Wireless
access control panel
U-Prox IP560

Instruction manual

Wireless access control panel with built in reader

About this document

This manual covers installation, adjustment and use of U-Prox IP560 (hereinafter panel) wireless single door access control panel. Read this manual carefully prior to installing the system.

Characteristics, Intended use and parameters of the panel are described in the section "Summary". Section "Terms" provides an explanation of terms found in this document. The look of the panel, the pins and the mode of work are described in the "Description section". Order of installation, adjustment of external devices and panel configuration are described in "Working with the device" section.

Attention! Read this manual carefully prior to installing the system.
Installation, adjustment and utilization of panel is allowed only to persons or organizations with the appropriate authority from the manufacturer

Technical support

To get warranty and technical support you can apply to authorized service centers, situated on the territory of countries, enlisted in the warranty card.

Warranty and technical support are performed on the territory of the country, where the customer applied for warranty or free service.

Technical information is available on the system website **www.u-prox.com**

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Brief description of the panel

U-Prox IP560 panel - a device designed to control access to residential and business premises,

Panel operates both standalone and in system.

U-Prox IP560 panel provides control of one or two actuators. It controls access into the room with one door with one built in reader (single-sided door) or with two readers (double-sided door).

U-Prox IP560 processes the information received from the reader(s) or via the Bluetooth Low Energy (BLE) interface and unlocks door driving actuators with built in relays.

Panel has built in reader and keypad. Also cellphones and smartphones may serve as ID's (with U-Prox mobile application).

Supported 3 operation modes for smartphones with U-Prox BLE ID:

• "Door-Proximity" – 10-20 cm, reader activates by built-in proximity sensor. Recommended for double-sided doors and turnstiles

• "Door" - up to 60-70 cm

• "Barrier/Gate" - adjustable range of interaction from 1 to 15 m

It is possible to connect optional external U-Prox or iPR reader to the panel. Panel may situate inside premises while external reader used.

Panel adjusted with Bluetooth Low Energy (BLE) interface in standalone operation mode. Adjustment includes access rules configure, ID list edit, full panel operation adjustment.

The panel can work offline or as part of the network. To add it to access control network, U-Prox IC L control panel used. U-Prox IC L panel communicates with U-Prox IP 560 via ISM band radio and via Ethernet (wired computer network) with access control system server. To extend the range of wireless system U-Prox HE and U-Prox HW repeaters are used, communicating with U-Prox IC L over Ethernet (wired computer network) or Wi-Fi (wireless computer network).

U-Prox IP560 panel has terminals for Request to Exit button and Door contact.

Thoroughly thought-out technical and design solutions, external reader connection possibility, user identification and communication via BLE, non-volatile memory and real time clock allow the use of the panel for multiple kinds of access control systems.

Intended use

U-Prox IP560 panel designed for operation in access control systems (ACS) of diverse scale in small offices as well as on large enterprises as well as in standalone operation mode and in access control system.

Panel provides access into one room, controlling as well as entry and exit and alarm system of rooms, associated with entry point. Panel provides antipassback function when equipped with external reader and controls access in both directions.

Summary

- Standalone and in system operation modes
- Built in ASK and FSK ID card reader
- Read range up to 80mm
- Power supply +10,8...+15 V
- Power consumption less than 160 ma @12V
- Maximal power source voltage ripple 500 mV
- Connection U-Prox or iPR of external readers
- Bluetooth Low Energy (BLE) interface for user identification

- Built in Request to Exit button
- Door Contact terminal
- Request to Exit button terminal
- Open/remove tamper
- Two relays with NO, NC, COM terminals 3 A @ 24 V
- Alarm output. Open collector 24 V, 60 mA
- Adjustment from the smartphone via Bluetooth (BLE) interface in standalone operation mode
- Adjustment from the access control system server via computer network
- Antipassback
- Real time clock
- Nonvolatile memory:

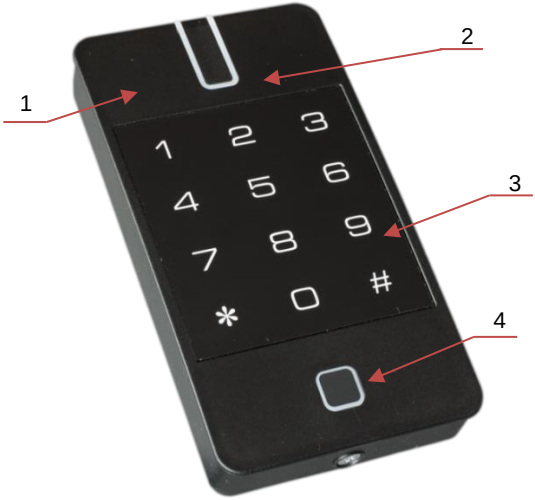
  Standalone operation mode:
  - 255 user ID's, including 1 master code, 1 engineer code
  - 4096 events
  - "Day" and "Night" modes

  In system operation mode:
  - 3000 user ID's
  - 6000 events
  - 255 time zones
  - 255 week schedules
  - 255 holidays
- Dimensions – 119,4x65,4x24 mm
- Weight – 0,2 kG

Description and operation

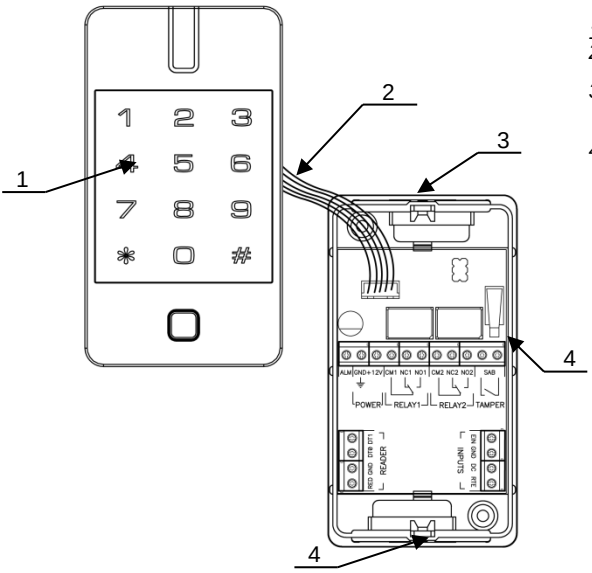
Panel

The look of the access control panel is shown in Fig. 1 and Fig. 2.



1. *Panel enclosure*
2. *LED*
3. *Keypad*
4. *Built-in RTE button and Bluetooth indicator*

Fig. 1. U-Prox IP560 panel view



1. *Panel cover*
2. *Panel cover and bottom board connection cable*
3. *Nuts for fixing screw. Bottom may turn on 180 grad at mounting*
4. *Panel bottom with commutation board.*

Fig. 2. U-Prox IP560 in general and details

Panel terminals assignment

Terminal	*Description*	*Assignment*
ALM		Alarm output
GND	**GND**	Power supply connection
+12V	**+12V**	
NC1	**Normally closed**	Relay #1 contacts
NO1	**Normally open**	
CM1	**Common**	
NC2	**Normally closed**	Relay #2 contacts
NO2	**Normally open**	
CM2	**Common**	
SAB TAMPER	**Tamper**	Enclosure and removal tamper.
RED	**Reader power +12V**	External reader connection
GND	**GND**	
D1	**Data 1**	
D0	**Data 0**	
EIN	**Programmable input**	Inputs
GND	**GND**	
DC	**Door contact**	
RTE	**Request to Exit button**	

Annunciation of panel readers

Current panel access modes indicated by readers connected. It is possible to adjust separate annunciation for each panel with system software. Default annunciation settings are present in table below:

Operation mode	***Readers' annunciation***
Normal mode	No sound, Red blinks once per second
Free pass	No sound, Green and Amber alter once per second
Night mode or Panel blocked	No sound, Red and Amber alter once per second
Alarm	No sound, Red light continuously
Card enrollment	No sound, Green blinks once per second
Panel startup	No sound, No lights
Upload or Download	Short clicks in standby mode, no sound Red light continuously in system
Access granted	One beep, Green light continuously In 5 seconds before door relock beeps every second
Access denied	Long sound, Red light continuously
Code change mode on keypad command [*]	Yellow light continuously after mode entry
	Yellow blinks for new code entry

Bluetooth indication

Operation mode	***Bluetooth indication***
Normal mode	No sound, no indication
Connected	No sound, Blue light continuously
Programming allowed	No sound, Blue light blinks fast
Connected, no correct data received	Short beeps, Blue light blinks once per second. In 5 seconds – connection reset

Panel operation

The panels supplied unloaded with factory settings below in document. In this state Red blinks once per second.

For panel standalone operation, adjust it with application on smartphone.

For panel work in system, switch it into the network operation mode and add it to the system with automatic adjustment mode or manually and download the program settings from U-Prox Software.

Panel switches into the Normal operation mode if inputs are safe and settings downloaded into the panel.

ID entry (card pass)

Press keys on the keypad sequentially to enter the code. The length of the code must be not less than four digits and not more than ten digits. Finalize code entry with [#] key press. Buzzer beeps on each key press. Correct entry confirmed with one short beep. Entry error or unknown code entry followed with one long sound.

Keypad blocked after several sequential wrong (unknown) codes entry or RF ID passes. This function is inactive by default.

Press [*] key to cancel erroneous key sequence.

The key sequence erased and panel returns to the Normal mode after 40 seconds pause in entry.

RF ID pass equivalent to the key entry. Panel accepts both ASK RF ID's and FSK ID's.

Built in reader reads cards and accepts codes both in Normal mode and in Program mode.

Built in reader reads RF ID's. Beside this, external reader connection is possible; In this case panel situated within secure premises.

U-Prox ID mobile application allows use smartphone or tablet as ID. Smart Bluetooth interface utilized in this case.

Standalone mode

User codes

There are several code (RF ID) types for panel control..

