



**Wireless access control panel**

# **U-Prox IP500**

**Installation and programming manual**

## About this document

This manual covers installation, adjustment and use of U-Prox IP500 (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](http://www.u-prox.com)

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**Brief description of the panel**

U-Prox IP500 panel - a device designed to control access to residential and business premises, including time of passage of and events.

Panel operates built-in reader of ASK and FSK cards.

U-Prox IP500 processes the information received from the reader, and unlocks door. The internal handle operates freely.

Panel has end-of-line supervised input for door position supervision.

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 500 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 IP500 has advanced hardware capabilities and intellectual functions to control access point (AP) and reader in the U-Prox access control system. U-Prox IP500 has enough non-volatile memory to store access database for 3,000 users and up to 6,000 events.

**Intended use**

Panel U-Prox IP500 is designed for operation in access control systems (ACS) of diverse scale in small offices as well as on large enterprises. Panels are incorporated in ACS via ISM band radio and computer network Ethernet or wireless Wi-Fi.

The panel provides access to one room.

**Summary**

- Power 4 AAA alkaline batteries
- 50000 openings after battery replacement
- 2 years operation after battery replacement
- Built-in ASK and FSK reader
- Direct operation with U-Prox IC L panel
  - ISM band device with bi-directional communication
    - ITU Region 1 (EU): 868.0-868.6 MHz
    - ITU Region 2 (USA): 902.5-914.5 MHz
    - ITU Region 3 (AUS): 915.5-927.5 MHz
  - Guaranteed range 6 - 20 m
  - U-Prox HE and U-Prox HW repeaters for range extension
- One end-of-line resistor supervised input
- Request-to-exit on inner door handle
- Adjusted with U-Prox IP software
- Real-time clock
- Non-volatile memory:

IDs	3000
Permanent	1000
Temporary	2000
Events	6000
Time zones	250
Weekly schedules	250
Holidays	250

- Temperature range: 0 - +55 °C at 80% relative humidity.
- Maximum relative humidity 80% without condensation

## **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 or built-in to the ACS control panel. U-Prox IP500 has built-in reader.

### **Access point (AP)**

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 unlock the door and exit from the premises turn the inside handle. Opening the door with the key or the cylinder handle generates an event FORCED ENTRY (if the door contact is connected).

### **Door contact**

Properly designed ACS is used to supervise door status (opened or closed), such as 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 sensor of door closing, position sensor of the turnstile rotor and the position sensor of boom barrier are connected to the input of access control panel. The input used to connect these sensors, is called the input of sensor of passage (or Door Contact)

### **Door time**

If door sensor is open, corresponding access point goes into "Alarm" mode (refer to "Alarm» mode below). 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.

### **Schedules**

Date and time of valid access are indicated when setting user access rights.

Depending on modification, 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.

