



Access control panel

U-Prox IC L

Installation and programming manual

About this document

This manual covers installation, adjustment and use of U-Prox IC L (hereinafter panel) 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 IC L control panel - a device designed to control access to residential and business premises, including time of passage and events.

Panel operates U-Prox IP500 wireless battery powered escutcheons.

U-Prox IC L processes the information received from the U-Prox IP500 wireless battery powered escutcheons via ISM band wireless interface.

U-Prox HE and U-Prox HW repeaters are used for radio range extension. Ethernet (wired LAN) or Wi-Fi (wireless LAN) are used for U-Prox HE and U-Prox HW connection to U-Prox IC L.

The network settings of the control panel are programmed via a standard USB port (micro USB B).

The device is available in two versions: modification 1 - without the PoE (Power over Ethernet) and modification 2 - with PoE support.

U-Prox IC L supports power supply External 12V DC (+E, GND) and 802.3af PoE. Panel can connect to a Power over Ethernet (PoE) switch or injector, simplifying installation and eliminating the need for expensive additional wiring

U-Prox IC L has advanced hardware capabilities and intellectual functions to control up to 500 access points (AP) with U-Prox IP500 control panels as door devices, which have their own ID and event databases.

Thoroughly elaborated technical and design solutions, easy installation, communication over a computer Ethernet network, non-volatile memory and the clock, PoE power up ability, protecting the communication ports from short circuit, over-voltage and reverse polarity - all allows to use the panel to build a variety of Access Control Systems (ACS) - from the system for a small office to the clock house of a large enterprise.

Intended use

U-Prox IC L control panel is designated for work in U-Prox access control system for U-Prox IP500 control panel network creation.

U-Prox IC L control panel both with U-Prox HE and U-Prox HW repeaters are connected to the access control system server via computer network.

Characteristics

- Power:
 - **External power supply, 12V:**
 - Current consumption max 150 mA @ 12V
 - Maximum voltage ripple 500 ma peak to peak
 - **Micro USB B**
 - **Modification 2: IEEE 802.3af PoE:** power class 0, up to 12,95W:
 - output for powering actuators – max 12V, 0.7A
- Direct operation with U-Prox IP500 panels
 - 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 of 20 m
 - U-Prox HE and U-Prox HW repeaters for range extension
- One micro USB B port for network settings configuring and firmware upgrade
- Isolated Ethernet port, 10BASE-T/100BASE-TX, 802.3af PoE
- Adjusted with U-Prox IP software. Supports automatic configuration for one-range network.
- Real-time clock
- Non-volatile memory:

Events	35000
Connected devices	512
- 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.

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 (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.

Downloading

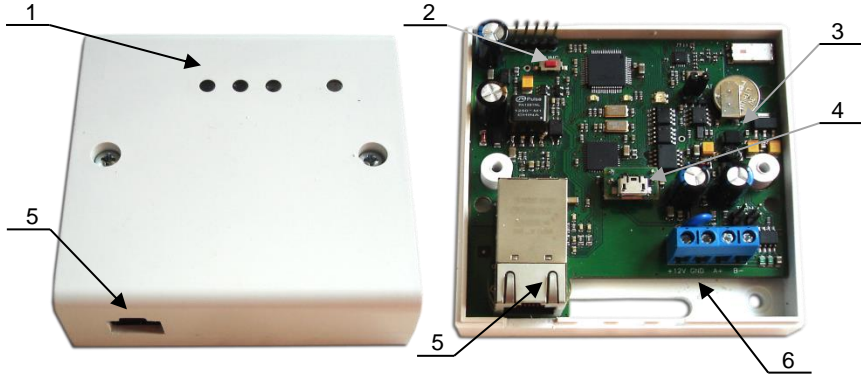
Control panel is to be downloaded after all parameters are set – modes of inputs, outputs, access rights and others. During downloading parameters are rewritten into access control panel.