Administrative codes - engineer's code and administrator's (Master) code. Use these codes to switch into the Program mode to adjust:

- Engineer's code,
- Master code,
- User codes, their names and parameters,
- Relay operation modes and entry/exit duration (for each user personally)
- Alarm output duration,
- Keypad blocking duration,

User codes. This codes allow to:

- Drive relays,
- Switch panel into the night operation mode and vice versa

Administrator adjusts code category and options for each code individually.

- Code category defines the access mode.
- Code options define numbers of relays driven with code, relay duration and entry/exit duration.

Duress code

Each user owns additional "duress" access code independently on code category.

Panel performs all actions, programmed for normal user code and activates Alarm output on duress code entry.

Users own RF ID's or Mobile ID's do not have additional duress code.

Duress code differs from normal code by one in the last digit. For example, if normal code is **[1] [2] [3] [4]**, then duress code will be **[1] [2] [3] [5]**.

If last digit of normal code is [9], then duress code ends with [0]. For example. If normal code is **[2] [0] [0] [9]**, then duress code is **[2] [0] [0] [0]**.

Code change with [*] command

Each user may change his own identifier with [*] command.

Attention!!! The identifier changing is possible only with the built-in reader.

Press [*]. Buzzer beeps three times and LED will light up Amber. Enter old [User code][#]. LED blinks Yellow if correct code entered. Pass new RF ID twice or enter new [User code][#] and confirm with second new [User code][#] entry.
New code accepted if its alternation with user was allowed, old code entry was correct and new code not equal to the any other user code or duress code in panel.
Engineer's code changed in the same way.

Example.

User, owns code [1] [2] [3] [4] [5] and wants to change it to [4] [3] [2] [1].
Press [*] key, panel will beep three times and LED will light up Amber.
Enter old user code [1] [2] [3] [4] [5], panel will emit error sound and exit from the code change command, switching Amber LED off.
Enter new code [4] [3] [2] [1] [#], panel will emit long sound. Panel will emit Error sound if the same code (normal or duress) exists in panel code list. Enter new code [4] [3] [2] [1] [#] once more, panel will sound long.
Enter [#] once more to exit code change command.

Durations

Default durations

Panel has default durations for ease of panel adjustment. These durations are "Relay #1duration", "Relay #2 duration" and "entry/exit duration".
One may set default values of durations for codes' parameters. Changing this value one changes corresponding parameter for all codes with durations, set to default..
Example. The value of 255 is set automatically to relay duration for each newly created code, which means, that the default value used (factory setting 3 sec). If somebody sets relay duration value 255 to several codes, it will mean that codes have default relay duration. It is enough to change default relay duration to change the relay duration for mentioned codes if necessary.

Entry/exit duration

The entry/exit duration countdown starts after relay activation. The countdown stops after the first violation with subsequent restore of the door contact. The buzzer starts beeping in 5 seconds before entry/exit delay exhaustion if door remains open to warn user about this. Close the door and enter code once more to extent duration. Entry/exit time is programmable. Allowed values are 0 to 253 seconds.

"Opened door" mode

Door position (opened or closed) not supervised if code with entry/exit duration value 254 entered until the door contact state not changed to opposite.

Keypad blocking

Panel blocks keypad and reader for programmed time if wrong code or unknown RF ID passed tree times subsequently to prevent the code or RF ID matching. The Keypad blocking time allowable values are 0 to 255. Zero value means, that keypad blocking mode is off.

Panel standalone operation modes

Panel operates in several modes:

- - normal day mode,
- - normal night mode,
- - programming,

- - keypad and reader blocking.

LED blinks Red in normal day mode. Panel performs programmed actions on RF ID pass or code entry in this mode. The actions could be Relay#1 and/or Relay#2 activation and a choice of relay for activation.

LED is blinks Red and Yellow alternately in normal night mode. The difference from day mode is that only codes and RF ID's of category "Day and night" are active in this mode.

Panel switched from night mode to the day mode and vice versa" automatically by schedule or manually with code not having the right to control any relay. Such code must have category "Day and night", because if it will have another category it will be possible to switch panel into the night mode but will not be any way to return to day mode.

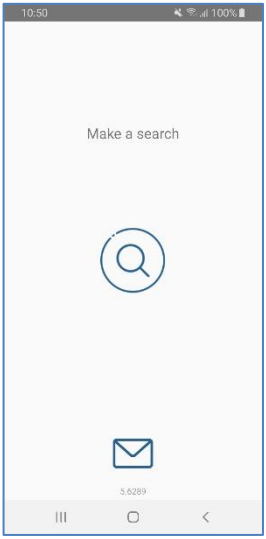
Panel performs all actions, programmed for normal user code and activates Alarm output for programmed time on duress code entry. Alarm output activates after the code entry immediately. If there were no any keypad activity, panel will return to normal mode in 40 seconds.

Panel programming in standalone mode

Download and install U-Prox Config application.

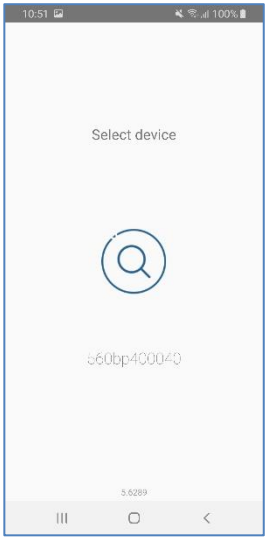
Mobile devices with Android 5.0 OS and higher, Apple 8.0 IOS and higher supported. Device must have Bluetooth 4.0 and higher with BLE (Bluetooth Low Energy) support.

Run U-Prox Config application



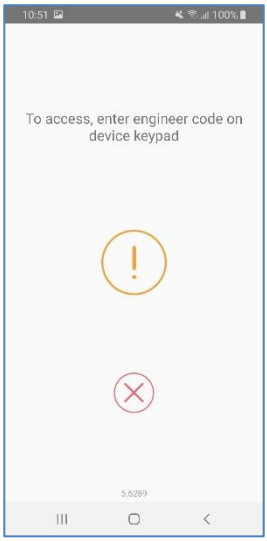
Press "Start" button on application. Application will search for Bluetooth devices. If Bluetooth is not activated on your device application will request for activation, press 'OK'

Attention! The location services must be ON in Android 6.0 and higher for Smart Bluetooth operation

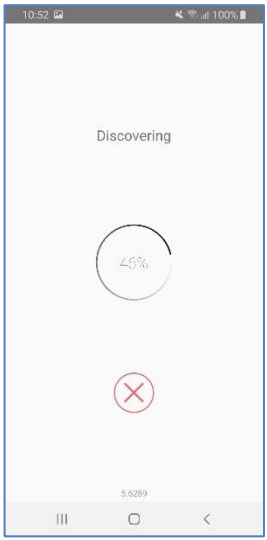


Panel name and distance to the panel displayed at scan.

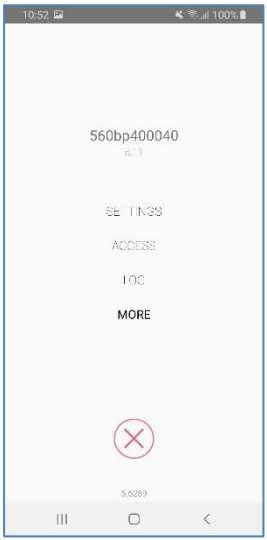
Enter engineer's code on the keypad – panel will allow connection for programming for 40 seconds. Access reject message displayed on attempt to connect without authorization.



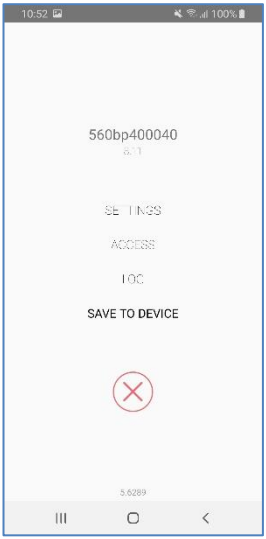
Select panel from the device list and press 'Connect' button. Application will read out panel settings.



The main menu will activate after the settings readout. Advanced options displayed after ‘More’ button pressed.



The menu item ‘Save To Device’ became active after settings adjustment. Select ‘Save To Device’ to save changes.

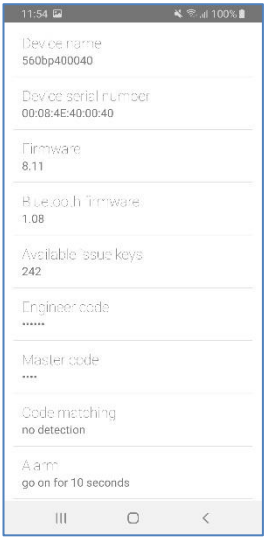


Press ‘Disconnect’ ⊗. button to break connection with panel.

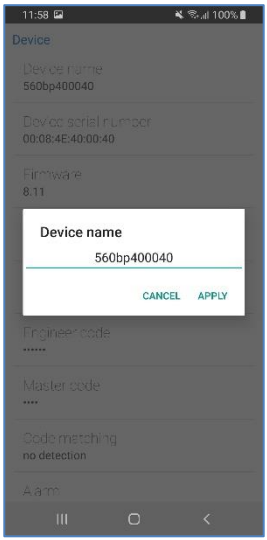
Attention!!! Disconnection without writing settings will cause changes loss.