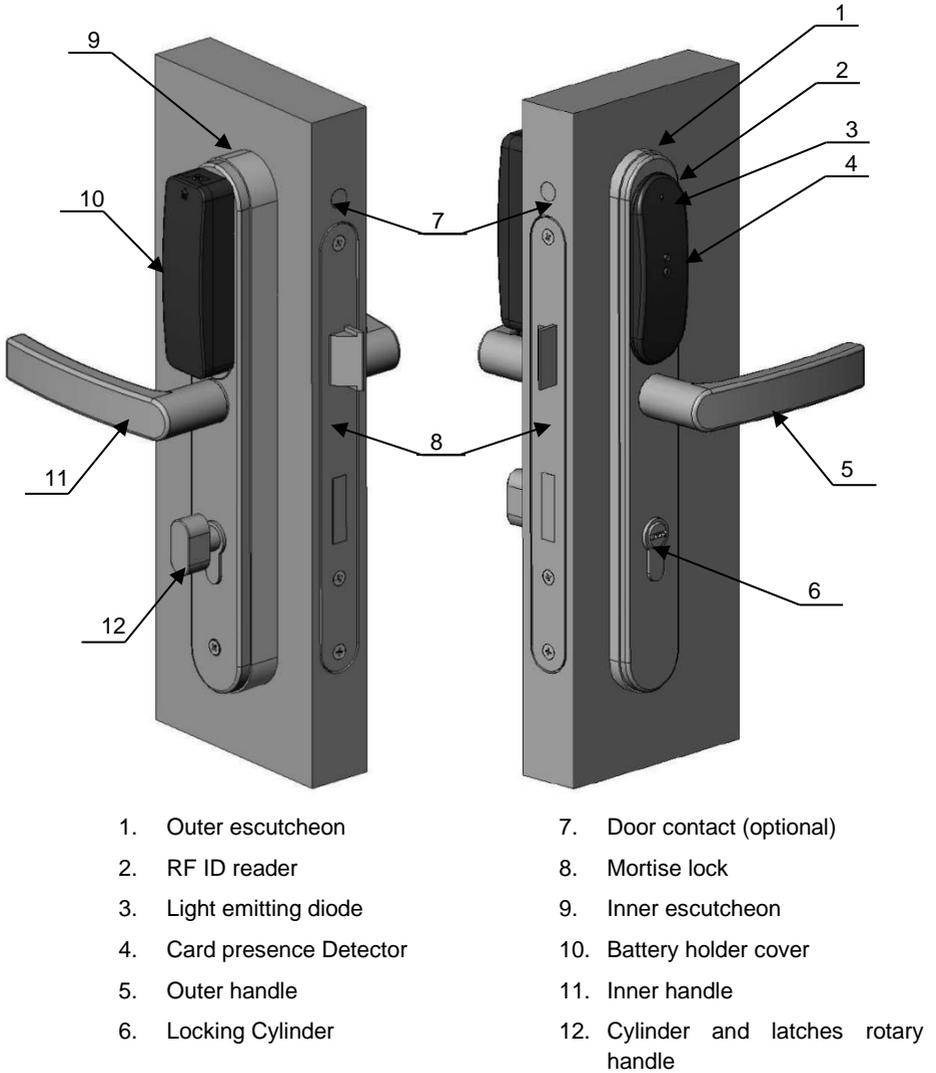
Time zones are utilized by the application to validate, authorize, or perform various functions based on schedules.

### **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.

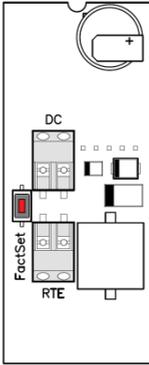
**Description and operation****Panel**

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



**Fig. 1.** U-Prox IP500 panel installed on the door

**Assignment of the access control panel contacts**

Name	Assignment	
RTE	Request-to-exit detector on the handle	
DC	Door Contact for door position supervision	
FactSet	Return to factory setting button	

**Fig. 2.** U-Prox IP500 board

**Sound and light panel indication is on reader light emitting diode (LED) of reader**  
**Siren sound and LED blinks reds on identifier presentation** – low battery, replace

**Long beep and LED lights red constantly** – access denied

**Short beep and LED lights green constantly** – access granted

**One beep and LED alters green and yellow light** – free pass mode

**One beep and LED blinks red** – door blocked mode

**Three beeps and LED blinks red** – panel download in progress

**Tapping sound signals** - within range of infrared sensor entered obstacle.

**Siren sound and LED blinks reds sounds** - within range of the infrared sensor obstacle is more than a minute. Control panel also sent event "Reader sensor trouble"

**Panel operation**

The panels supplied unloaded with factory settings below in document. To make the panel work in access control system (ACS) you have to add it to the system using the automatic adjustment mode or manually and download the program settings from U-Prox Software.

Panel goes to mode "Normal" after downloading program settings if door contact is in normal state. Panel can supervise one access point with request-to exit operated with inner door handle. There are four different modes of access point: "Normal", "Alarm", "Blocking" and "Free pass". Mode "Free pass" has the highest priority, as this mode is activated in the event of a fire, followed by modes of "Blocking", "Alarm" and "Normal" in decreasing order of priority.

**"Normal" mode**

This is the main mode of panel. In this mode the panel grants or denies access to RF ID owners.

**Opening door with RF ID**

To open the door user passes RF ID to the reader. If RF ID is enrolled and the passage is granted, access point opens and panel will send "Access granted" event to the access control system. The reader LED becomes green.

**Exit from premises**

To exit from premises press inner door handle. Pressing the handle opens the door mechanically. Panel will send "Request-to-exit" event to the access control system.

