Access control panel U-Prox IC A

Installation and programming manual

itv®

U-Prox

About this document

This manual covers installation, adjustment and use of U-Prox IC A (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 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

Contents

Brief description of the panel

U-Prox IC A control panel - a device designed for to organize system of global antipassback and to control access to residential and business premises.

Executing devices are control panels NDC F18 IP, U-Prox IP100, U-Prox IP300 and U-Prox IP400.

U-Prox IC A processes the information received from the NDC F18 IP, U-Prox IP100, U-Prox IP300 and U-Prox IP400 via Ethernet.

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 A 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 A has advanced hardware capabilities and intellectual functions to control up to 500 devices and up to 64 antipassback areas.

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.

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
- U-Prox IC A works with NDC F18 IP, U-Prox IP100, U-Prox IP300 and U-Prox IP400 via Ethernet.
- One USB 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	47000
Connected devices	512
Antipassback areas	64

- Temperature range: 0 -55 ^{0}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 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. NDC F18 IP use Wiegand interface.

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.

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.

Global antipassback

Tracking of identifier movement through controlled access points. The object is divisible by access areas. Passage into areas of access is possible through multiple access points. Access control panels denied access when trying to re-pass, unauthorized use of the identifier in these areas. When access is denied door control panels and the main antipassback panel generate message GLOBAL ANTIPASSBACK: Access Denied.
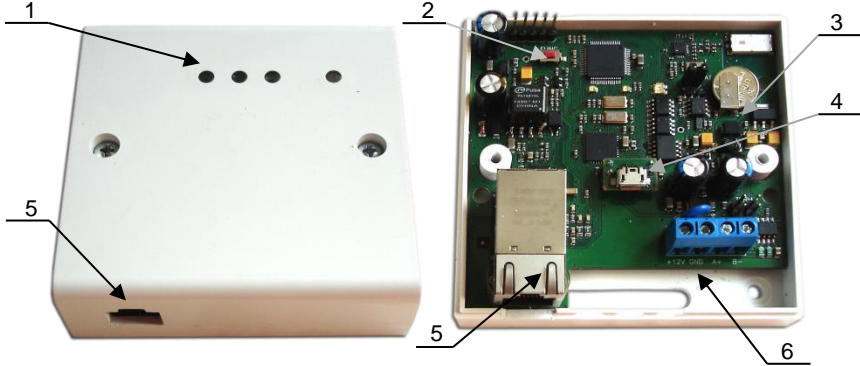
Downloading

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.
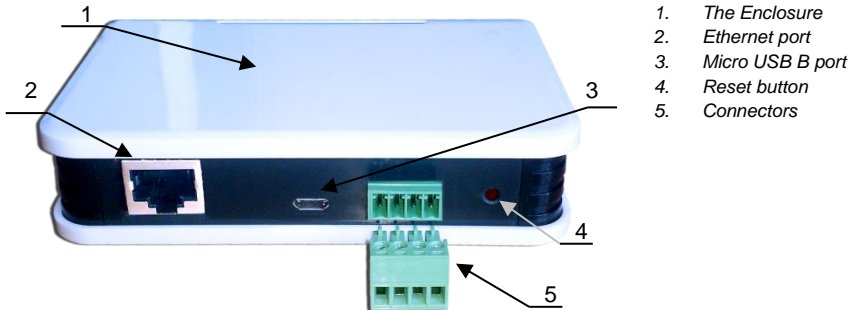
Description and operation

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 A modification 1

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

Figure 2b. U-Prox IC A modification 2

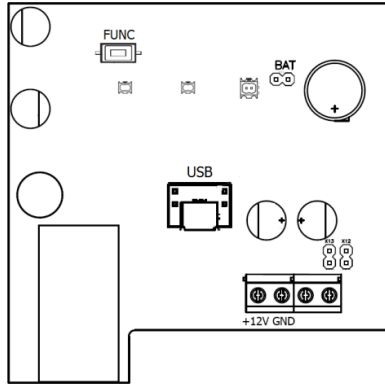Location of jumpers and connectors on control panel board and their function is shown in Fig. 2 (a and b):
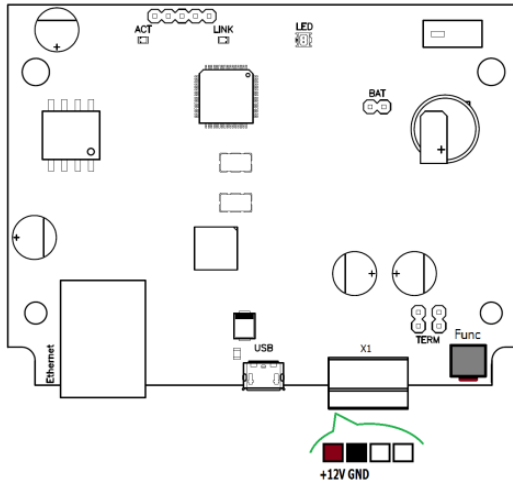
Figure 2a. U-Prox IC A board modification 1