‘Settings’ menu item contains main panel settings:

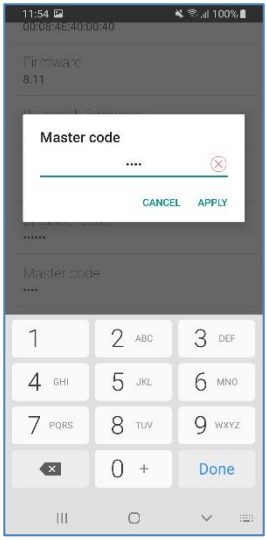
“Device” settings group



“Device name” – panel name setting

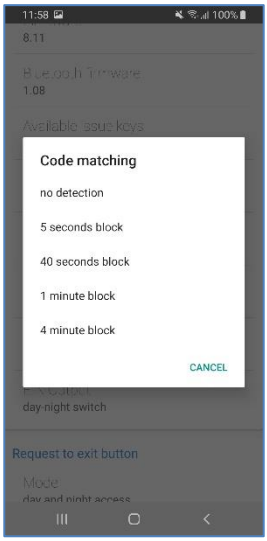


"Firmware" and **"Bluetooth firmware"** – firmware version and upgrade
"Available issue keys" – the number of free cells in memory for identifiers
"Master code" - code # 0 change
"Engineer’s code" - code # 1 change

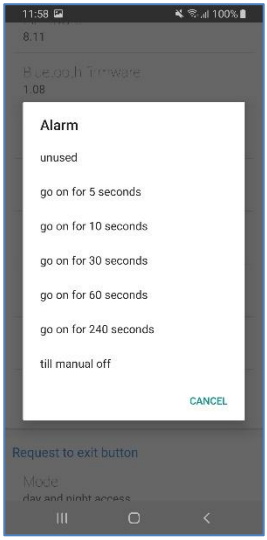


New code accepted if it is not equal to any other code in system, including duress codes.

"Code match" – keypad blocking duration at code match attempt
Allowable values 5 seconds to 4 minutes or code match function disable



"Alarm" – alarm output activity duration
Allowed values 0 to 240 seconds or deactivation with engineer's code



"Request to exit button" (RTE) settings group

"Mode" – RTE operation modes:

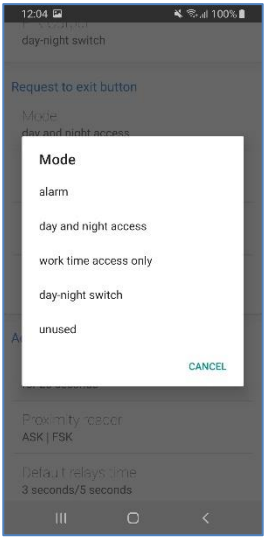
"alarm" – Button press activates alarm output

"day and night access" – RTE active always

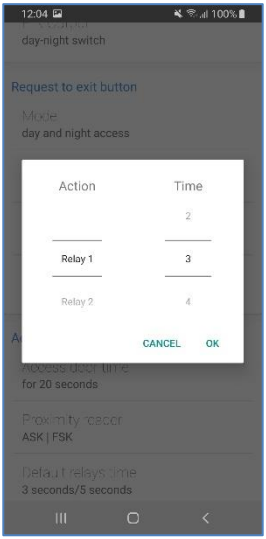
"work time access only" – RTE active when panel is in day mode only

"day and night modes switch" – RTE press alters day and night panel modes

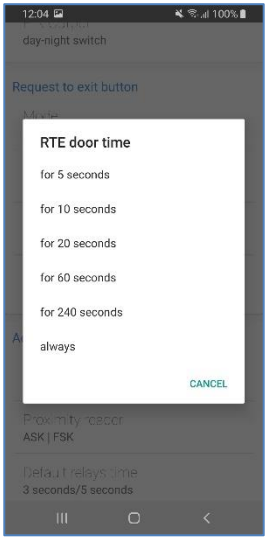
"unused" – RTE is disabled



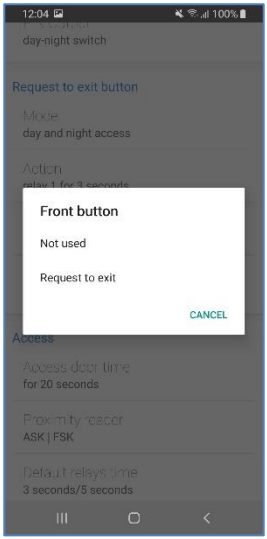
“Action” – actuators’ actions settings after RTE button press



“Door time”– delay duration setting after RTE button press



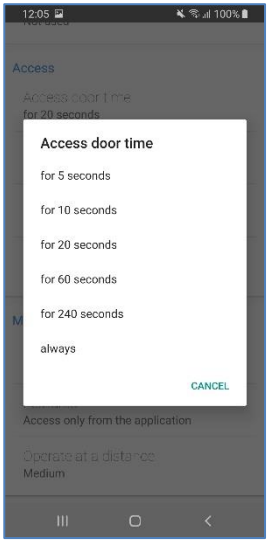
"Front button" – built-in RTE button enabling and disabling (see fig. 1):



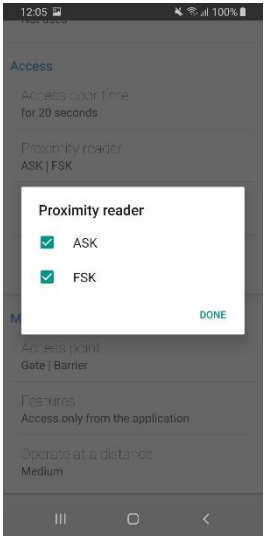
“Access” settings group

" Access Door time" – Sets default value for Entry/exit duration.

Allowable values 0 .. 240 seconds or door opened



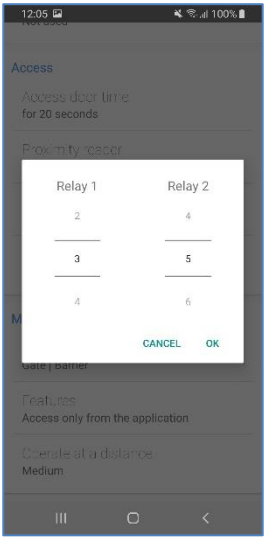
"Proximity reader" – RF ID type selection: ASK only FSK only or ASK and FSK simultaneously.



Attention!!! ASK and FSK modulation is ON by default

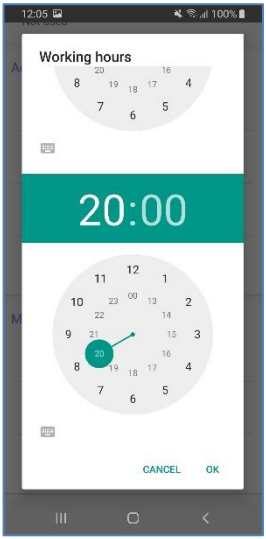
"Default Relays time" – settings of default duration of Relay #1 and Relay #2 activation

Allowable values 0 .. 254 seconds. Zero value used for relay trigger mode



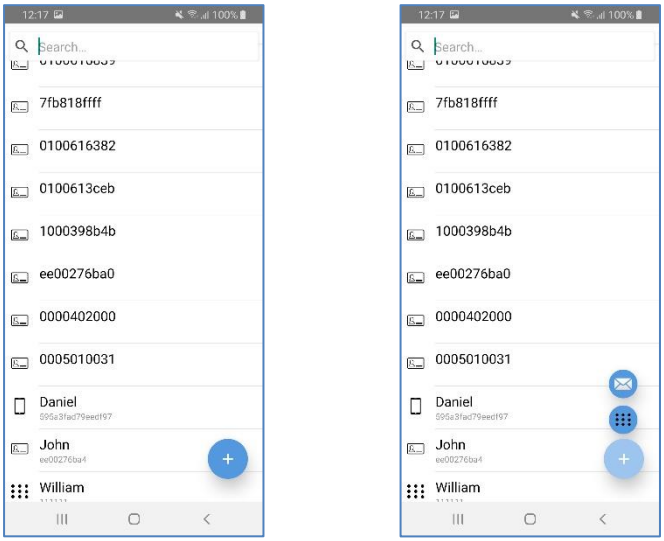
“Working hours” – Night/Day mode automatic switch schedule. Panel is in day mode inside period of time set and in night mode outside it. Manual switch by passing ID with appropriate option between Night and Day modes possible only if automatic change mode is Off.

Panel starts to beep every second in one minute before automatic switch into the Night mode and beeps 2 times every second in 20 seconds before switch.



Press ◁ ("Back") to exit “Settings” menu

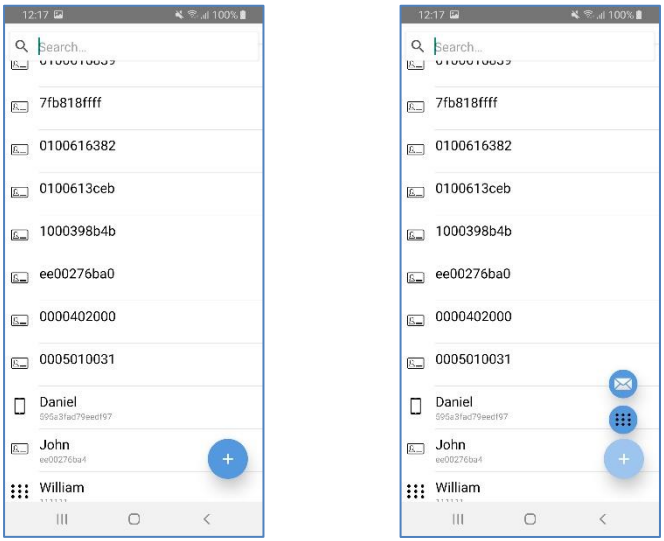
‘Access’ menu item contains the list of codes, enrolled in panel



Each list entry contains:

- Access type: day – white background, day and night – orange background, or without access – white background
- Code name or numeric value of the code if name was not set
- Type of ID: keypad code, RF ID or mobile ID

To remove code from the list, swipe it from right to left. Element marks as removed. To restore it press "Cancel".

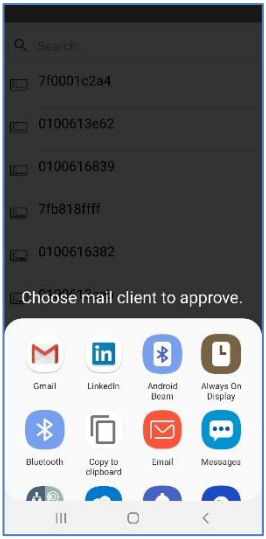


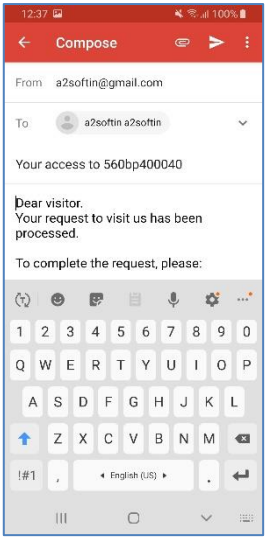
To enroll new RF ID pass RF ID to the reader. This action adds RF ID to the list of ID's with default settings.