**Access denial upon entering RF ID**

Access may be denied to RF ID owner due to the following reasons (the reader LED is red):

- Cards (RF IDs) and schedules are not loaded in the panel (light off)
- access control panel is in unloaded state
- card is not enrolled in the panel
- card term expired
- RF ID passed is out of schedule
- RF ID passed is marked as lost or blocked
- the panel is in "Alarm" mode
- the panel is in "Blocked" mode
- pass count is exhausted for the temporary card (visitor).

**"Alarm" Mode**

Depending on the programmed functions Access point goes into mode "**Alarm**" in case of unauthorized passage (Door Forced Open), opening of panel cover, entering RF ID recorded as lost, if AP is open too long (open time AP is exceeded), in case of RF ID matching attempt, opening the door with the key or the cylinder handle.

If Access point is in "Alarm mode", passage is forbidden. Access point may be opened with inner door handle .

To exit from the "Alarm" mode pass the ID with "Alarm Cancel" attribute or by command from the computer.

**"Free Pass" Mode**

There are circumstances when you need to open access points for Free pass of people, such as in the case of fire, earthquake or in other emergency. For this case, the panel has "Free Pass" mode.

In "Free Pass" Mode LED of reader flashes green and yellow on any (even not enrolled) ID passed.
--------------------------------------------------------------------------------------------------

The access point goes into "Free Pass" mode after the command of operator from the computer. The access point is in "Free Pass" mode until the command from the computer comes (command from the computer will not work).

As long as access point is in "Free Pass" mode, the lock is held in open position, the panel stores a log event "Access granted" on presentation of RF ID code regardless. It is used to control the presence of personnel on the premises in case of an emergency.

### **"Blocking" mode**

If it is necessary to deny access to Access Point to all users of the system, the panel switches into "Blocking" mode. If Access Point is in "Blocking" mode, the passage is granted only to owners of RF IDs with the mark "Security Service". Access Point may be opened by inner door handle.

Access point goes into "Blocking" mode after the operator command from the computer. Access point is in "Blocking" mode until the command from the computer.

Warning !!! Timeout on receiving command from software can be up to one period of the test signal, ie, up to 2 minutes

### **RF ID properties (cards)**

#### ***Code (RF ID card code)***

Each card has a unique code which is set at the time of its manufacture. It consists of 10 hexadecimal digits.

#### ***Validity (of Card)***

Card Validity expiration date

### **Alarm Cancel**

Passing the card to door reader, when the door is in "Alarm" state, panel registers event "Alarm cancelled" and puts the door to Normal mode. If the card that has no right to cancel the "Alarm" is passed, the door will remain in the same state. "Access denied. Alarm Status" event recorded into the log.

### ***Security Service***

Security Service mark gives the right of access to a blocked door.

When the ordinary card is passed if door is in "Blocking" Mode, "Access denied. Blocked state" event recorded. Card with attribute "Security Service" pass. If the card is valid and has access right at the moment, the panel gives access and event "Access granted. Blocked state» is registered.

### ***VIP***

Access right to pass always everywhere, except through blocked door.

VIP card may be assigned any schedule, Antipassback and validity period is NOT applied to it. The card may have PIN code

If the door is in "Blocked state", access is denied for RF ID with this attribute checked.

**The communicator**

U-Prox IP500 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.

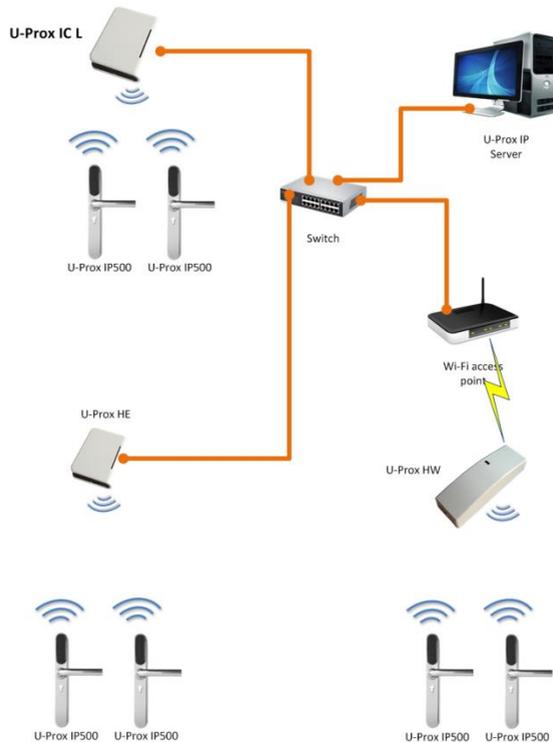
U-Prox IP500 panel communicates to the access control system server using ISM band radio interface via U-Prox IC L receiver and U-Prox HE and U-Prox HW repeaters.