Figure 2b. U-Prox IC A 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

Communicator operation

U-Prox IC A panel operates automatically. After the upload from the access control system server the data from the NDC F18 IP, U-Prox IP100, U-Prox IP300, U-Prox IP400 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 A panel connected to the computer network with wired Ethernet.

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.
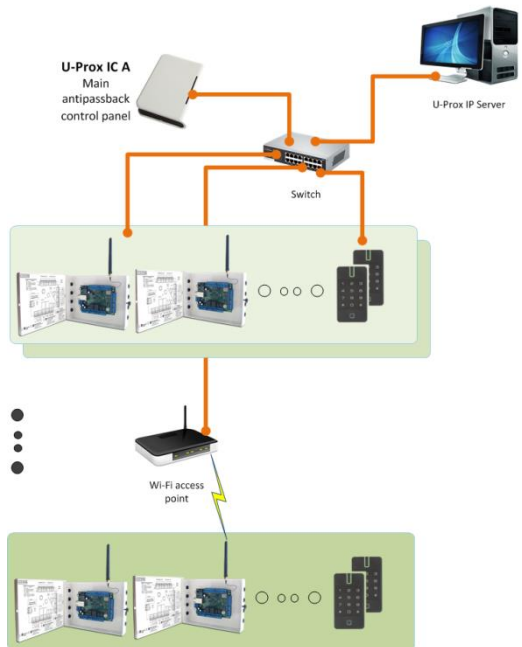
Figure 3. Mixed type (Ethernet & Wi-Fi) local network connection example
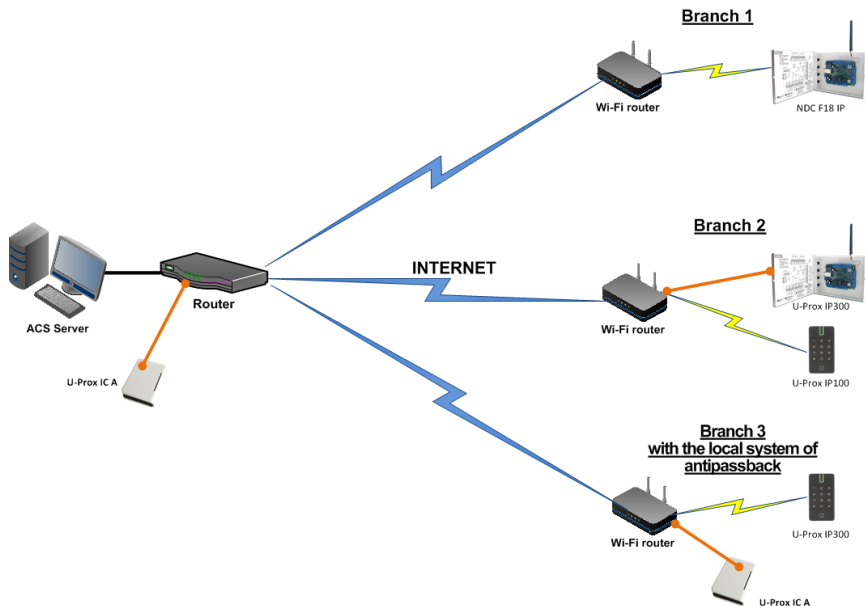
Figure 4. Distributed network example

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.

Global antipassback

The basis of the global antipassback is the zoned antipassback. The facility is divided into rooms - zones of access or areas. With this division the entrance to another area is exit from the previous one, and the passage in the area is possible through various access points.