Description and operation

Panel

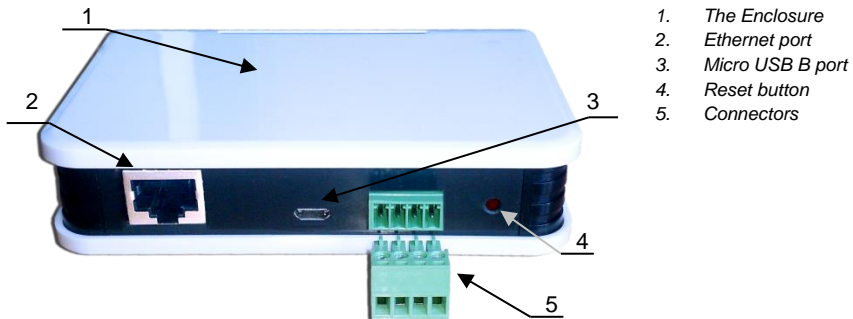
The device is available in several modifications.

The look of the control panel is shown in Fig. 1 (a and b)



1. The Enclosure
2. Reset button
3. Panel board
4. Micro USB B port
5. Ethernet port
6. Connectors

Figure 1a. U-Prox IC L modification 1



1. The Enclosure
2. Ethernet port
3. Micro USB B port
4. Reset button
5. Connectors

Figure 2b. U-Prox IC L modification 2

Location of jumpers and connectors on control panel board and their function is shown in Fig. 2 (a and b):

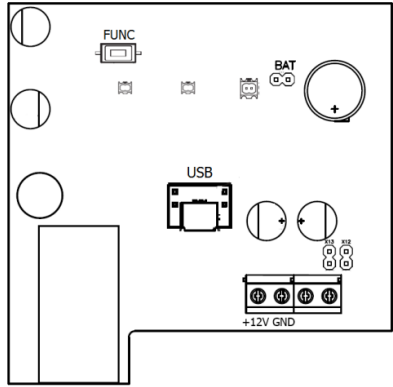


Figure 2a. U-Prox IC L board modification 1

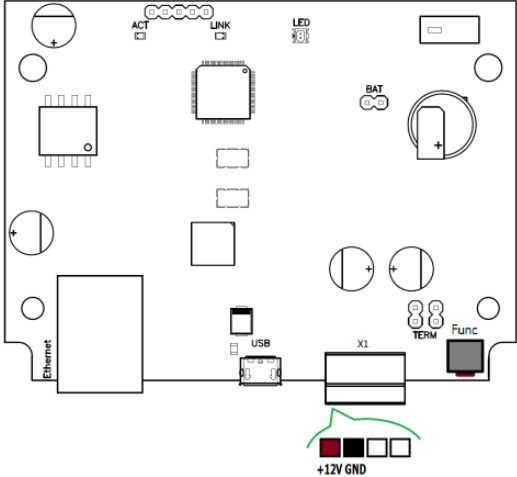


Figure 2b. U-Prox IC L board modification 2

Assignment of the access control panel

Contact	Name	Purpose
+12V	+12V	External 12V power supply connection
GND	GND	
USB Connector		
Micro USB B	USB Connector	For network settings configuration and firmware upgrade
Jumper		
BAT	BAT	For memory and Real-Time Clock backup battery switch
Button		
FUNC	FUNC	Service button

Light emitting diodes (LED's)

LED's from left to right:

Link LED

- Ethernet cable is OK when lit

Act. LED:

- Frequent flashing means data exchange

LED – bi-color LED

- Red flashes 2 times per second – no connection to the ACS server
- Green flashes once per second – connection to the ACS server is OK

Panel operation

The panels supplied unloaded with factory settings below in document. In this state, the bi-color LED on the panel flashes red twice per second. To make the panel work in access control system (ACS) you have to upload a network setting using the "Configurator" software and USB port or use the automatic adjustment mode.

Panel goes to the "Normal" mode after uploading the configuration.

To return to the factory settings use the command from the U-Prox software or with the routine described in Service Maintenance section.