Panel communicator operates in the **notification** mode. Event report message is send ACS server on each new event. The backward commands from access control system received with acknowledgments to event messages or periodic test signals repeated every 2 minutes.

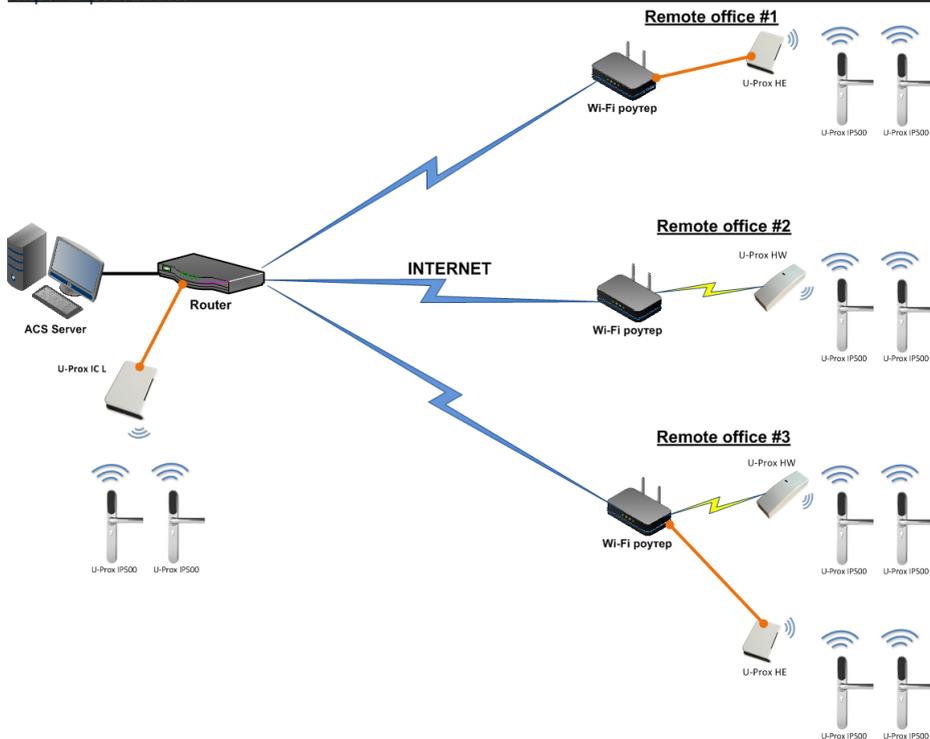
Attention!!! The delay of delivery of the operator command to U-Prox IP500 may last up to 2 minutes, i.e. the period of the test signal

Panel provides encryption protection of the data and commands with 256 bit key, unique serial number supervision and communication channel supervision with periodical test messages.

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 IP500 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 IP500 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 IP500 wireless panels via the ISM band radio.

