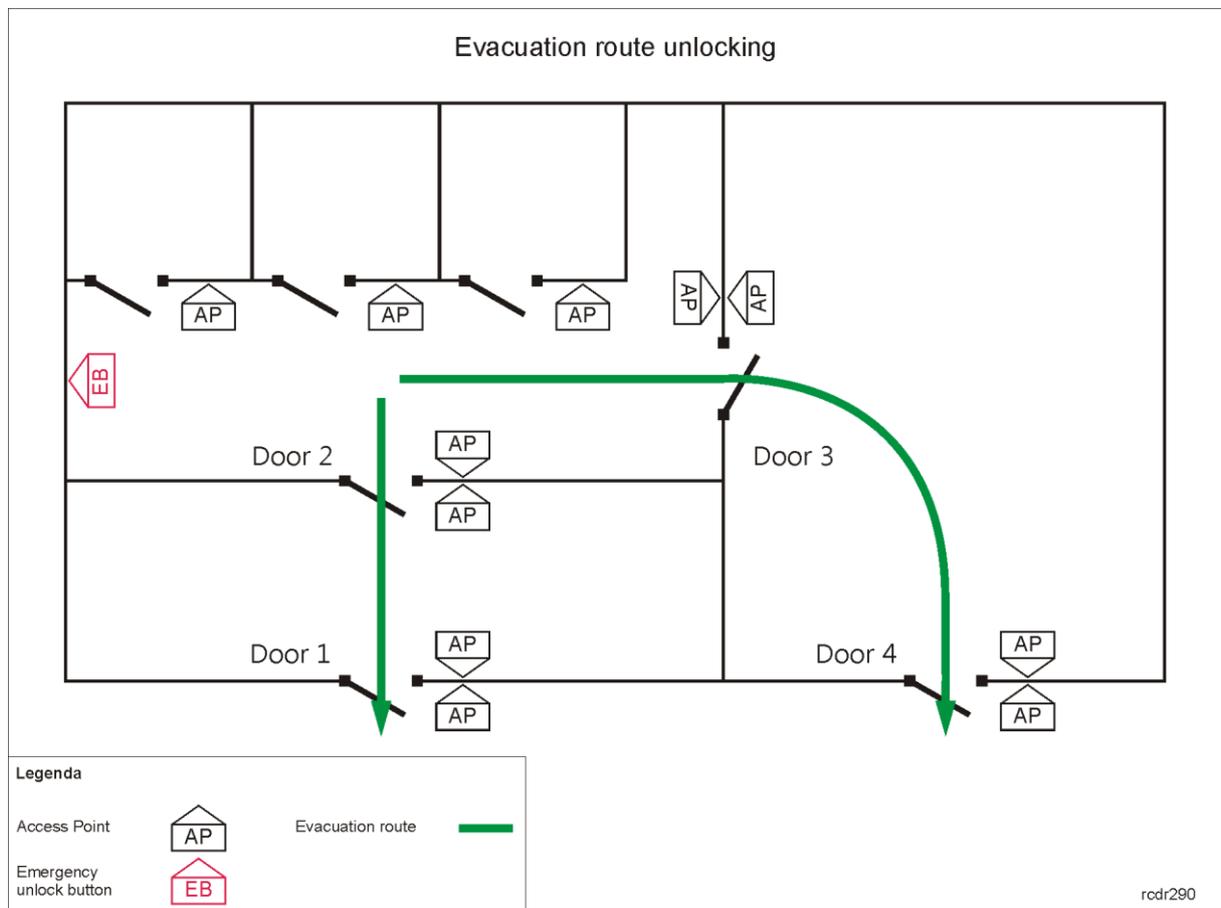
- Within low level configuration of MC16 controller and MCX expander configure door contact inputs as NC type using RogerVDM software or VISO v2 software.
- Create all Access Doors with *Add Access Door Wizard* including all necessary Access Authorizations and configuration of inputs, outputs and Access Points (readers) according to figure above.
- Enrol user(s) with *Add Person Online* wizard assigning Authentication Factor(s) and all Authorizations.
- In the navigation tree of VISO software within the same controller double click *Inputs* command.
- Modify one by one all three inputs created with wizard using *Edit* button, enabling *Multifunction* option and selecting *Function limit =3*. Close the window with *OK* button.
- For Door 1 in the bottom part of the screen select *Inputs* tab and then *Add* button in order to define input functions as follows:
 - Input IN2 (MC16) with function [130]: *Door Contact Toggle*.
 - Input IN1 (MC16) with function [132]: *Disable Door Toggle*.
 - Input IN1 (MCX) with function [132]: *Disable Door Toggle*.
- For Door 2 in the bottom part of the screen select *Inputs* tab and then *Add* button in order to define input functions as follows:
 - Input IN1 (MC16) with function [130]: *Door Contact Toggle*.
 - Input IN2 (MC16) with function [132]: *Disable Door Toggle*.
- For Door 3 in the bottom part of the screen select *Inputs* tab and then *Add* button in order to define input functions as follows:
 - Input IN1 (MCX) with function [130]: *Door Contact Toggle*.
 - Input IN2 (MC16) with function [132]: *Disable Door Toggle*.
- Synchronize controller settings with VISO software.