In the Normal mode panel processes information from U-Prox IP500 panels received through the built-in wireless ISM band interface or via U-Prox HE and U-Prox HW repeaters. U-Prox HE and U-Prox HW repeaters and U-Prox IC L transact through Ethernet or Wi-Fi and local computer network.

Communicator operation

U-Prox IC L panel operates automatically. After the upload from the access control system server the data from the permitted repeaters and U-Prox IP500 wireless control panels processed and access event messages are sent to the access control system server.

Panel Communicator operates in **notification** mode that means that data transmission to the access control system server is initiated on the access event.

U-Prox IC L panel connected to the computer network with wired Ethernet.

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

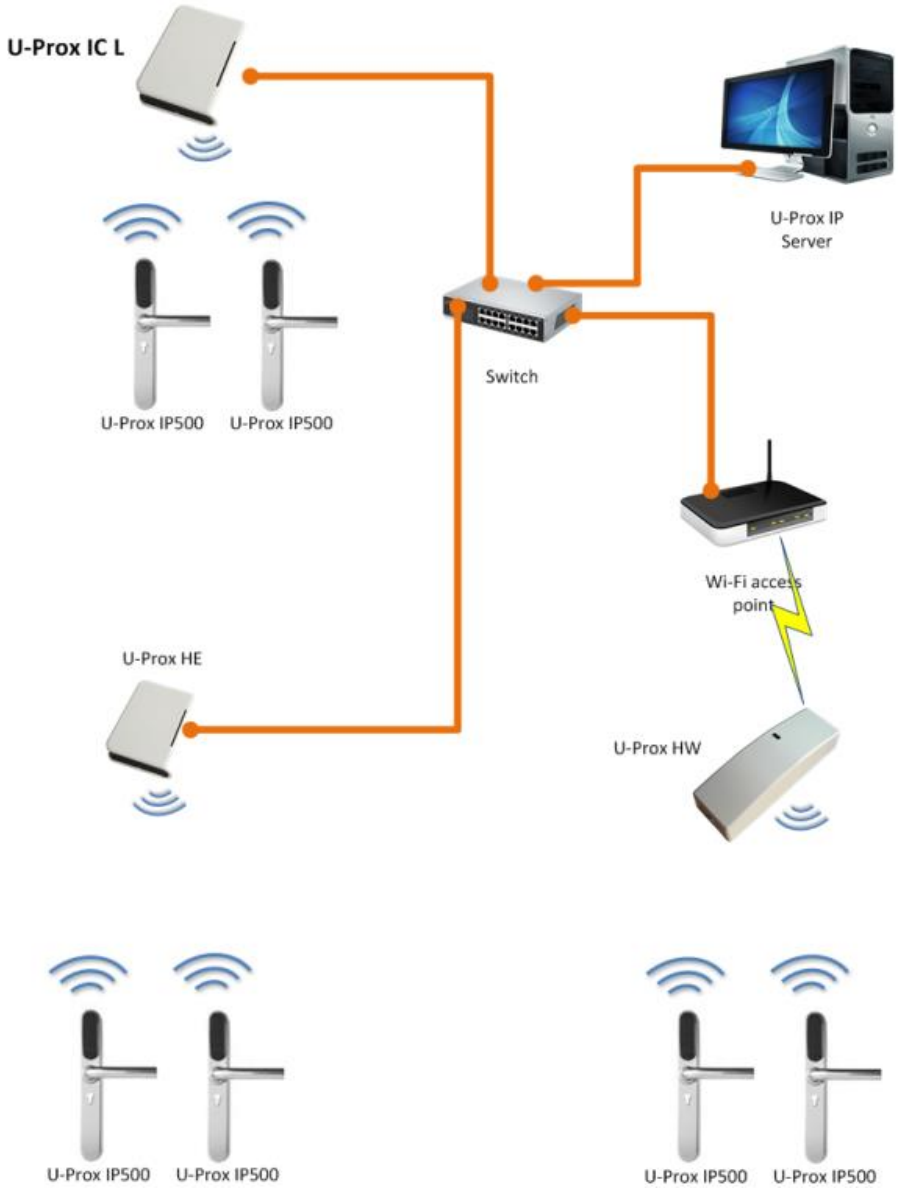


Figure 3. Mixed type (Ethernet & Wi-Fi) local network connection example

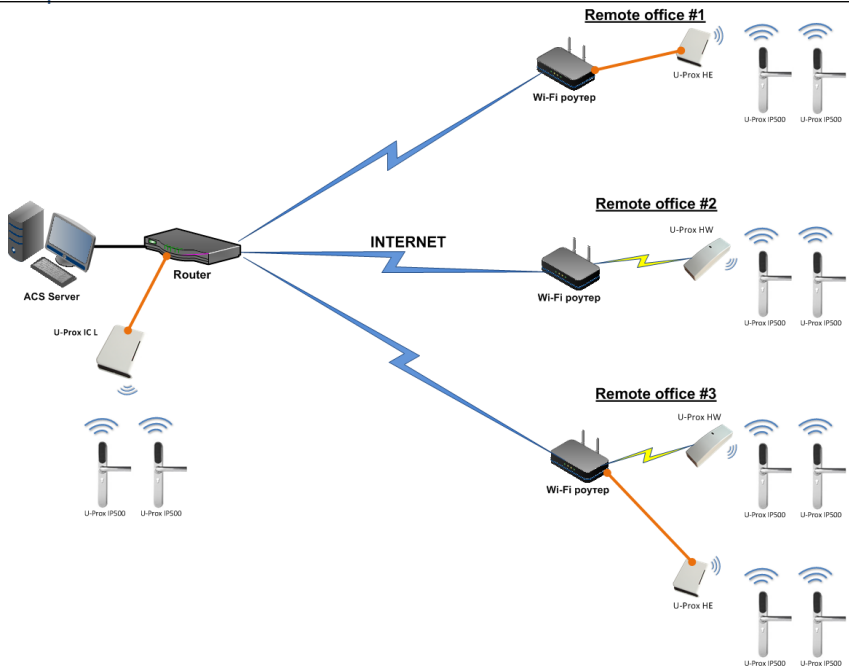


Figure 4. Distributed network example

It is highly recommended to use VPN technology for computer network connecting central office with sites for additional security.

It is highly recommended to use routers with two different technology Internet access channels fir redundancy.

Algorithm of working in LAN

1. If DHCP - obtaining IP address with the start of the access control panel
2. Update of IP status of address (announcement and extension of reserved IP, if DHCP)
3. Determine accessibility of ACS server (IP or DNS name)
4. Periodic sending of test signals
5. If there is, sending of events. Waiting for server commands.

Algorithm of operation on the Internet (local wire net)

1. If DHCP - obtaining of IP address within local network affiliate at panel launch
2. Update of status of IP addresses (announcement and extension of reserved IP, if DHCP)
3. Determine possibility of access to the Internet (accessibility of given IP address of router)

4. Determine accessibility of ACS server (IP or DNS name)
5. Periodic sending of test signals
6. If there is, send the events. Waiting for server commands.
7. Failure - transition to the second specified IP address of router.

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 IP control panel routes data from the allowed U-Prox IP500 wireless panels via U-Prox HE and U-Prox HW repeaters. The U-Prox 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.