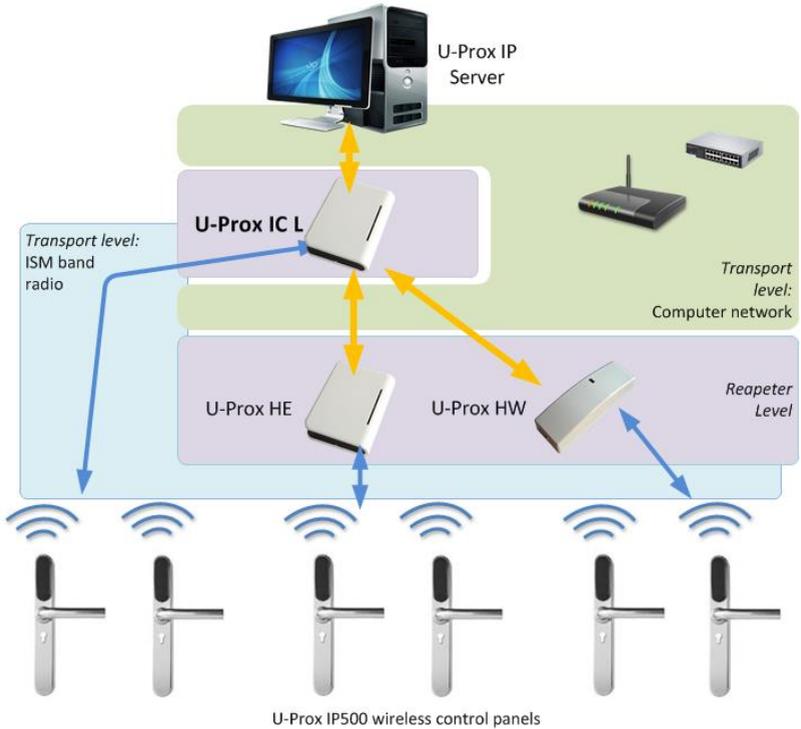


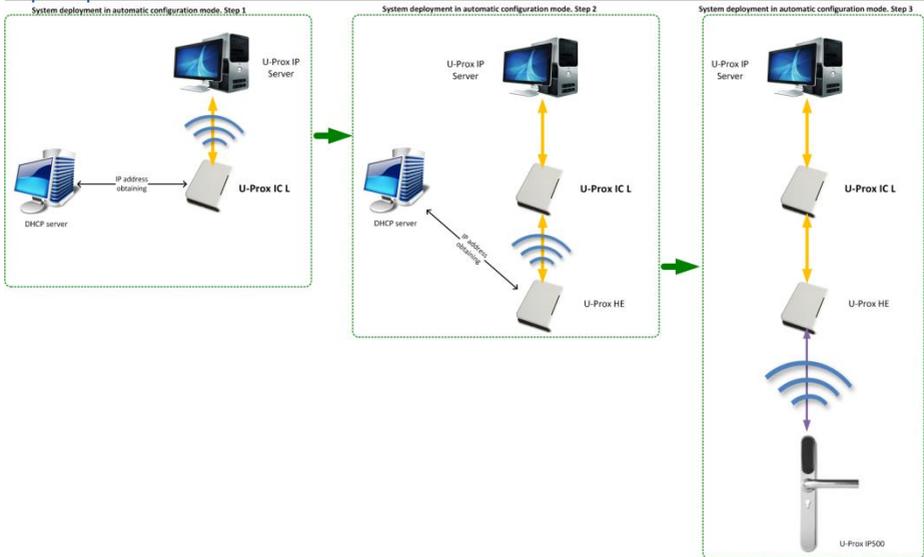
Fig. 5. Wireless lock system architecture

**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 repeaters connection
3. U-Prox IP500 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 IP500 automatic configuration**

1. U-Prox IP500 announces itself in the ISM band after the power-up
2. If U-Prox IP500 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 IP500 panel added to the DB
- f. Operator must upload U-Prox IP500 panel after the adjustment it in the DB. U-Prox IP500 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
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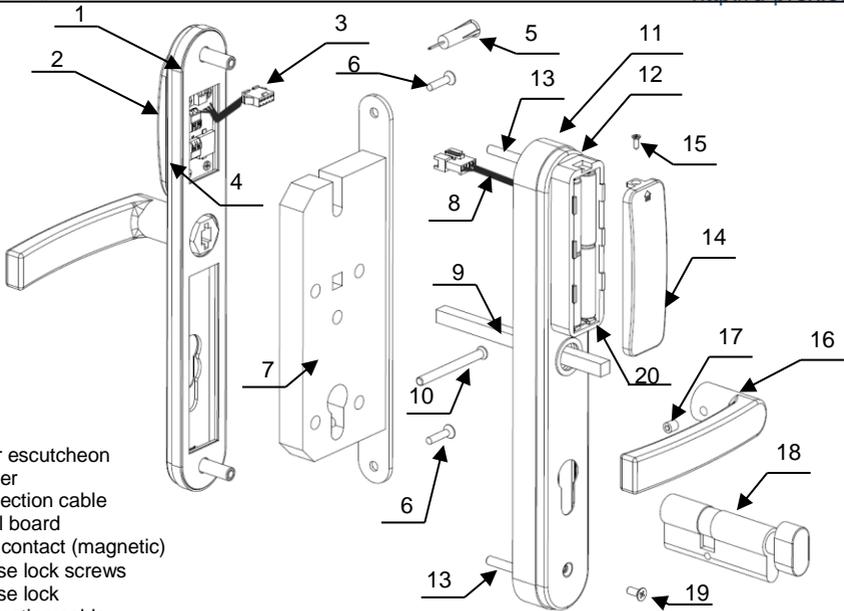
- 3. U-Prox IP500 returns to the normal operation mode