To enroll new keypad code enter it from the keypad finalizing with [#] key. This action adds RF ID to the list of ID's with default settings.

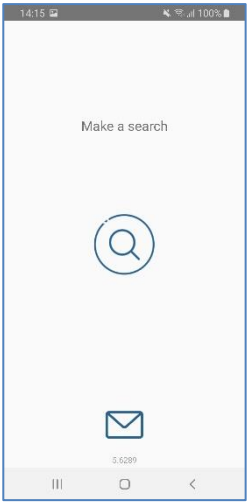
To enroll new code manually press Add button ('+'), and then "Code", enter code, its name and code parameters. Press 'Apply' to save changes.

To enroll new mobile ID press Add button ('+'), and then Mobile ID by e-mail. Enter the visitor's email address and select the e-mail program - will be formed invitation letter. Click "Send"

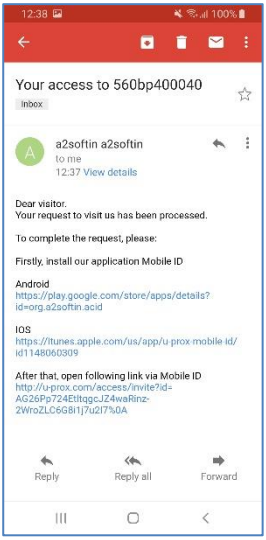


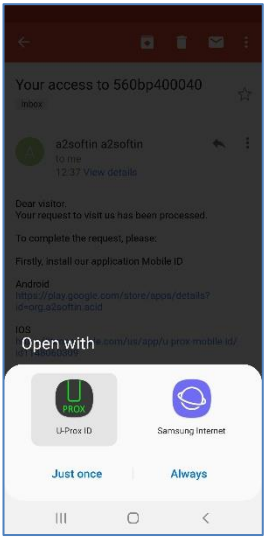


You can send invitation from the application's start page

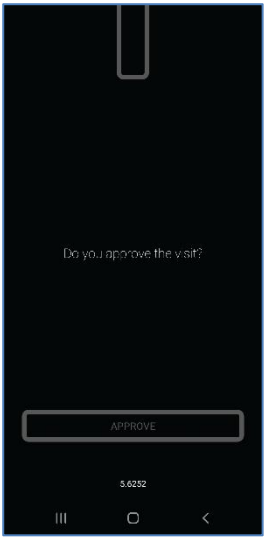


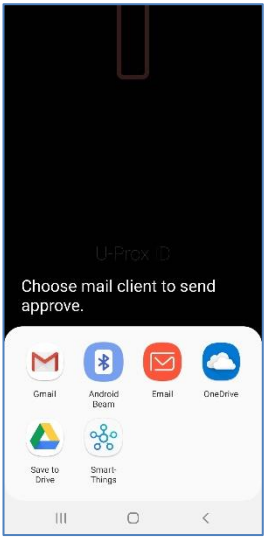
Click on the link - depending on the settings of smartfone you will be offered to open the link in the U-Prox ID application or in the browser.

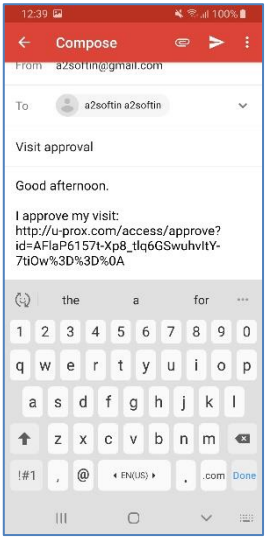




The U-Prox ID application will automatically start, asking you to confirm the visit. Click the button and select the mail program. Send e-mail back to the person who sent you Invitation

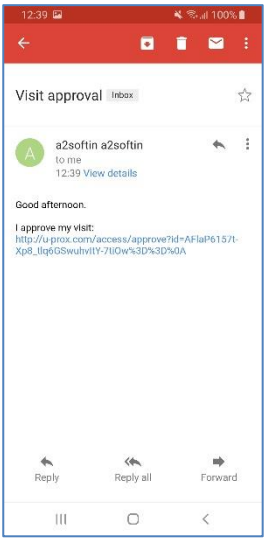


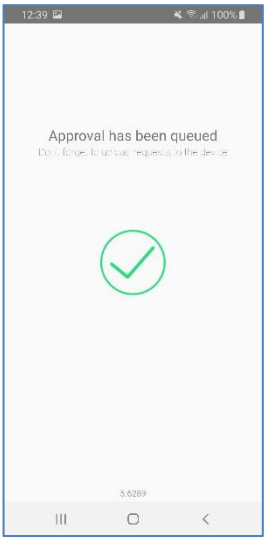




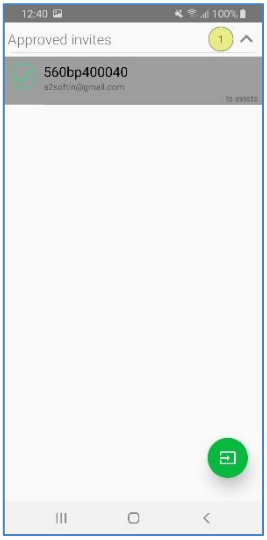
Installer will receive e-mail containing a link to activate access. Click on the link - depending on the settings of smartfone you will be offered to open the link in the

U-Prox Config application or in the browser.The U-Prox Config application will automatically start.

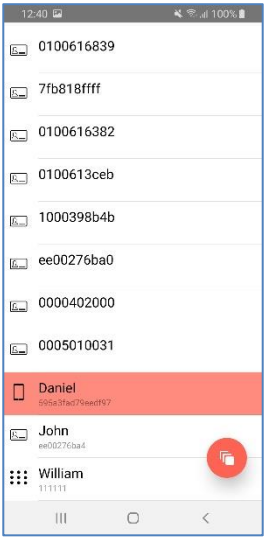




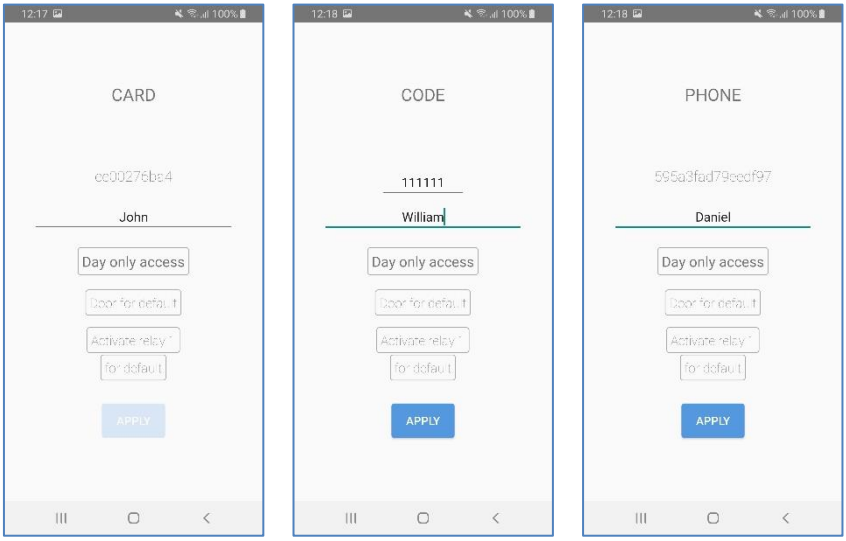
After downloading the confirmations, connect to the controller and process the confirmations. Go to the menu item "Access" and select "Approved invites". A confirmation list will open.



Click - Mobile IDs will move to the general list.

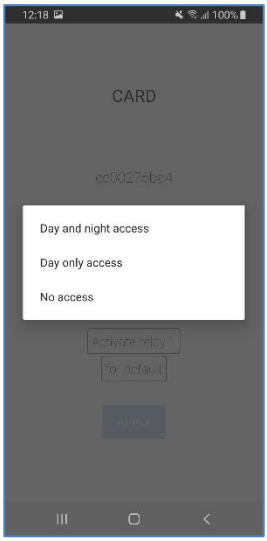


To change settings for code select it in the list (nap it). The settings window will open. Change card name and settings. Press ‘Apply’ to save the changes.

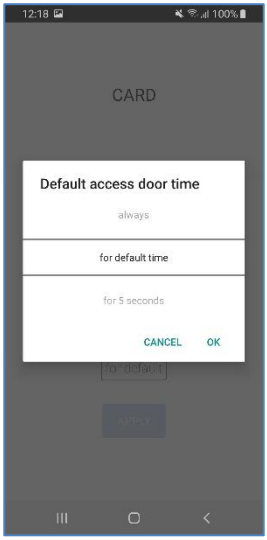


It is possible to set personally for each identifier:

- access type



- Door open duration after the grant of access



- action type after the ID pass

- Relay activation duration (if relay selected in item above)

Press “Apply” button to save changes.

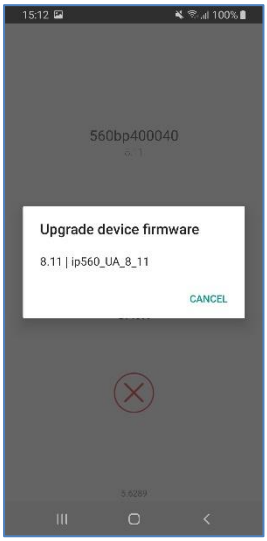
To change settings for several ids select the first of the identifiers in the list, click on it and hold until it is highlighted in color. Select other identifiers. Next, click - the settings window will open. Change cards settings.