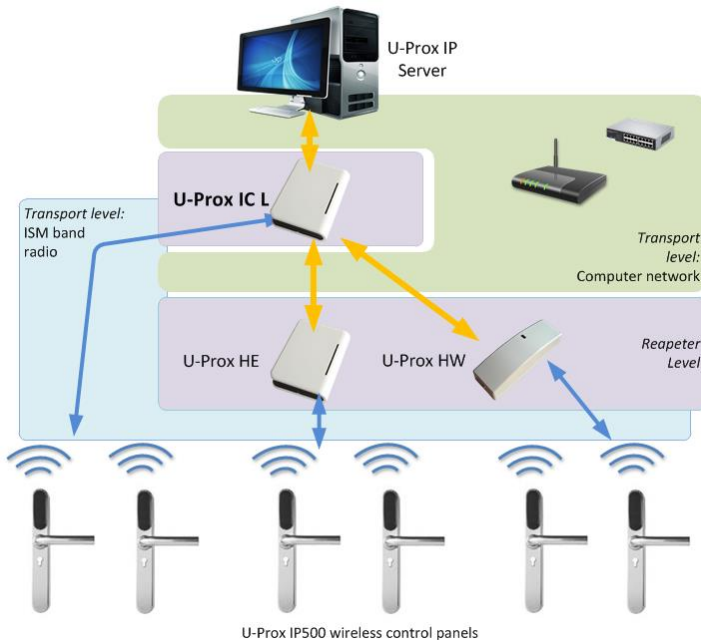


Fig. 5. Wireless lock system architecture

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

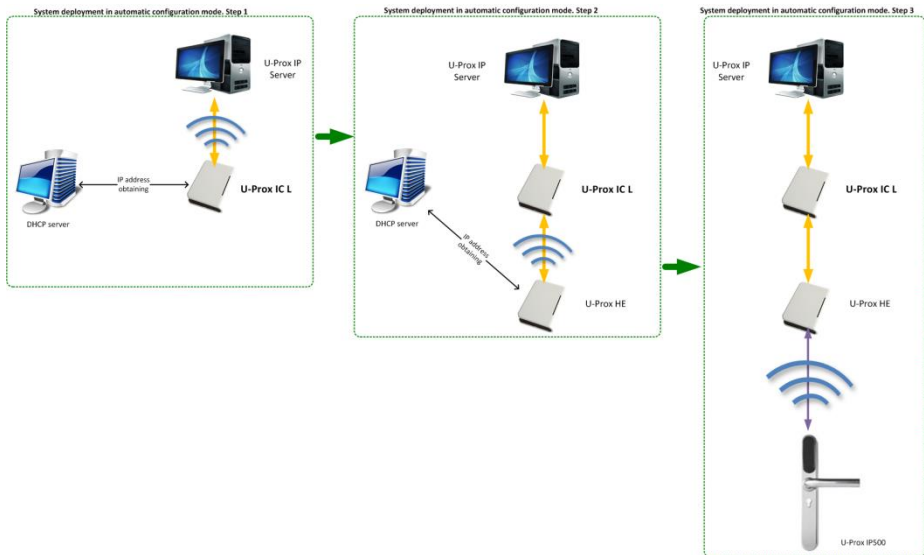


Fig. 6. Wireless lock system deployment

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 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 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

3. U-Prox IP500 returns to the normal operation mode

How to work with the device

U-Prox IC L control panel shipped in the plastic enclosure without the power supply. Dimensions marked on the Fig. 7.

Connection

1. Perform initial network setup of control panel (that specifies settings of network parameters) with utility "Configurator" via USB port before installation, if it is impossible to adjust them automatically
2. Prepare the place for installation mark and drill mounting holes (see **Mount recommendations**)
3. Perform Ethernet wiring
4. Perform power wiring if it is necessary
5. Install and fix the enclosure cover with screws
6. Connect the control panel in the U-Prox IP software (according to the software manual)

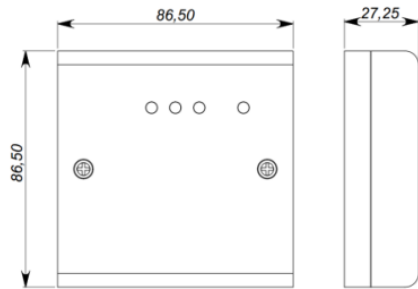


Figure 7a. Dimensions, modification 1

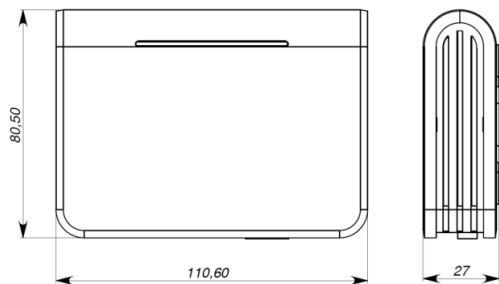


Figure 7b. Dimensions, modification 1

7. Download the control panel
8. The device is ready for operation

Mount recommendations

Place the control panel in the place, convenient for service.