### **How to work with the device**

Control panel made in form of door escutcheons with handle locking mechanics inside. There is no need to install any additional equipment at the door.

Reader is on outer door escutcheon in shape of small plastic enclosure.

The parts of panel are shown on Fig. 7 on the next page.



- 1. Outer escutcheon
- 2. Reader
- 3. Connection cable
- 4. Panel board
- 5. Door contact (magnetic)
- 6. Mortise lock screws
- 7. Mortise lock
- 8. Connection cable
- 9. Rectangle
- 10. Cylinder fixing screw
- 11. Inner escutcheon

- 12. Inner escutcheon cover
- 13. Escutcheons fixing screws
- 14. Battery holder cover
- 15. Battery holder cover screw
- 16. Inner handle
- 17. Handle fixing screw
- 18. Mortise lock cylinder
- 19. Inner escutcheon cover fixing screw
- 20. Battery holder

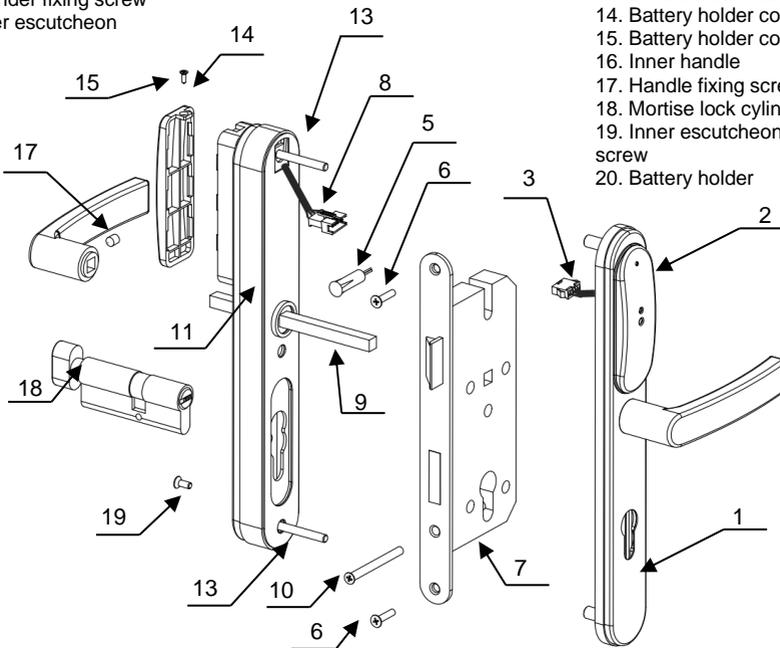
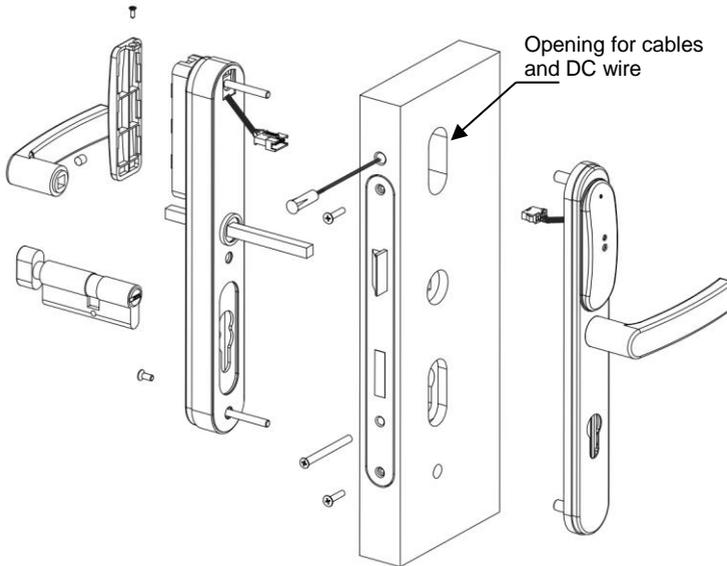