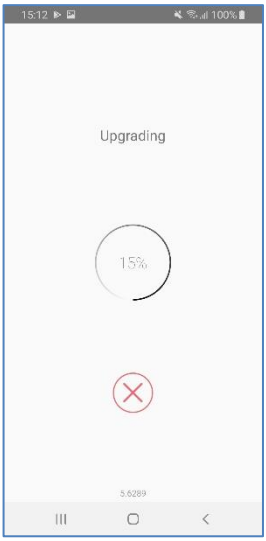
Press ‘Apply’ to save the changes.
Press ◁ ("Back") button to exit “Access” menu item

To view the event log use “Log” menu item:

Press .button to export log.
Press ◁ ("Back") button to exit “Log” menu item

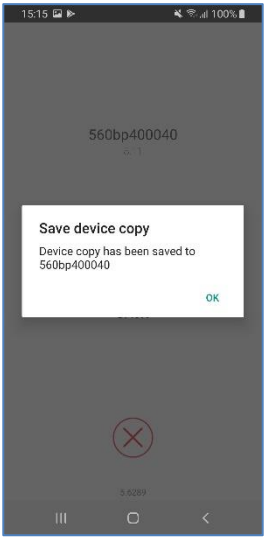
Use "Upgrade" menu item from advanced options to upgrade panel firmware.
The list of available files in *bin format displayed after this item selected. Firmware upgrade process will start after desired file selection.



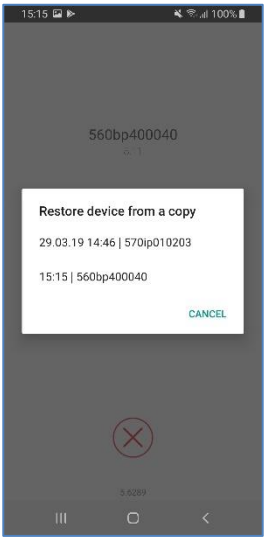


Attention!!! All files with firmware must store in "Download" folder in main mobile device memory.

Panel settings save and restore available from "Save" and "Restore" menu items of the advanced options.
All settings saved into the file with *.eep extension in Download folder in main memory of the mobile device.



The list of available files with settings will display after “Restore” menu item selection. Select one of them to restore settings into the panel.

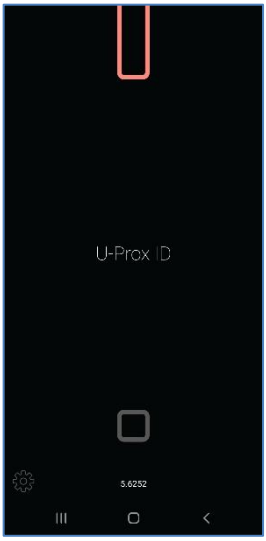


Mobile ID

Download and install U-Prox Mobile ID application.

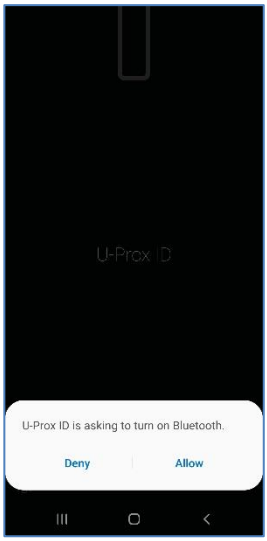
Mobile devices with Android 5.0 OS and higher, Apple 8.0 IOS and higher supported. Device must have Bluetooth 4.0 and higher with BLE (Bluetooth Low Energy) support.

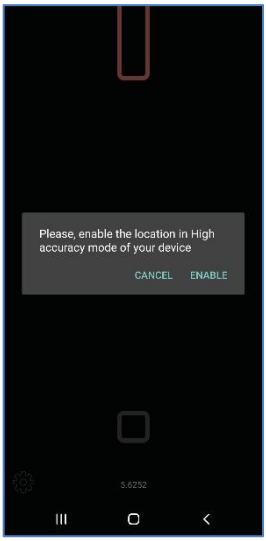
Run U-Prox ID application.



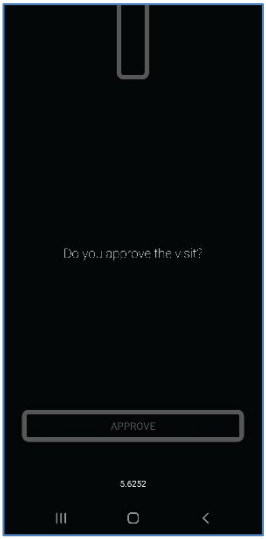
Press ☐ button in application –will exchange data with application. If Bluetooth is not activated on your device application will request for activation, press 'OK'

Attention! The location services must be ON in Android 6.0 and higher for Smart Bluetooth operation

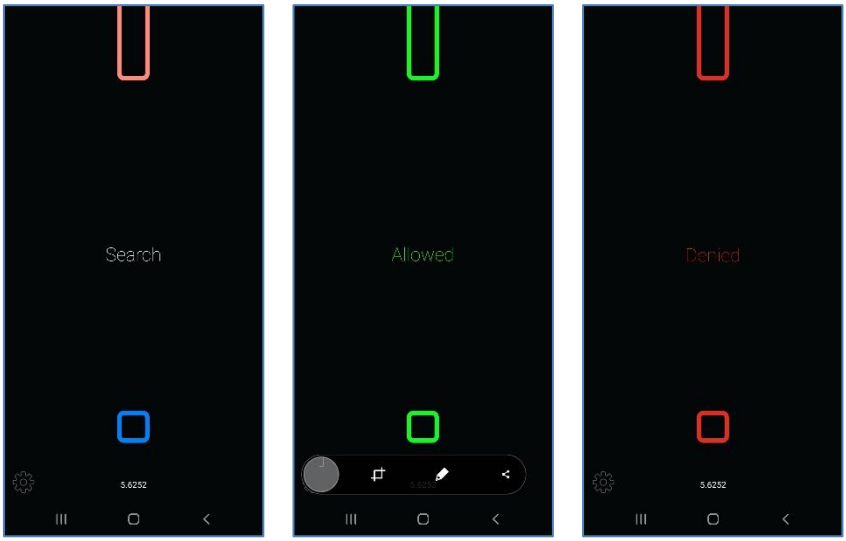




Attention! Button in application will be inactive until any invitation for access is received and confirmed.



Panel will grant access if code where enrolled in it and have correct access rights. Panel and application indication will change.



In system operation mode

Panel controls one door with one or two access points. Access point may be in one of four operation modes: **"Normal"**, **"Alarm"**, **"Blocked"** or **"Free pass"**. **"Free pass"** mode has highest priority followed by **"Blocked"**, **"Alarm"** and **"Normal"** in range of priority decrease.

"Normal" mode

Normal mode is the main panel mode. Panel grants or denies access to cardholders in this mode.

Reader LEDs blink red in normal mode.

Entry/exit on ID pass

To enter the room user passes RF ID to the reader. If RF ID enrolled and entry at the time of pass allowed, panel grants access and opens door with actuator. Reader LED lights Green.

Entry/exit on ID pass and PIN code

After RF ID pass panel checks PIN entry necessity and if it is reader LED starts to blink Amber. It means that panel waits for PIN entry. Panel grants access and opens door with actuator after correct PIN entry. Reader LED lights Green.

Exit on RTE button press

To exit from the room with single-sided door or to open door remotely for somebody press Request to Exit button. Door opens (i.e. actuator powered) after press with subsequent depress of the Request to Exit button, reader LED lights Green.

Access deny on RF ID pass

Access may be denied to RF ID holder for reasons as follows (LED lights Red):

- panel was not downloaded (LED not lights);
- RF ID was not enrolled in the panel (for 1 second sounds the buzzer and LED lights Red);
- RF ID term of use expired (for 1 second sounds the buzzer and LED lights Red);
- access denied at that time and date (for 1 second sounds the buzzer and LED lights Red);
- at attempt to pass twice in one direction through the door with "antipassback" function ON (for 1 second sounds the buzzer and LED lights Red);
- RF ID, marked as 'Lost' or 'Blocked' passed (for 1 second sounds the buzzer and LED lights Red);
- panel is in 'Alarm' mode(for 1 second sounds the buzzer and LED lights Red);
- panel is in 'Blocked' mode(for 1 second sounds the buzzer and LED lights Red);
- the temporary RF ID is not valid yet (for 1 second sounds the buzzer and LED lights Red);
- passage counter expired for temporary (visitors') RF ID (for 1 second sounds the buzzer and LED lights Red);

"Alarm" mode

Readers' LEDs light Red continuously in this mode. Access point switches into the "Alarm" operation mode in case of: door force open, panel enclosure open, RF ID,

marked as 'Lost' pass, door is open too long and on code matching attempt if last option selected.

Panel activates outputs set as 'Alarm' and 'Bell' in "Alarm" mode. 'Alarm' output lasts active during "Alarm" mode. 'Bell' output duration is programmable. Access point is blocked for entry if it is in "Alarm" mode. One can open the door with RTE button.

To exit from "Alarm" mode pass RF ID with 'Alarm cancel' flag ON or send corresponding command from the system server.

"Free pass" mode

It is necessary to open the doors for free personnel pass in case of fire, earthquake, water flow and other emergencies. Panel has "Free pass" mode for this case.

Reader LED alter Green and Amber in "Free pass" mode.

Command from system server or 'Free Pass' input violation may switch access point into "Free Pass mode". Access Point lasts in "Free Pass" mode until 'Free Pass' input violated or cancelation command received from system server. Command from system server cannot cancel "Free Pass" mode until 'Free Pass' input restore.

Panel provides "Free Pass" mode setting for access point A or for access point B or for both A and B access points.

All time long while panel is in "Free Pass" mode, it keeps lock opened, fixes RF ID passes and code entries saving in the event memory, and sending to the system server 'access granted' events, independently on the antipassback, access rights, e. t. c. settings and state. This information used for supervision of personnel presence in premises in case of emergency.