To mount the control panel on the wall, perform actions:

Modification 1 (see Fig. 8a):

- Open the enclosure cover, remove the board and mark fixing holes using the enclosure bottom as template
- Pull the power wiring through the opening in the enclosure
- Fix the enclosure bottom
- Connect the power wiring

Modification 2 (see Fig. 8b):

- Perform the marking of holes using the accompanying drawing;
- Fix the enclosure;
- Connect the wires

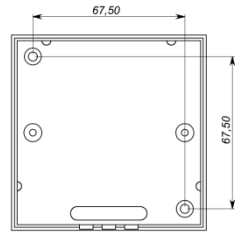


Figure 8a. Fixing holes marking, modification 1

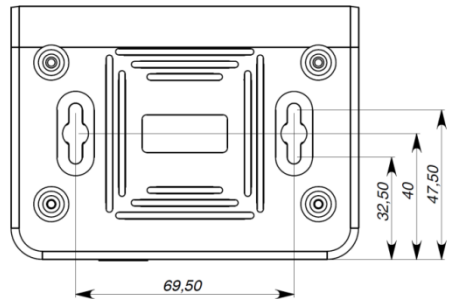


Figure 8a. Fixing holes marking, modification 2

Communication

U-Prox IC L uses wired computer network for connection to the access control system server. With computer program “Configurator” the adjustment of following parameters provided:

- static or dynamic (DHCP) IP address assign to the panel
- operation with IP or DNS (computer domain name) access control system server address
- operation in the Internet network with route backup possibility via the second redundant router

U-Prox IC L control panel operates in automatic mode. It routes event message data from the allowed U-Prox IP500 wireless panels through repeaters connected to the Ethernet computer network to the access control system server after the configuration data upload.

The panel communicator operates in the **notification** mode that means that data transmission to the access control system server is initiated on the access event.

Operating in the computer network U-Prox IC L control 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.

Wired computer network

The Ethernet interface used for device connection into the network and for device powering with PoE technology. The Ethernet cable must not exceed 100 meters without use of additional equipment. The data transmission speed is 100Mbit/sec.

The Ethernet connection examples are on the Fig.9.