Fig. 7. Overall dimensions

### Installation sequence

1. Before installation remove old mortise lock and escutcheons, mark and drill holes and mortises in the door
2. Prepare and install the mate part of the mortise lock
3. Drill the holes in the doorpost for magnet and in the door for the magnetic door contact in the place, marked on the Fig. 8 below (optionally).
4. Install the mortise lock and fix it with screws
5. Connect magnetic door contact to the DC terminal (optionally)
6. Install the outer escutcheon 1 and run connection wire 3 through the prepared for it opening (see Fig.8)



**Fig. 8.** Cable running

7. Connect wires 3 and 8 with connector
8. Install inner escutcheon 11. Take care that rectangle 9 fell into corresponding holes in the mortise lock and outer escutcheon precisely
9. Fix inner 11 and outer 1 escutcheons with screws 13
10. Put on the cover 12 of the inner escutcheon and fix it with screw 19
11. Insert the cylinder 18 and fix it with screw 17
12. Place the inner handle 16 on the rectangle 9 and fix it with screw 17
13. Place the batteries into the battery holder 20 following the polarity marked below in this document, see Fig 9.

14. Put on the cover 14 of the battery holder 20 and fix it with screw 15
15. Add the panel to the access control system database according to the access control system manual
16. Download panel from the access control system according to the access control system manual
17. Panel is ready to operation

### Door contact connection

Panel has one terminal for door contact connection. Loop is normal when shorted that means that door is closed and signals the door opening on breakage. This input is disabled by default.

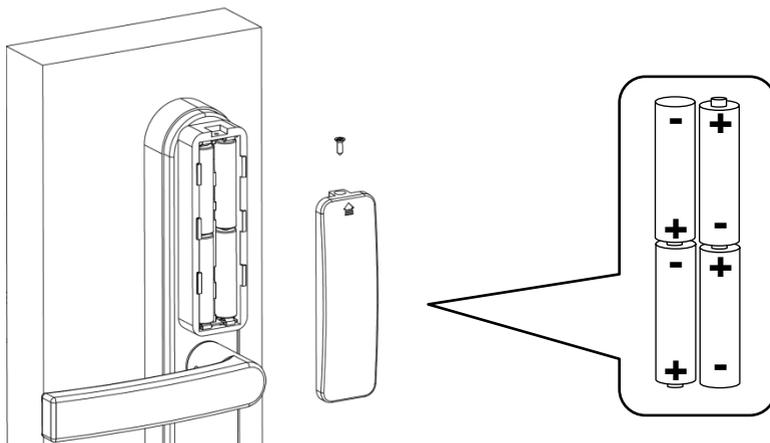
Panel defines the access point state with the door contact. It is impossible to detect the door forced open od door opened too long access point states without the door contact proper operation.

Panel generates the "Entry occurred" message on inner handle press when the door contact is absent. **To enable door contact** set the Z1 zone as 'A' door pass direction detector.

### Service maintenance

#### Battery replacement

Panel supervises the battery state. The siren sounds and LED blinks red on battery discharge. To replace batteries unscrew the screw fixing the battery holder cover, take it off, remove used batteries and install new ones (see Fig. 9.).



**Fig. 9.** Battery replacement

**Return to factory settings**

To Return to factory settings:

1. De-power control panel (remove at least one battery)
2. Press and hold FUNC button
3. Supply power to control panel (insert battery(ies))
4. Wait for 10 seconds and release FUNC button

**Factory settings**

**Input Z1 door contact**

Disabled

**Built-in reader**

Wiegand 42bits

**Emergency unlock**

In an emergency to unlock the door use keys to enter premises and inner handle or cylinder handle to exit premises.