"Blocking" mode

Panel may block access point for all users in critical alarm situations. Only users with ID's with 'Security service' flag may open the door. RTE press doesn't affect the door in this mode.

Reader's LEDs blink Red and Amber alternately.

Command from system server or 'Blocking' input violation may switch access point into "Blocking" mode. Access Point lasts in "Blocking" mode until 'Blocking' input violated or cancelation command received from system server. Command from system server cannot cancel "Blocking" mode until 'Blocking' input restore.

Panel provides "Blocking" mode setting for access point A or for access point B or for both A and B access points

RF ID properties

Code (digital card code)

Each RF ID (card) has its unique code, assigned during its manufacturing. Code length is 10 hexadecimal digits.

PIN-Code

Additional code associated with the card. PIN length is six or less decimal digits. For use on access points, equipped with readers with keypad.

User must enter PIN-code and press [#] key after the card pass. Panel grants access after correct PIN-code entry. Panel will emit warning sound, log "Wrong PIN-code" event and deny access on wrong PIN-code entry.

Card expiry date

Date of card validity expiration.

Alarm cancellation

Panel logs 'Alarm state cancelation' event and changes state to "Normal" on card pass with 'Alarm cancellation' flag. Panel will not cancel "Alarm" state and will log "Access denied. Alarm state." on card without 'Alarm cancellation' flag passed.

Security service

'Security service' flag allows card to enter blocked door.

Panel logs 'Access denied. Door blocked.' event if card without 'Security service' flag passed to the reader of the blocked door. Panel logs 'Access granted. Door blocked.' event if card with 'Security service' flag passed to the reader of the blocked door.

Antipassback disabled

'Antipassback disabled' flag gives right to move freely in any direction through the door with antipassback to the user with this card. Panel grants access to the card with this flag based on card access rights independently on card position (previous door pass direction).

VIP

User with card with 'VIP' flag can open any doo at any time, except the door in the blocked state.

Card with this card may have any schedule, the antipassback state doesn't influence it, card has no expiry term. Card with this flag may have PIN-code.

Panel doesn't grant access to card with this flag, if door is in 'Blocking' mode.

Variants of Use and modes of output

One can program all panel outputs freely for any function: **lock, bell, alarm, programmable output**. Besides this any output programmed for one of **output operation modes**: **start-stop** (output lasts active while some command or panel mode active. For instance, panel is in "Alarm" mode), **pulse** (output is active for programmed time), **trigger** (subsequent activation commands alter output state), **continuous**.

The communicator

U-Prox IP560 panel operates automatically - after downloading data from the server, it processes the card passed according to its access rights, grants or denies access and sends event messages to the ACS server.

U-Prox IP560 panel communicates to the access control system server using ISM band radio interface via U-Prox IC L receiver and U-Prox HE and U-Prox HW repeaters.

Panel communicator operates in the notification mode. Panel sends event report message to ACS server on each new event. The backward commands from access control system received with acknowledgments to event messages or periodic test signals.

Periodic test signals used for communications supervision. Test messages transmitted every two (2) seconds. The backward commands from access control system received with acknowledgments to event messages or periodic test signals.

Panel provides encryption protection of the data and commands with 256 bit key and protection against panel substitution due the unique serial number supervision.

Both local enterprise computer network operation (see Fig.3) and Internet network (see Fig.4) operation via repeaters provided. This allows the distributed systems of any scale construction.

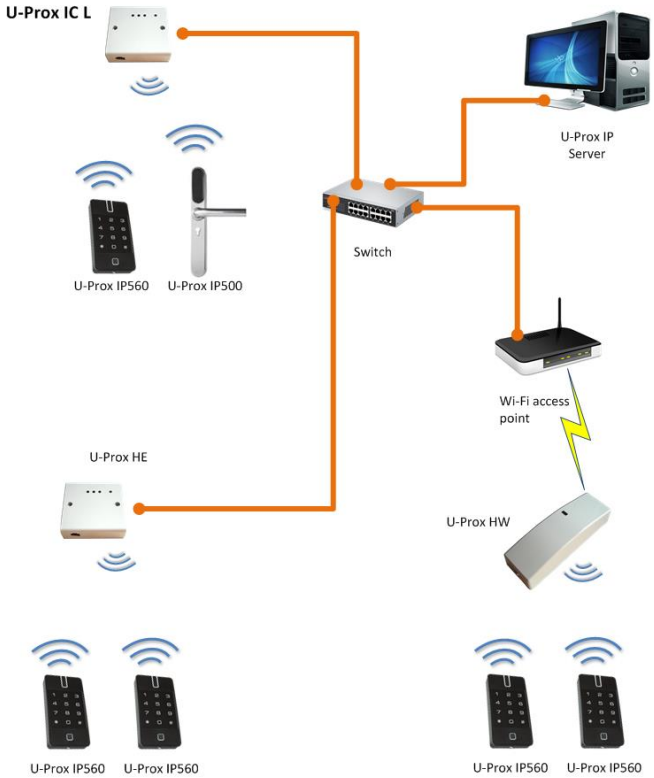


Fig. 3. An example of a local network of mixed type (Ethernet and Wi-Fi)

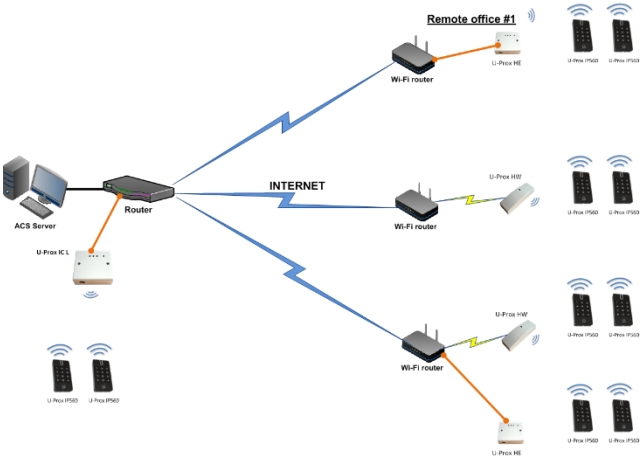


Fig. 4. An example of a distributed network

Wireless lock system architecture

The architecture of the wireless locks system has definitely hierarchic structure. All U-Prox IP560 control panels operate in the automatic mode, i.e. make decision about the access using data uploaded beforehand.

U-Prox IC L control panel routes data from the allowed U-Prox IP560 wireless panels via U-Prox HE and U-Prox HW repeaters. The U-Prox IP access control system server, U-Prox IC L, U-Prox HE and U-Prox HW communicate each other via the computer network. The U-Prox IC L, U-Prox HE and U-Prox HW communicate to the U-Prox IP560 wireless panels via the ISM band radio.

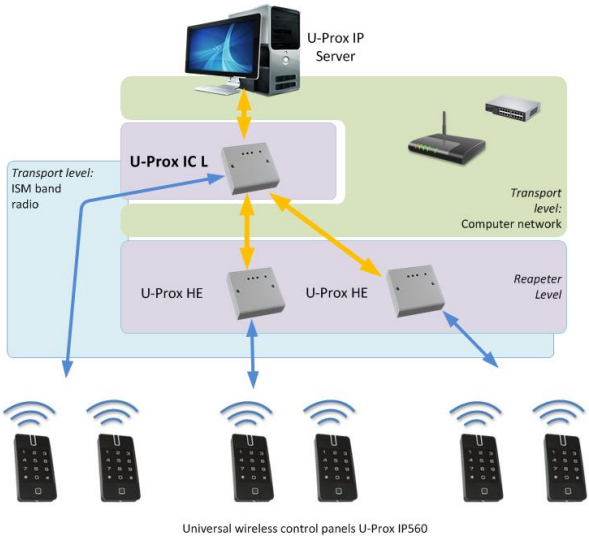


Fig. 5. Wireless lock system architecture

Wireless lock system deployment

The use of the existing computer network infrastructure, standard network protocols (DHCP for instance) allowed to provide the “plug-and-play” principle. The mode of the automatic server address configuration in the panels eases the wireless lock system deployment significantly.

The deployment is made in three steps (see Fig. 6.):

1. U-Prox IC L control panel connection
2. U-Prox HE repeater's connection
3. U-Prox IP560 wireless panels connection

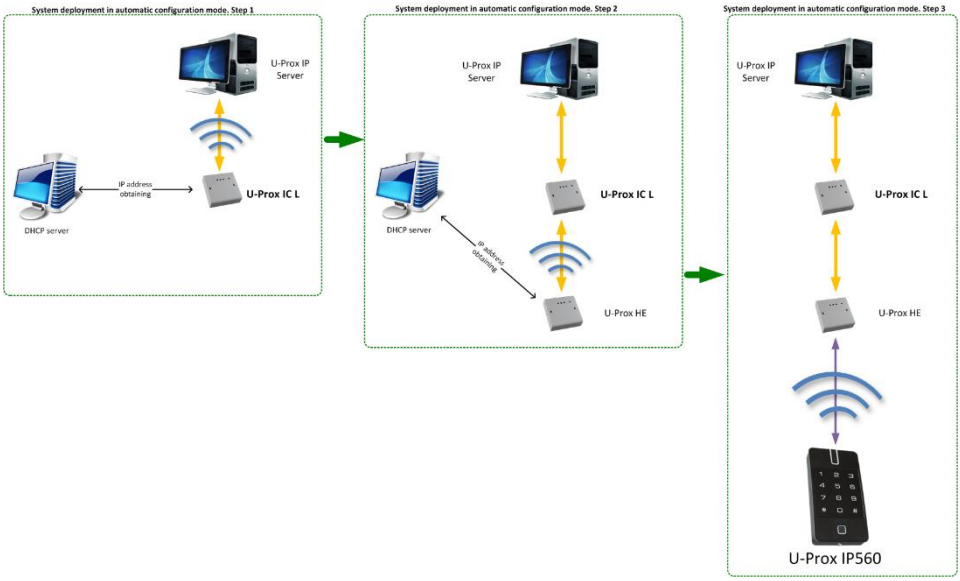


Fig. 6. Wireless lock system deployment

The algorithms for operation on each step described below.