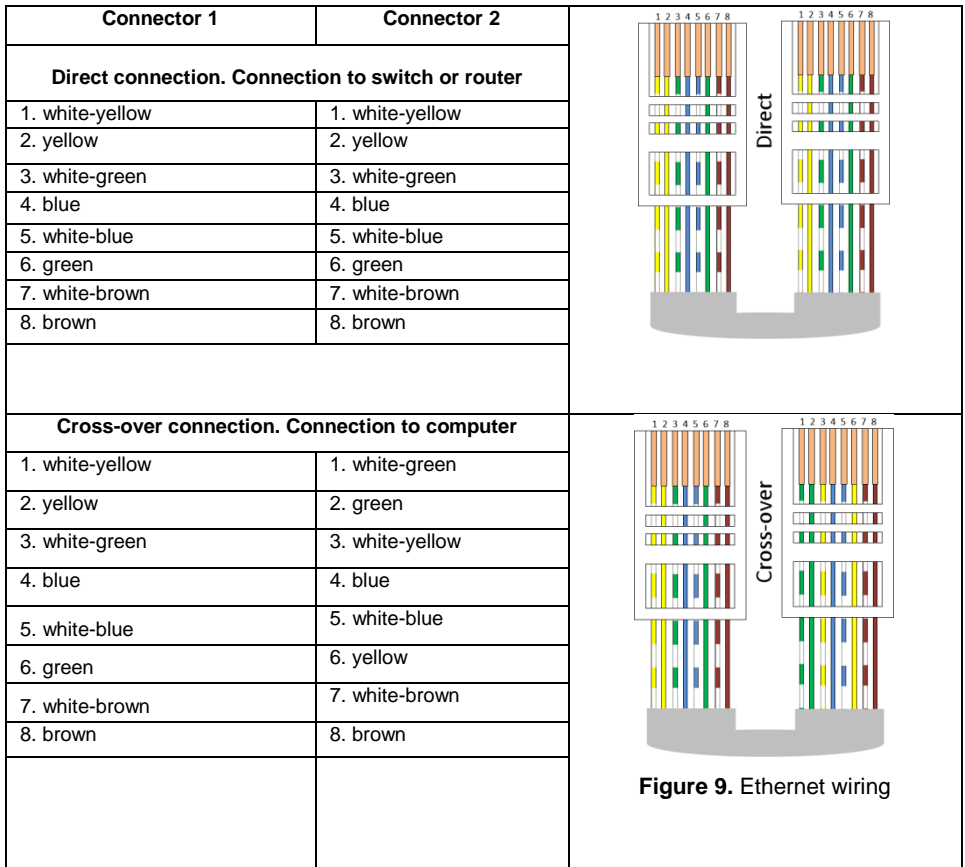


Figure 9. Ethernet wiring

To adjust panel communicator perform:

- Adjust panel network settings (don't adjust when use DHCP):

- IP address
- Subnet mask
- Gateway (router) Internet 1 IP address (no need in local network)
- Gateway (router) Internet 2 IP address (miscellaneous)
- DNS server 1 IP address (if data send to the domain name)
- DNS server 2 IP address (miscellaneous; if data send to the domain name)
- Adjust communication to the server (no need in automatic configuration mode):
 - Server 1 IP or DNS name of ACS server
 - Access ports (write port and read port)
 - Test message frequency

Panel program order

Software	Actions
<p>“Configurator” through the USB</p>	<ol style="list-style-type: none"> 1. Define desirable adjustment mode: automatic or manual 2. Adjust initial settings if manual configuration used: <ol style="list-style-type: none"> a. Server settings: IP address or server DNS name, access ports (write and read ports) <div style="border: 1px solid black; padding: 2px; margin: 5px 0;">Do not proceed paragraph b. if there is DHCP in the network</div> <ol style="list-style-type: none"> b. Panel settings: panel IP address in the computer network, subnet mask, DNS server IP address, Internet gateway
<p>U-Prox IP software</p>	<ol style="list-style-type: none"> 3. Panel connection and enrollment in access control system database (see U-Prox IP software instruction manual) 4. Panel adjustment with U-Prox IP software <ol style="list-style-type: none"> a. Repeaters enrollment b. U-Prox IP500 wireless panels enrollment 5. Upload panel from U-Prox IP software

Service maintenance

Return to factory settings

To Return to factory settings:

1. De-power control panel
2. Press and hold FUNC button
3. Supply power to control panel
4. Wait for 10 seconds, until LED diode lights and release FUNC button
5. LED diode will flash 6 times that means factory settings restored

Switching to programming mode

To put access control panel in programming mode do the following:

1. Do not turn off the power.
2. Open enclosure
3. Connect cable to the USB and configure the device using the software "Configurator"

Replacing the device firmware

1. De-power the panel
2. Remove the top cover of panel
3. Connect the notebook with USB cable to the panel
4. Using special software, do the replacement of panel firmware
5. After downloading the software to the access control panel WAIT for or 40-50 seconds. (If readers are connected wait for 6 short beeps)

Factory settings

Communicator

Ethernet mode enabled, DHCP enabled (no device IP set), no ACS server set

Reference for device installation modification 2