Antipassback control panel receives data from the access control panels and tracks the movement of personnel from area to area . Also can be tracked the location of the person who has multiple IDs (See Figure 5).
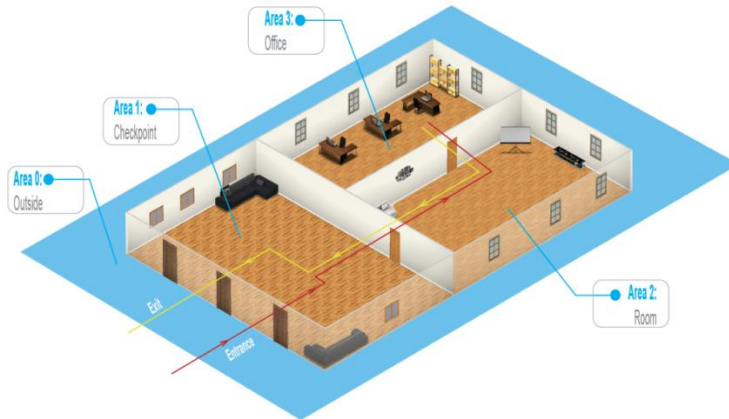

Figure 5. Allocation of access areas

Initially an employee has the location "unspecified". After the first presentation ID to a reader's location

The location "unspecified" is assigned when registering a new employee, or after the system operator command "location reset" of person is fixed by U-Prox IC A.

With the use of global antipassback it is possible to suppress passback, using duplicate card for infiltration (sudden appearance inside), transferring the ID to another person, etc (See Figure 6).
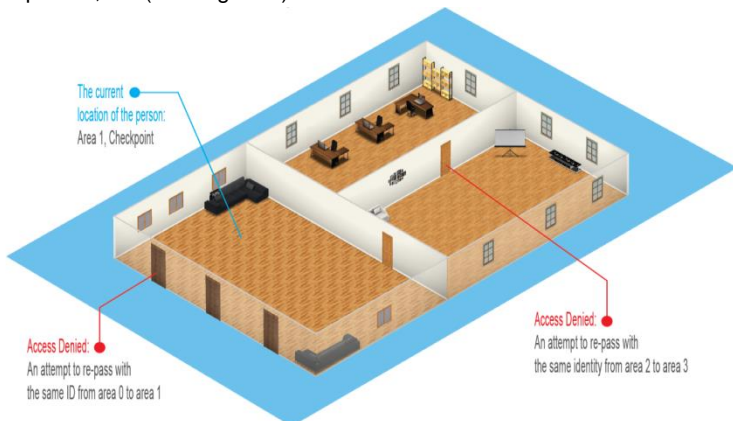

Figure 6. Tracking the violations

In case of lost communication with the access control panels, forced entry, free pass, etc. U-Prox IC A merges access areas together , considering that the personnel may be both there and there.

After restoring the normal state of access point or communication with the control panels, areas will be unmerged (See Figure 7).
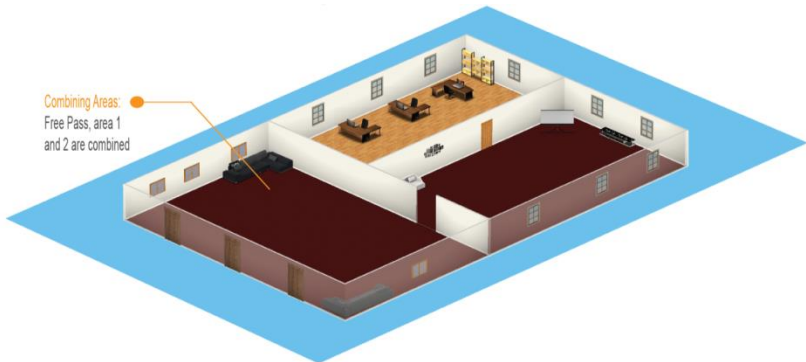

Figure 7. Merging access zones

U-Prox IP400, U-Prox IP100, U-Prox IP300, NDC F18 IP access control dialog boxes can be configured to two variants of behavior in case communication lost with U-Prox IC A:

- Not just anyone has permission to pass;
- Pass all, according to the rules of the local antipassback

The requirements for U-Prox IC A adjusting:
- The control panel must have a static address (IP or DNS)

The requirements for U-Prox IP100, U-Prox IP300, U-Prox IP400, NDC F18 IP adjusting:
- Only control panels with double-sided doors (entrance and way out on presentation of ID) can be involved in global antipassback.
- In configuring server address # 1 has to be the ACS server address.
- In configuring server address #2 has to be the address of the U-Prox IC A
- In the U-Prox IP software must be enabled antipassback mode "General" for the door
- For each access control dialog box must be specified master antipassback control panel and reaction to the deprivation of communication with him.

U-Prox IP400, U-Prox IP100, U-Prox IP300, NDC F18 IP control panels deliver events to two destinations at the same time. First one is ACS server's address, to display and store events in a database program. The second one is address of U-Prox IC A. The Antippassback control panel sends an answer with command to deny or grant access.

After ID presentation the delay in granting or denial of access may be up to 1 minutes, depending on the topology and bandwidth of the computer net

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.