Inputs in the example above are used for two or three functions. They are used for door status monitoring and another door(s) locking.

Emergency group opening of doors

In RACS 5 it is possible to unlock group of doors with input signal. In practical applications it can be used to open door on evacuation route in case of fire alarm or simply open group of doors when necessary.

In the example below when input with EB button is triggered then Door 1, 2, 3 and 4 will be unlocked. Such input can be activated with a button or the output of other system e.g. fire alarm system. Multifunction input is operated within single MC16 access controller. If more than one controller is responsible for doors at evacuation route then such signal must be connected to each controller.



In order to configure door unlocking as in the example above:

- Create all Access Doors with *Add Access Door Wizard* including all necessary Access Authorizations and according to figure above.
- Enrol user(s) with *Add Person Online* wizard assigning Authentication Factor(s) and all Authorizations.
- In the navigation tree of VISO software within the same controller double click *Inputs* command.
- In the opened window select *Add* button in order to define logical input. In the next window Enable *Multifunction* option and define *Function limit* equal to the number of doors for group unlocking. According to example the *Function limit* =4. In the *Name* field of *Object* area indicate input of the controller e.g. IN1 of the controller.

- In the navigation tree of VISO software within the same controller double click *Access Doors* command.
- For Door 1 in the bottom part of the screen select *Inputs* tab and then *Add* button in order to define input function as follows:
 - Input IN1 (MC16) with function *[121]: Set Emergency Door Unlocked Mode*.
- Assign the same IN1 (MC16) input for the remaining Door 2, 3 and 4 using the same *[121]* function.
- Synchronize controller settings with VISO software.

The function *[121]* unlocks door(s) indefinitely. In order to restore normal mode when function *[121]* is used it is necessary to use input with the function *[123]: Clear Emergency Door Mode* at each door. Alternatively instead of *[121]* and *[123]*, the function *[137]: Emergency Unlocked Door Mode Toggle* can be applied as it unlocks door(s) as long as the input is activated i.e. as long as the button is pressed. Functions *[121]*, *[123]* and *[137]* have the highest priority among other door opening methods in RACS 5. They can also be used to lock/unlock previously mentioned interlocking.

Alternatively it is possible to configure global door unlocking on the level of the whole system instead of individual controllers. Global commands, events and RACS 5 Communication Server are used in such approach. More information on emergency unlocking of Access Doors is given in AN044 application note.

Contact:
Roger sp. z o.o. sp.k.
82-400 Sztum
Gościszewo 59
Tel.: +48 55 272 0132
Fax: +48 55 272 0133
Tech. support: +48 55 267 0126
E-mail: support@roger.pl
Web: www.roger.pl