Server addresses automatic configuration for U-Prox IC L

1. Panel checks for DHCP mode ON (panel address 0.0.0.0) or static IP
2. If DHCP mode is ON, the dynamic IP address obtain routine will start
3. The panel automatic configuration mode starts if the access control system IP address (IP or DNS name) is not set:
    a. Panel sends data packages announcing access control system server about itself as a new device in the local network

Despite it is broadcast announcement, it is limited with one range local network and active network equipment. That's why the IP addresses of the access control system server are to be set manually for networks with sophisticated topology.

b. The system will warn operator after the receiving of the data package from the new panel. Than operator must add panel to the system database (DB).
c. After the panel added to the DB it receives the answer from the access control system server. The address of the access control system server recorded into the control panel and it stops to broadcast.
d. Operator has to upload panel after it's adjustment recorded into the DB. Panel will be connected to the certain access control system server, eliminating panel control capture with another system.

Return panel to the factory settings to eliminate the panel connection to the system

e. In the case of access control system IP address change panel will initiate the automatic configuration routine, but the data exchange will be possible with previously connected system only.

U-Prox IC L addresses automatic configuration for repeaters

1. Repeater checks for DHCP mode ON (panel address 0.0.0.0) or static IP
2. If DHCP mode is ON, the dynamic IP address obtain routine will start
3. The panel automatic configuration mode starts if the U-Prox IC L panel IP address (IP or DNS name) is not set:

a. Repeater sends data packages announcing U-Prox IC L panel about itself as a new device in the local network

Despite it is broadcast announcement, it is limited with one range local network and active network equipment. That's why the IP addresses of the U-Prox IC L panel are to be set manually for networks with sophisticated topology.

b. The system will warn operator after the receiving of the data package from the new repeater through the U-Prox IC L panel. Than operator must add repeater to the system database (DB).
c. Operator has to upload U-Prox IC L panel after repeater recorded into the DB.
d. After the U-Prox IC L panel uploaded repeater it receives the answer from the U-Prox IC L panel. The address of the U-Prox IC L panel recorded into the repeater and it stops to broadcast. Panel will be connected to the certain access control system server, eliminating panel control capture with another system.

Return panel to the factory settings to eliminate the panel connection to the system

e. In the case of the U-Prox IC L panel IP address change repeater will initiate the automatic configuration routine, but the data exchange will be possible with previously connected system only.

U-Prox IP560 automatic configuration

1. U-Prox IP560 announces itself in the ISM band after the power-up
2. If U-Prox IP560 does not connected to anyone U-Prox IC L the automatic configuration mode will start:
   a. Panel will broadcast data packages announcing itself as a new panel
   b. Data packages are received with U-Prox HE repeaters and send to the U-Prox IC L control panel
   c. U-Prox IC L panel sends event message to the access control system server
   d. Access control system server warns operator about the new panel. Operator must add panel to the system database
   e. Operator must upload U-Prox IC L control panel after the U-Prox IP560 panel added to the DB
   f. Operator must upload U-Prox IP560 panel after the adjustment it in the DB. U-Prox IP560 panel will be connected to the certain access control system, eliminating panel control capture with another system.

Return panel to the factory settings to eliminate the panel connection to the system.

3. U-Prox IP560 returns to the normal operation mode.

How to work with the device

Panel placed into the small plastic enclosure. Dimensions are on the Fig. 7.

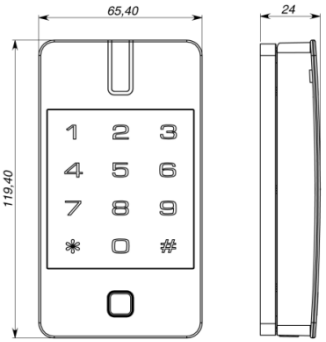


Fig. 7 Dimensions

Installation recommendations

1. Prepare the place of panel mount – mark and drill holes:
   a. Loosen the screw at the bottom of panel
   b. Take of cower, disconnect the cable from base.
   c. Mark the holes position on the place of mount, using base as template. Drill two holes 5 mm in diameter and 30 mm depth.
2. Run cable from the power supply
3. Run cable from the actuator (lock)
4. Install external reader and run its cables
5. Proceed Door Contact and RTE wiring
6. Connect all wires from power supply, lock, reader, door contact and RTE according to the paragraphs below.
7. Place the installation cables in the wall
8. Place and fix base, connect the cower with connection cable, close and fix it with screw.
9. Turn ON desired (standalone or in system mode)
10. If panel is in **standalone mode**, adjust and download settings with mobile application.
11. If panel is in **in system mode**, connect it with system server and adjust it from system server.
12. Panel is ready for work

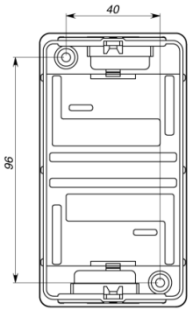


Fig 8. Back plate

Installing Panel

Panel should be installed on the wall next to the door for users may easily pass card to it.

Do not install panel on a metal surface, as it reduces the range of reading of built-in reader.

Power cables and other cables should not be located less than 0.1 m from the panel enclosure.

Cables may run both from the to and from bottom of the panel.

If the second reader is used, it must be at least 20 cm from panel to eliminate the effect of double reading.

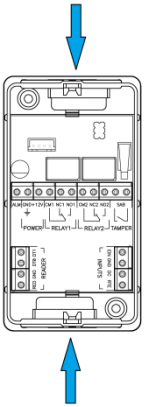


Fig. 9. Cable run

Connecting an external reader

The panel has a port for external readers. Only U-Prox series reader may be used with panel as external. The connection of U-Prox Mini RF ID reader is depicted on Fig.10.

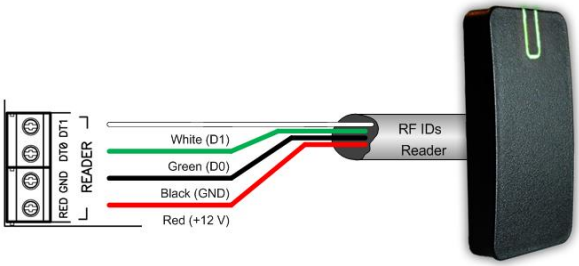


Fig.10. External reader connection

Current consumption of each external reader connected to terminals "12 V" should not exceed 100 mA. When connecting to panel a reader of long range with current consumption more than 100 mA, supply the voltage to it from the separate source.

Loops connection

Panel has two inputs for connecting the loops supervised with end of line resistors. Each input functionality programmable. Inputs' functions are:

- Door Contact
- RTE
- Door Contact + RTE
- Free pass (A, B, A+ B)
- Blocking (A, B, A +B)
- Sensors monitoring

Request to Exit button (RTE)

RTE is used for exit through single-sided door. In this case, access point opens when you press and release RTE. Use this input type for remote door opening button connection also. For example, to open the door manually, by the secretary or security guard.

The example of normally open contact RTE button connection to RTE terminal is on the Fig 11.

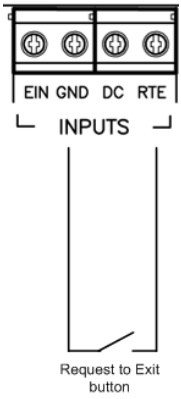


Fig. 11. RTE button connection

For proper operation, it is necessary to assign the connected loops as RTE when programming.

The use of button of the electric lock to open access point or "allow access" button on the turnstile evokes the "DOOR FORCED OPEN" event.

Door Contact

Control panel supervises the door state or position of the turnstile rotor wit the door contact. Panel cannot detect unauthorized access or door is open too long (multiple entrance with one ID for instance) without the Door Contact.

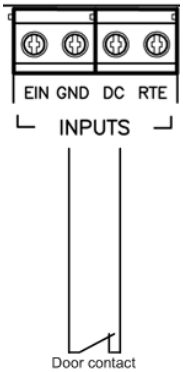


Fig. 12. Door contact connection

The example of normally closed door contact connection to DC terminal is on the Fig.12:

Access point, controlled by ACS, must have the door closer.

Program input as 'Door Contact' for proper operation of the door contact.

The control panel can operate without the door contact. In this case, after the passing RF ID for identify and granting access, an event "Access granted" is generated, the control panel send unlocking impulse, and returns to normal mode after door time expire.

Actuators

Panel has two relays to supervise actuators. Using outputs, panel controls electric locks or latches, operation of the barrier, or turns on any optional hardware.

Relays normally closed and normally open contacts. The relay contacts rating is 3A @ 24 V.

Do not use diodes with actuators connected to the source of alternate voltage.

Voltage ripple at actuator operation must not cause the panel malfunction. In case of such malfunction power up actuators from alternate power supply.

Electric locks

Normally closed and normally open relay contacts, are programmable for a wide range (0 ... 255 sec) of lock operation time. Panel controls electric lock or latch, barrier operation, turnstile, or turns on and off any optional hardware with this output.

When the lock time is equal to 0 pulse duration of 200 ms will sent to relay.

The example of actuator connection is on the Fig. 13. The first is powering the lock and second by depowering.

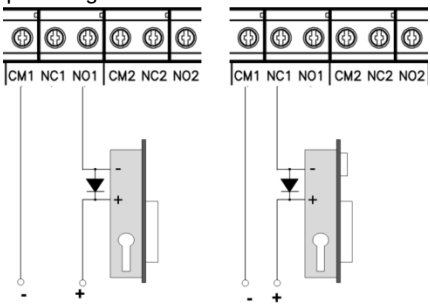


Fig. 13. Locks connection

When using relay to turn on / off current via inductive load, for example, to run electromagnetic lock, there are electric pulses of high amplitude. To prevent damage of relay contacts, shunt inductive load by diode, set in opposite direction to voltage of coil supply

Remember, that low-cost solenoid latch does not allow long power supply. For these latches program the lock time as short as possible to prevent coil overheating.