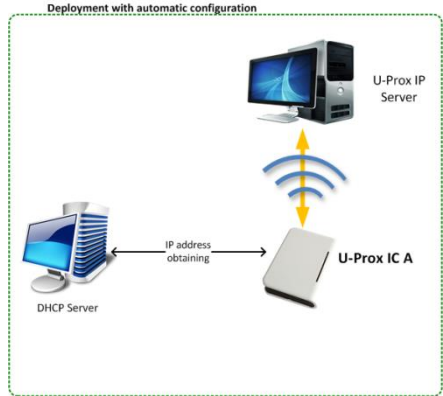The algorithms for operation on each step described below

Figure 8. System deployment

Server addresses automatic configuration for U-Prox IC A

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 single 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. 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 its adjustment recorded into the DB. Panel becomes associated to the certain access control system server, eliminating panel control capture with another system.

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

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

How to work with the device

U-Prox IC A control panel shipped in the plastic enclosure without the power supply. Dimensions marked on the Fig. 9.

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

Figure. 9a. Dimensions, modification 1

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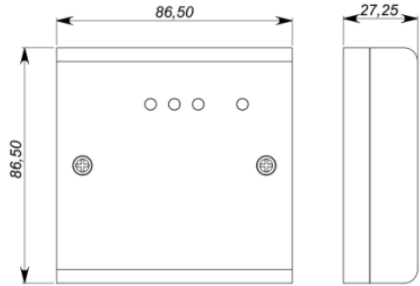7. Download the control panel
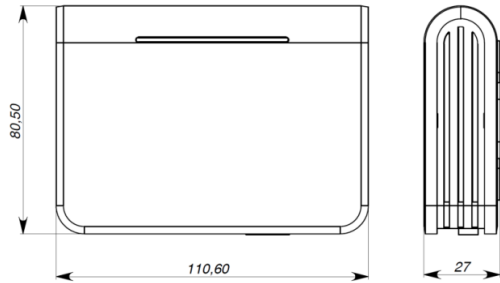8. The device is ready for operation

Figure. 9b. Dimensions, modification 2

Mount recommendations

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

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

Modifaction 1 (see Fig. 10a):

- 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
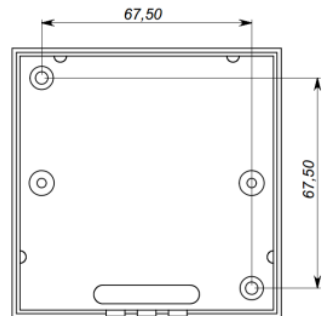- Fix the enclosure bottom
- Connect the power wiring

Figure 10a. Fixing holes marking, modification 1

Modifaction 2 (see Fig. 10b):

- Perform the marking of holes using the accompanying drawing;

- Fix the enclosure;
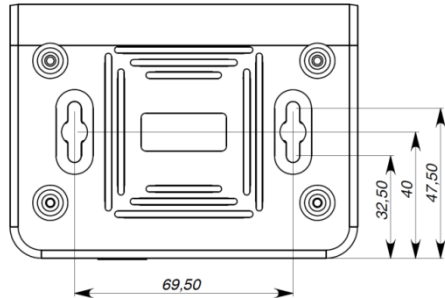
- Connect the wires

Figure 10b. Fixing holes marking, modification 2

Communication

U-Prox IC A uses wired computer networ 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 A panel operates automatically. After the upload from the access control system server the data from the NDC F18 IP, U-Prox IP100, U-Prox IP300, U-Prox IP400 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.

Operating in the computer network U-Prox IC A 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.11.

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Connector 1	Connector 2	
Direct connection. Connection to switch or router		
1. white-yellow	1. white-yellow	
2. yellow	2. yellow	
3. white-green	3. white-green	
4. blue	4. blue	
5. white-blue	5. white-blue	
6. green	6. green	
7. white-brown	7. white-brown	
8. brown	8. brown	
Cross-over connection. Connection to computer		
1. white-yellow	1. white-green	
2. yellow	2. green	
3. white-green	3. white-yellow	
4. blue	4. blue	
5. white-blue	5. white-blue	
6. green	6. yellow	
7. white-brown	7. white-brown	
8. brown	8. brown	

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
	1. Define desirable adjustment mode: automatic or manual
"Configurator" through the USB	2. Adjust initial settings if manual configuration used:
	a. Server settings: IP address or server DNS name, access ports (write and read ports)
	Do not proceed paragraph b. if there is DHCP in the network
	b. Panel settings: panel IP address in the computer network, subnet mask, DNS server IP address, Internet gateway
U-Prox IP software	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
	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
Communicatior

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

Reference for device installation modification 2