Do not use diodes with actuators connected to the source of alternate voltage.

Assign relay outputs as outputs of locks at panel programming for proper operation.

Bells

Bell (see Fig. 14.) is inductive load for power source, use protection diode, connecting it to direct current source (see warning about inductive load above).

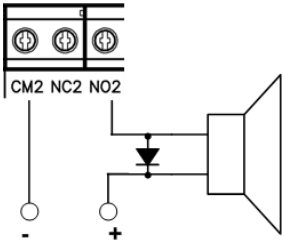


Fig. 14. Bell connection

Study bell instruction manual thoroughly before its connection. Consumption of the bell must not exceed 3 A.

Consult your supplier before connection of actuators (magnetic starters, turnstiles barriers etc.)

Program relay output, driving bell to 'Bell' type for its correct operation.

Alarm output

Alarm output is open collector. ALM shorts to GND when output is active. You may connect alarm output for connection to the alarm system or actuator with less than 60 mA consumption.

Alarm output is active during 'Alarm' mode.

Panel programming sequence

Software	Actions
	1. Define the panel operation mode: standalone or in system
Standalone mode: Adjustment via Smart Blue Tooth	1. Adjusting panel from mobile application: a. Entry/exit duration adjustment b. Reader adjustment: reader type: ASK, FSK, 26 0r 42 bit c. Outputs adjustment: type and durations 2. Enroll RF IDs and edit users with their access categories. 3. Panel is ready for use after download.
In system mode: Access control system server software	1. Connection and enrollment of the device in ACS (see ACS manual) 2. Panel adjustment with ACS system a. Door adjustment: single sided or double sided, antipassback operation mode, PIN entry duration (or OFF) b. Access points adjustment: Reader number, Entry/exit duration, 'No alarm at door force open', 'No alarm at door open too long' flags c. Readers adjustment: reader type 26 or 42 bits d. Panel inputs adjustment: input type and access point (for example, Door contact, access point A and B; or free pass, access point B). e. Panel outputs adjustment: output type (lock, bell etc.), operation mode, access point, activity duration (if applicable to type), controlling input. 3. Create list of users with ACS, containing IDs' with options, schedules of access rules for exact access points (see ACS manual) 4. Panel is ready for use after download.

Maintenance

Factory reset (before installation)

To return panel to the factory settings, perform the following steps:

1. Depower the panel
2. Remove top cover of panel
3. Short ALM and EIN terminals
4. Power up
5. Wait for six beeps, signaling the successful panel reset
6. Disconnect panel and remove short from ALM and EIN terminals
7.

Switching to programming mode (standalone mode)

To put panel in programming mode, do the following:

1. Enter **engineer's code** from keypad – all programming functions will be available or enter **master code** from keypad – user list edit will be available only
2. Connect to the panel with mobile application

Switch to the standalone mode

To switch into the standalone mode, proceed:

1. Depower panel
2. Remove the top cover of panel, leaving connected cable running to the bottom board
3. Short ALM and DC terminals
4. Power up panel
5. Wait for tree short and one long beep, signaling the successful panel switch into the standalone mode
6. Depower panel and remove short from ALM and DC terminals

Switch to the in system mode

To switch into the in system mode, proceed:

1. Depower panel
2. Remove the top cover of panel, leaving connected cable running to the bottom board
3. Short ALM and RTE terminals
4. Power up panel
5. Wait for tree short long beeps, signaling the successful panel switch into the standalone mode
6. Depower panel and remove short from ALM and RTE terminals

Factory settings

Mode - standalone
Master code – 1234
Engineers code - 5678
Entry/exit duration – 20 seconds,
Code matching blocking duration – 40 seconds
Inputs: RTE – ‘day and night’ mode, EIN - disabled
Outputs: Relay #1 – 3 seconds, Relay #2 – 3 seconds, ALM (alarm) – 10 seconds
Readers: full code read (42bit), ASK.

Terms

Identifiers

In access control systems each user has a unique RF ID. Identifiers can take the form of a plastic card, key FOB etc.

Reader

The information on the identifiers is read with READERS, connected to the ACS control panel. There are several types of RF IDs and readers for them. It is essential that reader and control panel use the same interface. Only U-Prox series readers may be connected to the U-Prox IP 100 control panel.

PIN (Personal Identification Number)

Some readers have built-in keypad. Keypads may be used for PIN entering. It can be both self-dependent or used as an additional code to user RF ID. When PIN is programmed as additional code, reader waits for PIN entering after RF ID is read-out.

Access point

Access point is a logical concept of the access control system implying control of passing through a door in one direction. It consists of reader, access control panel (or its part), door supervision devices (like door contact, RTE button etc.) and door locking device. For instance, the turnstile with two-way passes has two Access points – one for entrance and the other one for exit, door of this type is called double-sided door. A door with a reader on one side has only one Access point – Entry point, and it is called single-sided door\

Direction of passage

Passageway - is a logical unit of ACS, controlling passage through the access point in one direction. It includes reader, access control panel (or part of access control panel), actuator. So, tourniquet with double-sided control has two passageways, and the door, having single-sided reader - only one passageway. Access point, which consists of two passageways, is called double-sided, and the point of access, which consists of one direction of passage - single- sided.

RTE (request to exit)

To exit from the premises with a single-sided door, a button wired to control panel is used. This button is called RTE (request to exit) button. If someone opens a door otherwise than pressing RTE button – by re-energizing locking device, opening lock with a key etc., "Door Forced Open" event arises. RTE button may be used for remote door opening as well.

Door Contact

A properly designed ACS has to supervise door status (opened or closed): magnetic door sensor, sensor of the turnstile rotor position, inductive sensor of the road barrier, etc. This ensured that the system prevents situations when several users access the door with one RF ID or door left open after user's access and so on.

For these purposes the magnetic door sensor, the turnstile rotor position sensor and the position sensor of boom barrier are connected to the input of panel. The input used to connect the sensors, is called the input of the door contact.

Antipassback

Antipassback function is implemented in access control panels to prevent the situation when user gives his RF ID to another person after passing into the premises. If this

function is on, control panel tracks an RF ID position – inside or outside the premises. On any attempt to pass in the same direction twice the panel denies access and stores "Access Denied, Antipassback" event into the Log.

Antipassback function can be set on only in case of the double-sided door control.

Door time

If door sensor is open, corresponding access point goes into alarm. Alarm is not invoked, if contact is opened during Door Time interval. This interval starts when access is granted and lasts for the programmed time or terminates on opening and subsequent closing of door contact.

Code matching attempt

Control panels can activate alarm on attempt of a code (or RF ID) matching. Code matching is considered when invalid code (or RF ID) is entered several times successively. Valid code entering clears the counter. This function switching On and number of code entrances are subjects of programming.

Schedules

Date and time of valid access are indicated when setting user access rights. Control panel stores up to 250 time zones.

250 week schedules can be combined from these time zones.

Moreover, control panel can store up to 250 holidays, which happen once a year.

Time zones

Time zones are a part of schedule. This is a way to organize a range of days and times and associate it with access levels.

Time zones are utilized by the application to validate, authorize, or perform various functions based on schedules.

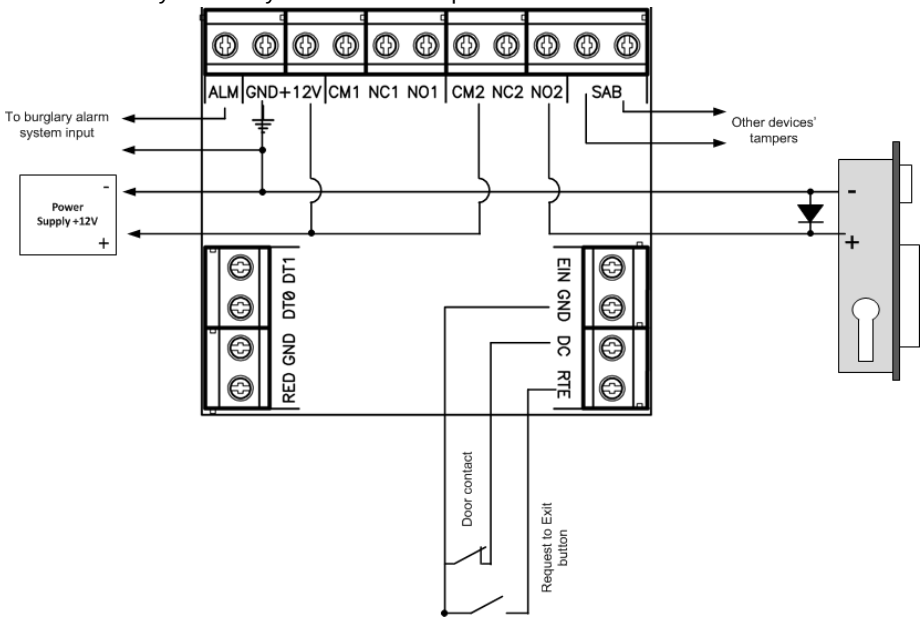
Downloading

Control panel is to be downloaded after all parameters are set – modes of inputs, outputs, access rights and others. During downloading parameters are rewritten into access control panel.

Annex A. Examples of use of panel in standalone mode

Access control

Use U-Prox IP560 panel for access control into one room.
Connection schema is on the Figure below.
Relay #2 commutates power on lock in this application.
The connection of lock closed when depowered shown. Connect positive contact of lock to 'NC2' terminal, if lock closed when powered used.
You may use Relay #1 contacts for optional devices control.



Panel settings example.

Alarm output duration: 10 seconds
Keypad blocking time: 40 seconds
Engineer's code: 1234 Master code: 5678
User code #1: 2 2 2 2, code type 4 (active, day, user can't change own code), controls relay #2, Entry/exit duration 30 seconds.
User code #2: 3 3 3 3, code type 4 (active, day, user can't change own code), controls relay #2, Entry/exit duration 30 seconds.
User code #3: 4 4 4 4, code type 4 (active, day, user can't change own code), controls relay #1, Entry/exit duration 30 seconds.